SUPPLEMENTARY MATERIAL

Thermodynamic matchers for the construction of the cuckoo RNA family

Jan Reinkensmeier[1], Robert Giegerich[1,*]

[1]Universität Bielefeld, Technische Fakultät and Center of Biotechnology, 33501 Bielefeld, Germany

[*]Correspondence to: Robert Giegerich; Email: robert@techfak.uni-bielefeld.de

This file contains:

Methods

Deriving structure and sequence characteristics for TDM modeling

The design decisions of a TDM rest on observations of the extrema of the structural features and the deviation in sequence patterns. As a consequence, two sources of information based on the already known RNAs belonging to the family under consideration are needed to parameterize a TDM: (1) a multiple structure alignment for discovering conserved sequence motifs and to obtain the consensus secondary structure and (2) individual secondary structure folds to derive the range of structural variation. Implicitly, structural variation refers to the variation of RNAs folded into the family's overall structure, not to the variation of MFE structures. Thus, in order to guarantee that a cuckoo RNA folds into the characteristic shape of the family and yet in the energetically optimal way, three auxiliary TDMs, tdm_{AUX_HP2}, tdm_{AUX_HP3}, tdm_{AUX_HP4}, one for each structural variant, were designed (**Fig. S1**).

Like RNAfold, most software tools that implement constraint folding define structure constraints on the base or base-pair level. Such constraints can be easily derived for the cuckoo family from the existing structure alignments, but we have to bear in mind that there often is an underrepresentation of base-pairs and stacking in the consensus structure for some RNAs in the alignments, causing suboptimal energies if the RNAs are folded into the consensus. Therefore, the intention to use TDMs is to enable a cuckoo RNA to fold into the family's structure and only the family's structure, but with the highest degree of freedom (as few constraints as needed). For example, the grammar of tdm_{AUX_HP2} defines two hairpins with arbitrary lengths of stems and hairpin loops. The only restriction is that in every loop the cuckoo motif must be present. Except for the motif constraint this definition is equivalent to the RNAshapes constraint folding using the most abstract level 5 (RNAshapes –C '[][]'). The grammars of the other auxiliary TDMs, tdm_{AUX_HP3} and tdm_{AUX_HP4}, define three and four hairpins, respectively, and require the cuckoo motif in one of the motif variants observed with this number of hairpins.

The auxiliary TDMs described here were applied on the 145 previously known cuckoo RNAs (**Table S5**) and the feature information that was gathered from this analysis was used to built the initial skeleton and cuckoo TDMs.

Supplementary figures

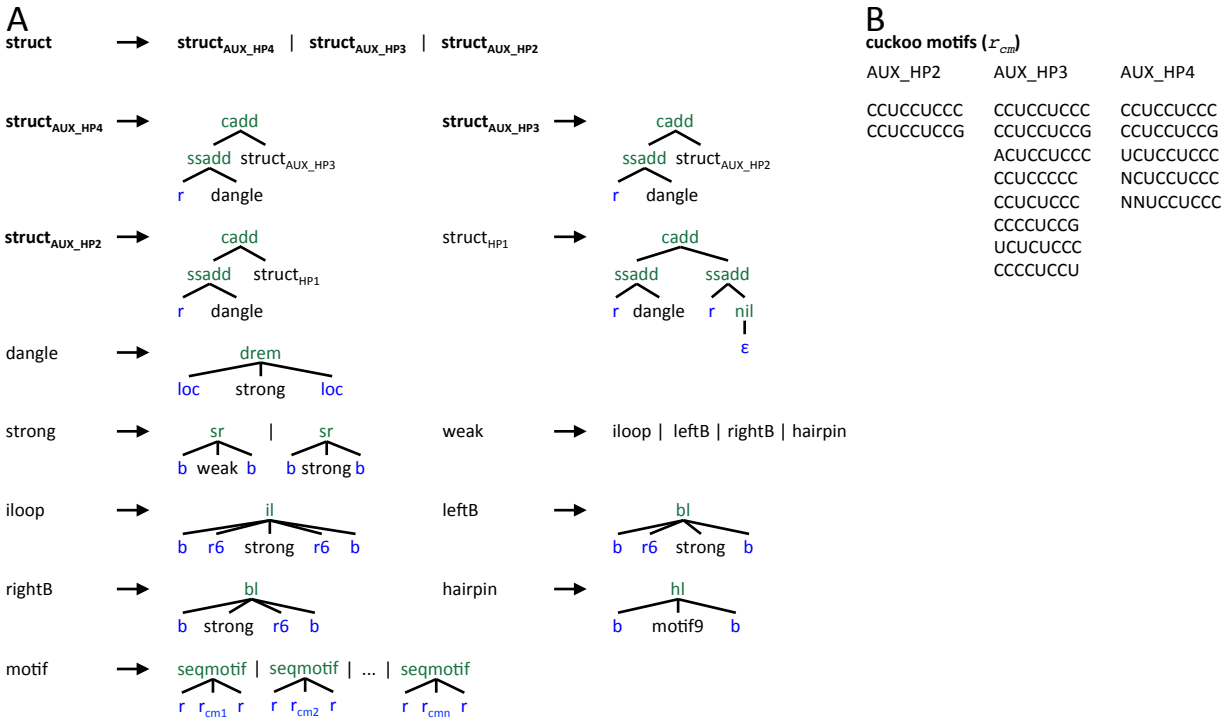


Figure S1. Unified grammar for auxiliary TDMs (A) and sequence constraints for cuckoo motifs (B). The auxiliary TDM grammars base on the same standard RNA folding grammar that is used by the cuckoo TDM grammar. $\mathtt{struct}_{\mathrm{AUX\_}X}$ is the grammars axiom, where $X \in \{HP2, HP3, HP4\}$ denotes the structural variant of a cuckoo RNA that folds into two, three or four hairpins, respectively (A). Size thresholds are applied only for helix interruptions, which are restricted to a maximum of six bases (*r6*), and the length of hairpin loops, which must be at least nine bases long (*motif9*). For each cuckoo motif in (B) an alternative production of *seqmotif* exists in the respective grammar, where r_{cm} corresponds to the cuckoo motif. The IPUAC convention is used to express cuckoo motifs.

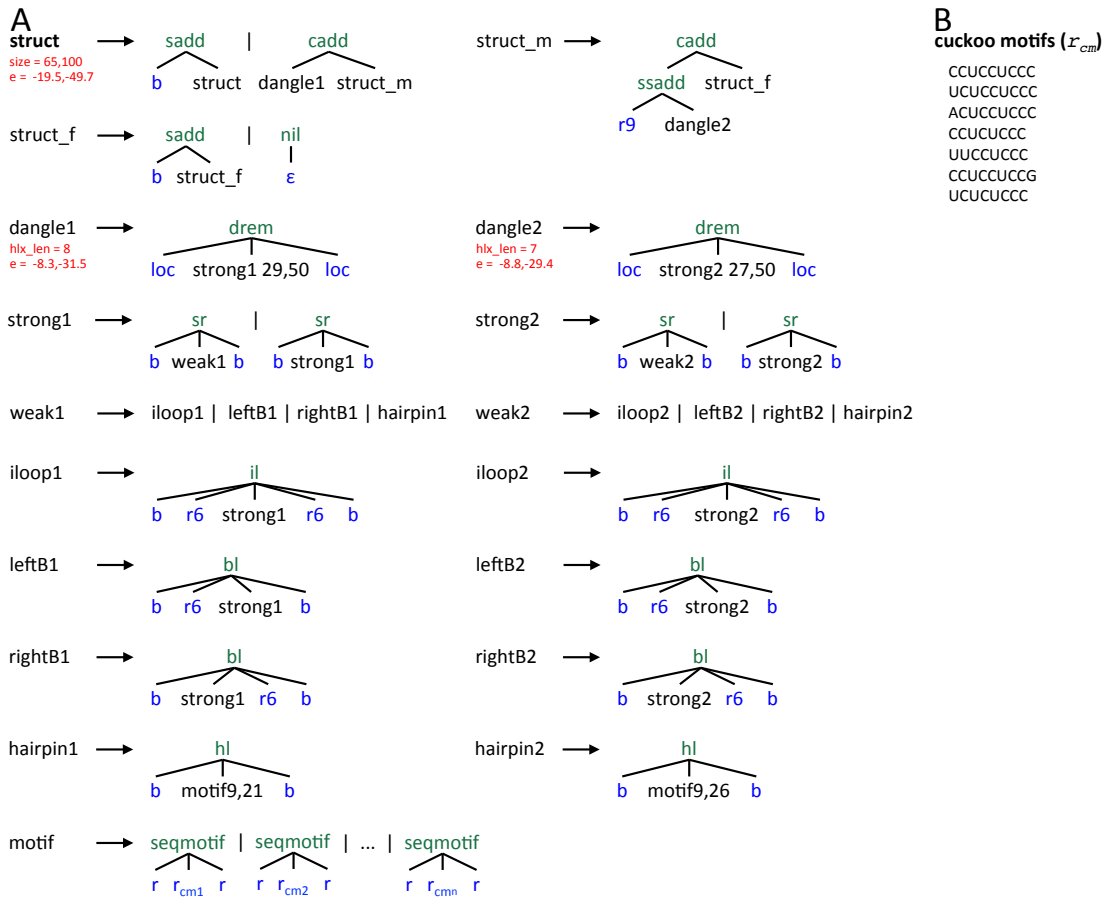


Figure S2. Grammar of HP2 cuckoo RNA specific TDM tdm_{HP2} (A) and sequence constraints for cuckoo motifs (B). Generally, the grammar of tdm_{HP2} is a less generic version of the cuckoo TDM grammar, and is tailored to cuckoo RNAs that consist of two hairpins (`struct`) (A). Both grammars apply the same algebra functions and production rules (see Methods for details). However, in order to apply specific constraints for the stem-loops separate nonterminals are defined, which are annotated at the end with a '1' for the first and a '2' for the second stem-loop. Vertical bars separate alternative productions that start at the same nonterminal. Algebra functions are colored in green and built the tree-like data structure from terminals and nonterminals. The functions call upon the energy functions of the thermodynamic model to compute free energies for the corresponding substructure. The following terminals (in blue) are used: ε denotes the empty word, `b` a single base from the RNA alphabet {`A,C,G,U`}, `r` a region of bases, and `loc` the end position of a neighbor subword. Numbers depict thresholds for size filters. A single number specifies the maximum size while two numbers determine a size range. Filter of nonterminals are colored red. Next to the helix length filter (`hlx_len`), an energy (`e`) and a global size filter (`size`) are introduced. These filter are applied either on the entire hairpin substructures (`dangle1`,

dangle2) or on the overall structure of the cuckoo RNA (*struct*). For each cuckoo motif in (B) an alternative production of *seqmotif* exists, where r_{cm} corresponds to the cuckoo motif. The IPUAC convention is used to express cuckoo motifs.

Table S1. Identified cuckoo RNAs.

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
1	Brucella abortus A13334	NC_016777	-	653262	653336	75	2
2	Brucella abortus S19	NC_010740	-	502220	502294	75	2
3	Brucella abortus bv. 1 str. 9-941	NC_006933	-	503016	503090	75	2
4	Brucella canis ATCC 23365	NC_010104	-	448045	448112	68	2
5	Brucella canis HSK A52141	NC_016796	+	347616	347683	68	2
6	Brucella melitensis ATCC 23457	NC_012442	+	693158	693235	78	2
7	Brucella melitensis M28	NC_017245	+	693239	693316	78	2
8	Brucella melitensis M5-90	NC_017247	+	693422	693500	79	2
9	Brucella melitensis NI	NC_017283	+	684915	684991	77	2
10	Brucella melitensis biovar Abortus 2308	NC_007624	-	503004	503078	75	2
11	Brucella melitensis biovar Abortus 2308	NC_007624	+	766870	766937	68	2
12	Brucella melitensis bv. 1 str. 16M	NC_003318	-	583662	583740	79	2
13	Brucella melitensis bv. 1 str. 16M	NC_003318	+	840862	840929	68	2
14	Brucella microti CCM 4915	NC_013118	-	449438	449505	68	2
15	Brucella microti CCM 4915	NC_013118	+	714994	715072	79	2
16	Brucella ovis ATCC 25840	NC_009504	+	715283	715365	83	2
17	Brucella pinnipedialis B2/94	NC_015858	+	769774	769858	85	2
18	Brucella suis 1330	NC_004311	+	714053	714140	88	2
19	Brucella suis ATCC 23445	NC_010167	+	701948	702026	79	2
20	Brucella suis VBI22	NC_016775	+	714103	714190	88	2
21	Chelativorans sp. BNC1	NC_008254	+	215078	215147	70	2
22	Chelativorans sp. BNC1	NC_008254	+	247442	247513	72	2
23	Dinoroseobacter shibae DFL 12	NC_009952	+	2630143	2630214	72	2
24	Jannaschia sp. CCS1	NC_007802	+	2789969	2790040	72	2
25	Jannaschia sp. CCS1	NC_007802	+	2790047	2790121	75	2
26	Jannaschia sp. CCS1	NC_007802	+	2790129	2790206	78	2
27	Loktanella vestfoldensis DSM 16212	ARNL01000047	+	167285	167363	79	2
28	Loktanella vestfoldensis DSM 16212	ARNL01000047	+	167366	167457	92	2
29	Loktanella vestfoldensis SKA53	AAMS01000006	+	20806	20885	80	2
30	Loktanella vestfoldensis SKA53	AAMS01000006	+	20888	20979	92	2
31	Oceanicola batsensis HTCC2597	AAMO01000006	-	253329	253403	75	2
32	Oceanicola batsensis HTCC2597	AAMO01000015	+	75594	75676	83	2
33	Oceanicola granulosus HTCC2516	AAOT01000003	+	159000	159071	72	2
34	Oceanicola granulosus HTCC2516	AAOT01000003	+	159079	159178	100	2
35	Oceanicola granulosus HTCC2516	AAOT01000003	+	159179	159271	93	2
36	Oceanicola granulosus HTCC2516	AAOT01000003	+	159276	159366	91	2
37	Octadecabacter antarcticus 307	NC_020911	-	1186564	1186643	80	2

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
38	Octadecabacter antarcticus 307	NC_020911	+	1586963	1587043	81	2
39	Octadecabacter arcticus 238	NC_020908	+	725520	725600	81	2
40	Octadecabacter arcticus 238	NC_020908	-	805823	805900	78	2
41	Octadecabacter arcticus 238	NC_020908	+	2229885	2229964	80	2
42	Paracoccus denitrificans PD1222	NC_008686	-	551382	551460	79	2
43	Paracoccus denitrificans PD1222	NC_008686	-	551461	551537	77	2
44	Paracoccus denitrificans PD1222	NC_008686	-	551548	551620	73	2
45	Paracoccus denitrificans PD1222	NC_008686	-	551632	551708	77	2
46	Parvibaculum lavamentivorans DS-1	NC_009719	-	2345729	2345812	84	2
47	Phaeobacter gallaeciensis 2.10	NC_018286	-	1028576	1028659	84	2
48	Phaeobacter gallaeciensis 2.10	NC_018286	-	1028692	1028768	77	2
49	Phaeobacter gallaeciensis DSM 17395 = CIP 105210	NC_018290	-	969366	969450	85	2
50	Phaeobacter gallaeciensis DSM 17395 = CIP 105210	NC_018290	-	969483	969559	77	2
51	Rhizobium etli CIAT 652	NC_010997	+	28126	28206	81	2
52	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011369	+	2611417	2611512	96	2
53	Rhodobacter capsulatus SB 1003	NC_014034	+	2557456	2557534	79	2
54	Rhodobacter capsulatus SB 1003	NC_014034	+	2557567	2557644	78	2
55	Rhodobacter capsulatus SB 1003	NC_014034	+	2557654	2557718	65	2
56	Rhodobacter capsulatus SB 1003	NC_014034	+	2557722	2557797	76	2
57	Rhodobacter sphaeroides 2.4.1	NC_007493	-	691712	691787	76	2
58	Rhodobacter sphaeroides 2.4.1	NC_007493	-	691826	691901	76	2
59	Rhodobacter sphaeroides 2.4.1	NC_007493	-	691940	692015	76	2
60	Rhodobacter sphaeroides 2.4.1	NC_007493	-	692055	692130	76	2
61	Rhodobacter sphaeroides 2.4.1	NC_007493	-	692169	692245	77	2
62	Rhodobacter sphaeroides 2.4.1	NC_007493	-	692284	692355	72	2
63	Rhodobacter sphaeroides 2.4.1	NC_007493	-	692386	692458	73	2
64	Rhodobacter sphaeroides ATCC 17025	NC_009428	-	686801	686877	77	2
65	Rhodobacter sphaeroides ATCC 17025	NC_009428	-	686914	686990	77	2
66	Rhodobacter sphaeroides ATCC 17025	NC_009428	-	687030	687103	74	2
67	Rhodobacter sphaeroides ATCC 17025	NC_009428	-	687134	687206	73	2
68	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775209	775284	76	2
69	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775322	775397	76	2
70	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775436	775511	76	2
71	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775550	775625	76	2
72	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775664	775739	76	2
73	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775778	775853	76	2
74	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	775892	775968	77	2
75	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	776007	776078	72	2
76	Rhodobacter sphaeroides ATCC 17029	NC_009049	-	776109	776181	73	2

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
77	Rhodobacter sphaeroides KD131	NC_011963	-	388542	388617	76	2
78	Rhodobacter sphaeroides KD131	NC_011963	-	388655	388733	79	2
79	Rhodobacter sphaeroides KD131	NC_011963	-	388773	388848	76	2
80	Rhodobacter sphaeroides KD131	NC_011963	-	388886	388961	76	2
81	Rhodobacter sphaeroides KD131	NC_011963	-	389000	389076	77	2
82	Rhodobacter sphaeroides KD131	NC_011963	-	389115	389186	72	2
83	Rhodobacter sphaeroides KD131	NC_011963	-	389217	389289	73	2
84	Roseobacter denitrificans OCh 114	NC_008209	+	3236828	3236905	78	2
85	Roseobacter denitrificans OCh 114	NC_008209	+	3236958	3237038	81	2
86	Roseobacter litoralis Och 149	NC_015730	+	2651702	2651779	78	2
87	Roseobacter litoralis Och 149	NC_015730	+	2651849	2651925	77	2
88	Roseovarius nubinhibens ISM	AALY01000001	-	1448571	1448659	89	2
89	Roseovarius nubinhibens ISM	AALY01000001	-	1795550	1795645	96	2
90	Roseovarius sp. 217	AAMV01000014	-	60809	60892	84	2
91	Roseovarius sp. 217	AAMV01000014	-	60923	61000	78	2
92	Ruegeria pomeroyi DSS-3	NC_003911	-	1229325	1229402	78	2
93	Ruegeria pomeroyi DSS-3	NC_003911	-	1229435	1229515	81	2
94	Ruegeria pomeroyi DSS-3	NC_003911	-	1229541	1229615	75	2
95	Ruegeria sp. TM1040	NC_008044	+	2128236	2128310	75	2
96	Ruegeria sp. TM1040	NC_008044	+	2128342	2128421	80	2
97	Sagittula stellata E-37	AAYA01000003	-	288749	288824	76	2
98	Sagittula stellata E-37	AAYA01000003	-	288853	288928	76	2
99	Sagittula stellata E-37	AAYA01000003	-	288952	289032	81	2
100	Sinorhizobium medicae WSM419	NC_009636	-	1974715	1974785	71	2
101	Sulfitobacter sp. EE-36	AALV01000002	+	574043	574121	79	2
102	Sulfitobacter sp. NAS-14.1	AALZ01000003	+	477443	477521	79	2
103	Sulfitobacter sp. NAS-14.1	AALZ01000014	-	12834	12913	80	2
104	Phaeobacter gallaeciensis DSM 26640	NC_023137	+	2565404	2565480	77	2
105	Phaeobacter gallaeciensis DSM 26640	NC_023137	+	2565513	2565597	85	2
106	Agrobacterium fabrum str. C58	NC_003063	+	1230300	1230420	121	3
107	Agrobacterium radiobacter K84	NC_011985	+	597906	598019	114	3
108	Agrobacterium radiobacter K84	NC_011985	-	1693286	1693404	119	3
109	Agrobacterium radiobacter K84	NC_011985	-	3945513	3945635	123	3
110	Agrobacterium sp. H13-3	NC_015183	+	109376	109491	116	3
111	Agrobacterium sp. H13-3	NC_015508	+	1615158	1615278	121	3
112	Agrobacterium vitis S4	NC_011984	+	7323	7437	115	3
113	Agrobacterium vitis S4	NC_011989	+	115128	115250	123	3
114	Agrobacterium vitis S4	NC_011989	+	2043917	2044035	119	3
115	Brucella abortus A13334	NC_016777	+	917127	917244	118	3

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
116	Brucella abortus A13334	NC_016795	-	2057998	2058103	106	3
117	Brucella abortus S19	NC_010740	+	766085	766202	118	3
118	Brucella abortus S19	NC_010742	+	358314	358419	106	3
119	Brucella abortus bv. 1 str. 9-941	NC_006932	+	359929	360034	106	3
120	Brucella canis ATCC 23365	NC_010103	+	338025	338130	106	3
121	Brucella canis HSK A52141	NC_016778	-	716263	716368	106	3
122	Brucella melitensis ATCC 23457	NC_012441	+	358980	359085	106	3
123	Brucella melitensis M28	NC_017244	+	358975	359080	106	3
124	Brucella melitensis M5-90	NC_017246	+	359228	359333	106	3
125	Brucella melitensis NI	NC_017248	+	359170	359275	106	3
126	Brucella melitensis biovar Abortus 2308	NC_007618	+	356297	356402	106	3
127	Brucella melitensis bv. 1 str. 16M	NC_003317	-	1644164	1644269	106	3
128	Brucella microti CCM 4915	NC_013119	+	339703	339808	106	3
129	Brucella ovis ATCC 25840	NC_009505	+	359686	359791	106	3
130	Brucella pinnipedialis B2/94	NC_015857	+	359797	359902	106	3
131	Brucella pinnipedialis B2/94	NC_015858	-	432926	433043	118	3
132	Brucella suis 1330	NC_004311	-	448112	448229	118	3
133	Brucella suis 1330	NC_004310	+	338022	338127	106	3
134	Brucella suis ATCC 23445	NC_010167	-	449214	449331	118	3
135	Brucella suis ATCC 23445	NC_010169	+	355561	355666	106	3
136	Brucella suis VBI22	NC_016775	-	448084	448201	118	3
137	Brucella suis VBI22	NC_016797	+	337983	338088	106	3
138	Chelativorans sp. BNC1	NC_008242	-	32194	32312	119	3
139	Chelativorans sp. BNC1	NC_008242	-	135271	135381	111	3
140	Chelativorans sp. BNC1	NC_008254	+	1916700	1916818	119	3
141	Chelativorans sp. BNC1	NC_008254	-	3977087	3977203	117	3
142	Ketogulonicigenium vulgare WSH-001	NC_017384	+	1585028	1585148	121	3
143	Ketogulonicigenium vulgare Y25	NC_014625	-	363561	363681	121	3
144	Loktanella vestfoldensis DSM 16212	ARNL01000047	+	167460	167590	131	3
145	Loktanella vestfoldensis SKA53	AAMS01000006	+	20982	21115	134	3
146	Mesorhizobium australicum WSM2073	NC_019973	+	2514219	2514328	110	3
147	Mesorhizobium australicum WSM2073	NC_019973	-	3842524	3842639	116	3
148	Mesorhizobium australicum WSM2073	NC_019973	-	3842695	3842817	123	3
149	Mesorhizobium australicum WSM2073	NC_019973	-	3842878	3842995	118	3
150	Mesorhizobium australicum WSM2073	NC_019973	+	5250476	5250594	119	3
151	Mesorhizobium ciceri biovar biserrulae WSM1271	NC_014918	-	241411	241528	118	3
152	Mesorhizobium ciceri biovar biserrulae WSM1271	NC_014923	+	2545677	2545786	110	3
153	Mesorhizobium ciceri biovar biserrulae WSM1271	NC_014923	-	3674844	3674959	116	3
154	Mesorhizobium ciceri biovar biserrulae WSM1271	NC_014923	-	3675022	3675138	117	3

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
155	Mesorhizobium ciceri biovar biserrulae WSM1271	NC_014923	-	3675192	3675313	122	3
156	Mesorhizobium ciceri biovar biserrulae WSM1271	NC_014923	+	5265891	5266010	120	3
157	Mesorhizobium loti MAFF303099	NC_002678	+	890586	890708	123	3
158	Mesorhizobium loti MAFF303099	NC_002678	+	890764	890886	123	3
159	Mesorhizobium loti MAFF303099	NC_002678	+	890945	891060	116	3
160	Mesorhizobium loti MAFF303099	NC_002678	-	4952227	4952339	113	3
161	Mesorhizobium loti MAFF303099	NC_002678	+	5350765	5350884	120	3
162	Mesorhizobium loti MAFF303099	NC_002678	-	6092422	6092540	119	3
163	Mesorhizobium opportunistum WSM2075	NC_015675	+	2663741	2663850	110	3
164	Mesorhizobium opportunistum WSM2075	NC_015675	-	4112140	4112256	117	3
165	Mesorhizobium opportunistum WSM2075	NC_015675	-	4112319	4112435	117	3
166	Mesorhizobium opportunistum WSM2075	NC_015675	-	4112500	4112616	117	3
167	Mesorhizobium opportunistum WSM2075	NC_015675	+	5830416	5830540	125	3
168	Oceanicola granulosus HTCC2516	AAOT01000003	+	159369	159502	134	3
169	Ochrobactrum anthropi ATCC 49188	NC_009667	+	448505	448616	112	3
170	Ochrobactrum anthropi ATCC 49188	NC_009668	-	273977	274099	123	3
171	Ochrobactrum anthropi ATCC 49188	NC_009668	+	274692	274808	117	3
172	Ochrobactrum anthropi ATCC 49188	NC_009668	+	1275653	1275770	118	3
173	Octadecabacter arcticus 238	NC_020908	-	805678	805816	139	3
174	Pelagibacterium halotolerans B2	NC_016078	+	2112639	2112774	136	3
175	Pelagibacterium halotolerans B2	NC_016078	+	2112938	2113067	130	3
176	Polymorphum gilvum SL003B-26A1	NC_015259	-	2331457	2331575	119	3
177	Rhizobium etli CFN 42	NC_007761	+	462572	462689	118	3
178	Rhizobium etli CFN 42	NC_007761	-	1926237	1926353	117	3
179	Rhizobium etli CFN 42	NC_007761	-	4314389	4314500	112	3
180	Rhizobium etli CFN 42	NC_007766	+	22825	22932	108	3
181	Rhizobium etli CIAT 652	NC_010994	+	513999	514116	118	3
182	Rhizobium etli CIAT 652	NC_010994	-	1912478	1912592	115	3
183	Rhizobium etli CIAT 652	NC_010994	-	4444891	4445011	121	3
184	Rhizobium etli bv. mimosae str. Mim1	NC_021905	+	460364	460481	118	3
185	Rhizobium etli bv. mimosae str. Mim1	NC_021905	-	1884349	1884464	116	3
186	Rhizobium etli bv. mimosae str. Mim1	NC_021905	-	4217281	4217392	112	3
187	Rhizobium etli bv. mimosae str. Mim1	NC_021911	+	23172	23285	114	3
188	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012848	+	112606	112722	117	3
189	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012850	+	107069	107186	118	3
190	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012850	-	1697043	1697151	109	3
191	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012850	-	4296637	4296748	112	3
192	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011368	-	306341	306452	112	3
193	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011369	+	98056	98173	118	3

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
194	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011369	-	1534501	1534616	116	3
195	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011369	-	4019331	4019445	115	3
196	Rhizobium leguminosarum bv. viciae 3841	NC_008378	+	407204	407312	109	3
197	Rhizobium leguminosarum bv. viciae 3841	NC_008380	+	512664	512781	118	3
198	Rhizobium leguminosarum bv. viciae 3841	NC_008380	-	2174961	2175069	109	3
199	Rhizobium leguminosarum bv. viciae 3841	NC_008380	-	4988043	4988157	115	3
200	Rhizobium tropici CIAT 899	NC_020059	+	542312	542433	122	3
201	Rhizobium tropici CIAT 899	NC_020059	-	1631584	1631703	120	3
202	Rhizobium tropici CIAT 899	NC_020059	-	3775245	3775367	123	3
203	Sagittula stellata E-37	AAYA01000003	-	288595	288722	128	3
204	Sinorhizobium fredii HH103	NC_016812	-	1359348	1359467	120	3
205	Sinorhizobium fredii HH103	NC_016812	-	1359641	1359757	117	3
206	Sinorhizobium fredii HH103	NC_016812	+	4014538	4014654	117	3
207	Sinorhizobium fredii HH103	NC_016815	-	233468	233581	114	3
208	Sinorhizobium fredii HH103	NC_018299	+	158094	158203	110	3
209	Sinorhizobium fredii HH103	NT_187148	+	158094	158203	110	3
210	Sinorhizobium fredii NGR234	NC_012586	+	2205316	2205429	114	3
211	Sinorhizobium fredii NGR234	NC_012587	-	1434171	1434291	121	3
212	Sinorhizobium fredii NGR234	NC_012587	-	1434465	1434581	117	3
213	Sinorhizobium fredii NGR234	NC_012587	+	3720582	3720698	117	3
214	Sinorhizobium fredii USDA 257	NC_018000	+	1713249	1713362	114	3
215	Sinorhizobium fredii USDA 257	NC_018000	-	3752633	3752757	125	3
216	Sinorhizobium fredii USDA 257	NC_018000	-	3752930	3753043	114	3
217	Sinorhizobium fredii USDA 257	NC_018000	+	5733804	5733912	109	3
218	Sinorhizobium fredii USDA 257	NC_018000	+	6267166	6267283	118	3
219	Sinorhizobium fredii USDA 257	NC_018191	+	159232	159341	110	3
220	Sinorhizobium medicae WSM419	NC_009620	-	679042	679158	117	3
221	Sinorhizobium medicae WSM419	NC_009636	-	1258034	1258158	125	3
222	Sinorhizobium medicae WSM419	NC_009636	-	1258315	1258426	112	3
223	Sinorhizobium medicae WSM419	NC_009636	-	3590302	3590414	113	3
224	Sinorhizobium meliloti 1021	NC_003037	+	1220693	1220806	114	3
225	Sinorhizobium meliloti 1021	NC_003047	-	206865	206977	113	3
226	Sinorhizobium meliloti 1021	NC_003047	-	1667488	1667611	124	3
227	Sinorhizobium meliloti 1021	NC_003047	-	1667771	1667886	116	3
228	Sinorhizobium meliloti 1021	NC_003078	+	1605828	1605944	117	3
229	Sinorhizobium meliloti 2011	NC_020527	+	1219031	1219144	114	3
230	Sinorhizobium meliloti 2011	NC_020528	-	206866	206978	113	3
231	Sinorhizobium meliloti 2011	NC_020528	-	1667197	1667320	124	3
232	Sinorhizobium meliloti 2011	NC_020528	-	1667480	1667595	116	3

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
233	Sinorhizobium meliloti 2011	NC_020560	+	1605843	1605959	117	3
234	Sinorhizobium meliloti AK83	NC_015590	-	1369797	1369920	124	3
235	Sinorhizobium meliloti AK83	NC_015590	-	1370080	1370195	116	3
236	Sinorhizobium meliloti AK83	NC_015590	-	3626930	3627042	113	3
237	Sinorhizobium meliloti AK83	NC_015596	-	574044	574160	117	3
238	Sinorhizobium meliloti AK83	NC_015597	+	172172	172288	117	3
239	Sinorhizobium meliloti BL225C	NC_017322	-	1231897	1232020	124	3
240	Sinorhizobium meliloti BL225C	NC_017322	-	1232180	1232295	116	3
241	Sinorhizobium meliloti BL225C	NC_017322	-	3479601	3479713	113	3
242	Sinorhizobium meliloti BL225C	NC_017323	-	1376421	1376537	117	3
243	Sinorhizobium meliloti GR4	NC_019845	-	201602	201714	113	3
244	Sinorhizobium meliloti GR4	NC_019845	-	1637016	1637139	124	3
245	Sinorhizobium meliloti GR4	NC_019845	-	1637299	1637414	116	3
246	Sinorhizobium meliloti GR4	NC_019849	-	141338	141454	117	3
247	Sinorhizobium meliloti Rm41	NC_018683	-	532712	532828	117	3
248	Sinorhizobium meliloti Rm41	NC_018700	-	1308437	1308560	124	3
249	Sinorhizobium meliloti Rm41	NC_018700	-	1308720	1308835	116	3
250	Sinorhizobium meliloti Rm41	NC_018700	-	3485604	3485716	113	3
251	Sinorhizobium meliloti Rm41	NC_018701	-	135189	135305	117	3
252	Sinorhizobium meliloti SM11	NC_017325	+	2001062	2001177	116	3
253	Sinorhizobium meliloti SM11	NC_017325	+	2001337	2001460	124	3
254	Sinorhizobium meliloti SM11	NC_017325	-	3713437	3713549	113	3
255	Sinorhizobium meliloti SM11	NC_017326	-	141142	141258	117	3
256	Agrobacterium fabrum str. C58	NC_003062	+	109477	109645	169	4
257	Agrobacterium fabrum str. C58	NC_003063	+	1831446	1831604	159	4
258	Agrobacterium radiobacter K84	NC_011983	+	957654	957810	157	4
259	Agrobacterium radiobacter K84	NC_011983	-	1921118	1921278	161	4
260	Agrobacterium radiobacter K84	NC_011987	-	138502	138658	157	4
261	Agrobacterium sp. H13-3	NC_015508	-	164001	164157	157	4
262	Agrobacterium sp. H13-3	NC_015508	-	244664	244817	154	4
263	Agrobacterium vitis S4	NC_011988	-	598435	598589	155	4
264	Agrobacterium vitis S4	NC_011988	+	901000	901158	159	4
265	Agrobacterium vitis S4	NC_011989	-	2793811	2793967	157	4
266	Brucella abortus A13334	NC_016795	+	1527400	1527550	151	4
267	Brucella abortus S19	NC_010742	-	888878	889028	151	4
268	Brucella abortus bv. 1 str. 9-941	NC_006932	-	890577	890727	151	4
269	Brucella canis ATCC 23365	NC_010103	-	867218	867368	151	4
270	Brucella canis HSK A52141	NC_016778	+	185975	186125	151	4
271	Brucella melitensis ATCC 23457	NC_012441	-	890344	890494	151	4

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
272	Brucella melitensis M28	NC_017244	-	890289	890439	151	4
273	Brucella melitensis M5-90	NC_017246	-	890603	890753	151	4
274	Brucella melitensis NI	NC_017248	-	886872	887022	151	4
275	Brucella melitensis biovar Abortus 2308	NC_007618	-	886855	887005	151	4
276	Brucella melitensis bv. 1 str. 16M	NC_003317	+	1116628	1116778	151	4
277	Brucella microti CCM 4915	NC_013119	-	873050	873200	151	4
278	Brucella ovis ATCC 25840	NC_009505	-	895750	895898	149	4
279	Brucella pinnipedialis B2/94	NC_015857	-	897286	897436	151	4
280	Brucella suis 1330	NC_004310	-	868834	868984	151	4
281	Brucella suis ATCC 23445	NC_010169	-	888714	888864	151	4
282	Brucella suis VBI22	NC_016797	-	868801	868951	151	4
283	Oceanicola batsensis HTCC2597	AAMO01000006	-	253121	253287	167	4
284	Ochrobactrum anthropi ATCC 49188	NC_009667	+	2453942	2454091	150	4
285	Octadecabacter antarcticus 307	NC_020911	-	1086719	1086896	178	4
286	Octadecabacter antarcticus 307	NC_020911	-	1955581	1955758	178	4
287	Octadecabacter antarcticus 307	NC_020911	-	1992343	1992520	178	4
288	Octadecabacter antarcticus 307	NC_020911	+	3698830	3699006	177	4
289	Octadecabacter arcticus 238	NC_020908	-	670324	670504	181	4
290	Octadecabacter arcticus 238	NC_020908	+	2787008	2787181	174	4
291	Octadecabacter arcticus 238	NC_020908	+	3179240	3179417	178	4
292	Paracoccus aminophilus JCM 7686	NC_022041	+	2655475	2655630	156	4
293	Paracoccus aminophilus JCM 7686	NC_022041	+	2655655	2655805	151	4
294	Paracoccus denitrificans PD1222	NC_008686	-	551203	551352	150	4
295	Polymorphum gilvum SL003B-26A1	NC_015259	-	2332074	2332228	155	4
296	Pseudovibrio sp. FO-BEG1	NC_016642	+	3461369	3461532	164	4
297	Rhizobium etli CFN 42	NC_004041	+	77637	77794	158	4
298	Rhizobium etli CFN 42	NC_007765	-	443012	443161	150	4
299	Rhizobium etli CIAT 652	NC_010994	+	1173479	1173639	161	4
300	Rhizobium etli CIAT 652	NC_010996	+	112261	112418	158	4
301	Rhizobium etli CIAT 652	NC_010998	-	345903	346054	152	4
302	Rhizobium etli bv. mimosae str. Mim1	NC_021908	-	449725	449873	149	4
303	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012848	+	265906	266069	164	4
304	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012852	+	119283	119433	151	4
305	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012854	-	2286	2441	156	4
306	Rhizobium leguminosarum bv. trifolii WSM1325	NC_012858	+	28612	28768	157	4
307	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011366	+	50780	50933	154	4
308	Rhizobium leguminosarum bv. trifolii WSM2304	NC_011368	+	607606	607759	154	4
309	Rhizobium leguminosarum bv. viciae 3841	NC_008384	-	574470	574626	157	4
310	Rhizobium tropici CIAT 899	NC_020062	+	1038279	1038431	153	4

# Cuckoo RNA	Species	Replicon	Strand	Position		Length	# Cuckoo Modules
311	Sinorhizobium medicae WSM419	NC_009621	+	316270	316428	159	4
312	Sinorhizobium medicae WSM419	NC_009621	+	338831	338988	158	4
313	Sinorhizobium meliloti 1021	NC_003037	-	1328176	1328333	158	4
314	Sinorhizobium meliloti 2011	NC_020527	-	1326513	1326670	158	4
315	Sinorhizobium meliloti AK83	NC_015591	+	252033	252190	158	4
316	Sinorhizobium meliloti BL225C	NC_017324	-	293093	293250	158	4
317	Sinorhizobium meliloti GR4	NC_019848	+	24154	24311	158	4
318	Sinorhizobium meliloti Rm41	NC_018683	+	26268	26425	158	4
319	Sinorhizobium meliloti SM11	NC_017327	+	29162	29319	158	4
320	Sulfitobacter sp. EE-36	AALV01000002	+	574555	574727	173	4
321	Sulfitobacter sp. NAS-14.1	AALZ01000003	+	477955	478127	173	4

Table S2. Synteny and genomic context of cuckoo RNAs.

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE							RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
1	CIN1	Brucellaceae	OG1	653418	653564	-	CDS	BAA13334_II01032	hypothetical protein								OG15	652016	653245	+	CDS	BAA13334_II01030	flavorubredoxin reductase
2	CIN1	Brucellaceae	OG1	502376	502534	-	CDS	BAbS19_II04820	hypothetical protein								OG15	500974	502203	+	CDS	BAbS19_II04810	pyridine nucleotide-disulfide oxidoreductase family protein
3	CIN1	Brucellaceae	OG1	503172	503330	-	CDS	BruAb2_0503	hypothetical protein								OG15	501770	502999	+	CDS	BruAb2_0502	pyridine nucleotide-disulfide oxidoreductase
4	CIN6	Brucellaceae	OG14	448555	449274	+	CDS	BCAN_B0464	TetR family transcriptional regulator		448064	448252	+	CDS	BCAN_B0463	hypothetical protein	OG13	446920	447978	+	CDS	BCAN_B0462	hypothetical protein
5	CIN6	Brucellaceae	OG14	346454	347173	-	CDS	BCAS2141_II0534	regulatory protein LysR								OG13	347750	348814	-	CDS	BCAS2141_II0535	hypothetical protein
6	CIN1	Brucellaceae	OG1	692918	693076	+	CDS	BMEA_B0706	hypothetical protein									694594	695436	-	CDS	BMEA_B0708	RpiR family transcriptional regulator
7	CIN1	Brucellaceae	OG1	693002	693157	+	CDS	BM28_B0696	hypothetical protein	OG15	693277	694563	-	CDS	BM28_B0697	pyridine nucleotide-disulfide oxidoreductase		694675	695517	-	CDS	BM28_B0698	transcriptional regulator
8	CIN1	Brucellaceae	OG1	693194	693340	+	CDS	BM590_B0694	hypothetical protein		693374	694747	-	CDS	BM590_B0695	rhodocoxin reductase		694859	695701	-	CDS	BM590_B0696	transcriptional regulator
9	CIN1	Brucellaceae	OG1	684687	684833	+	CDS	BMNI_II0677	hypothetical protein		684901	686238	-	CDS	BMNI_II0678	rhodocoxin reductase		686350	687192	-	CDS	BMNI_II0679	transcriptional regulator
10	CIN1	Brucellaceae	OG1	503160	503318	-	CDS	BAB2_0512	hypothetical protein								OG15	501758	502987	+	CDS	BAB2_0511	pyridine nucleotide-disulfide oxidoreductase class-II
11	CIN6	Brucellaceae	OG14	765708	766427	-	CDS	BAB2_0774	transcriptional regulator TetR		766730	766918	-	CDS	BAB2_0775	hypothetical protein	OG13	767004	768062	-	CDS	BAB2_0776	hypothetical protein
12		Brucellaceae		584622	585725	+	CDS	BMEII0559	glycine cleavage system aminomethyltransferase T									583439	583645	+	CDS	BMEII0558	rhodocoxin reductase
13	CIN6	Brucellaceae	OG14	839700	840419	-	CDS	BMEII0804	TETR family transcriptional regulator		840722	841036	-	CDS	BMEII0805	hypothetical protein	OG13	840996	842054	-	CDS	BMEII0806	transmembrane protein
14	CIN6	Brucellaceae	OG14	449948	450667	+	CDS	BMI_II459	TetR family transcriptional regulator		449457	449645	+	CDS	BMI_II458	hypothetical protein	OG13	448313	449371	+	CDS	BMI_II457	hypothetical protein
15	CIN1	Brucellaceae	OG1	714754	714912	+	CDS	BMI_II721	hypothetical protein								OG15	715085	716314	-	CDS	BMI_II722	pyridine nucleotide-disulfide oxidoreductase family protein
16	CIN1	Brucellaceae	OG1	715043	715201	+	CDS	BOV_A0682	hypothetical protein								OG15	715378	716607	-	CDS	BOV_A0683	pyridine nucleotide-disulfide oxidoreductase family protein
17	CIN1	Brucellaceae	OG1	769534	769692	+	CDS	BPI_II781	hypothetical protein								OG15	769871	771100	-	CDS	BPI_II782	pyridine nucleotide-disulfide oxidoreductase family protein
18	CIN1	Brucellaceae	OG1	713813	713971	+	CDS	BS1330_II0721	hypothetical protein								OG15	714153	715382	-	CDS	BS1330_II0722	pyridine nucleotide-disulfide oxidoreductase family protein
19	CIN1	Brucellaceae	OG1	701709	701867	+	CDS	BSUIS_B0720	hypothetical protein								OG15	702039	703268	-	CDS	BSUIS_B0721	hypothetical protein
20	CIN1	Brucellaceae	OG1	713863	714021	+	CDS	BSVBI22_B0720	hypothetical protein								OG15	714203	715432	-	CDS	BSVBI22_B0721	pyridine nucleotide-disulfide oxidoreductase family protein
21		Phyllobacteriaceae		214571	215014	+	CDS	Meso_0172	phasin									215234	215310	+	tRNA	Meso_R0004	tRNA-His
22		Phyllobacteriaceae		247150	247416	+	CDS	Meso_0212	hypothetical protein									247697	247972	+	CDS	Meso_0213	hypothetical protein
23	CIN1	Rhodobacteraceae		2628776	2629864	-	CDS	Dshi_2476	hypothetical protein								OG2	2630248	2630712	-	CDS	Dshi_2477	putative leucine-responsive regulatory protein
24	CIN1	Rhodobacteraceae	OG1	2789478	2789852	+	CDS	Jann_2773	hypothetical protein								OG2	2790224	2790676	-	CDS	Jann_2774	AsnC family transcriptional regulator
25	CIN1	Rhodobacteraceae	OG1	2789478	2789852	+	CDS	Jann_2773	hypothetical protein								OG2	2790224	2790676	-	CDS	Jann_2774	AsnC family transcriptional regulator
26	CIN1	Rhodobacteraceae	OG1	2789478	2789852	+	CDS	Jann_2773	hypothetical protein								OG2	2790224	2790676	-	CDS	Jann_2774	AsnC family transcriptional regulator
27		Rhodobacteraceae																					
28		Rhodobacteraceae																					
29	CIN1	Rhodobacteraceae	OG1	20582	20797	+	CDS	SKA53_07326	hypothetical protein								OG2	21202	21663	-	CDS	SKA53_07331	transcriptional regulator, AsnC family
30	CIN1	Rhodobacteraceae	OG1	20582	20797	+	CDS	SKA53_07326	hypothetical protein								OG2	21202	21663	-	CDS	SKA53_07331	transcriptional regulator, AsnC family

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE						RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position	Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
31	CIN1	Rhodobacteraceae	OG1	253412	253627	-	CDS	OB2597_16115	hypothetical protein							OG17	250382	252970	+	CDS	OB2597_16110	Putative uvrD/DNA Helicase II
32		Rhodobacteraceae		74835	75470	+	CDS	OB2597_18721	hypothetical protein								76073	80383	+	CDS	OB2597_18726	putative methylase/helicase
33	CIN1	Rhodobacteraceae	OG1	158763	158990	+	CDS	OG2516_05838	hypothetical protein								159616	160842	-	CDS	OG2516_05843	heat shock protein, Hsp70 family protein
34	CIN1	Rhodobacteraceae	OG1	158763	158990	+	CDS	OG2516_05838	hypothetical protein								159616	160842	-	CDS	OG2516_05843	heat shock protein, Hsp70 family protein
35	CIN1	Rhodobacteraceae	OG1	158763	158990	+	CDS	OG2516_05838	hypothetical protein								159616	160842	-	CDS	OG2516_05843	heat shock protein, Hsp70 family protein
36	CIN1	Rhodobacteraceae	OG1	158763	158990	+	CDS	OG2516_05838	hypothetical protein								159616	160842	-	CDS	OG2516_05843	heat shock protein, Hsp70 family protein
37	CIN1	Rhodobacteraceae		1186838	1187056	-	CDS	OAN307_c11810	hypothetical protein							OG2	1186093	1186545	+	CDS	OAN307_c11800	putative AsnC family transcriptional regulator
38		Rhodobacteraceae		1586475	1586957	+	CDS	OAN307_c15980	hypothetical protein								1587107	1587649	+	CDS	OAN307_c15990	putative PHB synthesis repressor protein
39		Rhodobacteraceae		725064	725513	+	CDS	OA238_c06950	hypothetical protein								725663	726205	+	CDS	OA238_c06960	putative PHB synthesis repressor protein
40	CIN1	Rhodobacteraceae		805909	806127	-	CDS	OA238_c07730	hypothetical protein							OG2	805130	805633	+	CDS	OA238_c07720	putative AsnC family transcriptional regulator
41		Rhodobacteraceae		2228456	2229466	-	CDS	OA238_c21140	putative IS481 family integrase								2230121	2230318	-	CDS	OA238_c21150	hypothetical protein
42	CIN1	Rhodobacteraceae	OG1	551716	552015	-	CDS	Pden_0580	hypothetical protein								550394	551167	-	CDS	Pden_0579	hypothetical protein
43	CIN1	Rhodobacteraceae	OG1	551716	552015	-	CDS	Pden_0580	hypothetical protein								550394	551167	-	CDS	Pden_0579	hypothetical protein
44	CIN1	Rhodobacteraceae	OG1	551716	552015	-	CDS	Pden_0580	hypothetical protein								550394	551167	-	CDS	Pden_0579	hypothetical protein
45	CIN1	Rhodobacteraceae	OG1	551716	552015	-	CDS	Pden_0580	hypothetical protein								550394	551167	-	CDS	Pden_0579	hypothetical protein
46		Rhodobiaceae		2346100	2346174	+	tRNA	Plav_R0027	tRNA-Glu								2343868	2345316	-	CDS	Plav_2164	RluA family pseudouridine synthase
47	CIN1	Rhodobacteraceae	OG1	1028770	1028988	-	CDS	PGA2_c09350	hypothetical protein							OG17	1026054	1028414	+	CDS	PGA2_c09340	DNA helicase II UvrD
48	CIN1	Rhodobacteraceae	OG1	1028770	1028988	-	CDS	PGA2_c09350	hypothetical protein							OG17	1026054	1028414	+	CDS	PGA2_c09340	DNA helicase II UvrD
49	CIN1	Rhodobacteraceae	OG1	969561	969779	-	CDS	PGA1_c09460	hypothetical protein							OG17	966842	969205	+	CDS	PGA1_c09450	DNA helicase II UvrD
50	CIN1	Rhodobacteraceae	OG1	969561	969779	-	CDS	PGA1_c09460	hypothetical protein							OG17	966842	969205	+	CDS	PGA1_c09450	DNA helicase II UvrD
51		Rhizobiaceae		27340	27705	-	CDS	RHECIAT_PC0000026	hypothetical protein								28423	28803	+	CDS	RHECIAT_PC0000027	putative glutathione-dependent formaldehyde-activating protein
52		Rhizobiaceae		2609131	2610966	-	CDS	Rleg2_2571	peptidase M24								2611835	2612713	-	CDS	Rleg2_2573	50S ribosomal protein L11 methyltransferase
53	CIN1	Rhodobacteraceae	OG1	2557251	2557454	+	CDS	RCAP_rcc02385	hypothetical protein								2557937	2558734	+	CDS	RCAP_rcc02386	hypothetical protein
54	CIN1	Rhodobacteraceae	OG1	2557251	2557454	+	CDS	RCAP_rcc02385	hypothetical protein								2557937	2558734	+	CDS	RCAP_rcc02386	hypothetical protein
55	CIN1	Rhodobacteraceae	OG1	2557251	2557454	+	CDS	RCAP_rcc02385	hypothetical protein								2557937	2558734	+	CDS	RCAP_rcc02386	hypothetical protein
56	CIN1	Rhodobacteraceae	OG1	2557251	2557454	+	CDS	RCAP_rcc02385	hypothetical protein								2557937	2558734	+	CDS	RCAP_rcc02386	hypothetical protein
57	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
58	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
59	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
60	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
61	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
62	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
63	CIN1	Rhodobacteraceae	OG1	692464	692679	-	CDS	RSP_6037	hypothetical protein							OG18	690398	691543	-	CDS	RSP_2091	benzoate transporter, BenE
64	CIN1	Rhodobacteraceae	OG1	687212	687427	-	CDS	Rsph17025_0680	hypothetical protein							OG18	685502	686647	-	CDS	Rsph17025_0679	benzoate transporter
65	CIN1	Rhodobacteraceae	OG1	687212	687427	-	CDS	Rsph17025_0680	hypothetical protein							OG18	685502	686647	-	CDS	Rsph17025_0679	benzoate transporter
66	CIN1	Rhodobacteraceae	OG1	687212	687427	-	CDS	Rsph17025_0680	hypothetical protein							OG18	685502	686647	-	CDS	Rsph17025_0679	benzoate transporter
67	CIN1	Rhodobacteraceae	OG1	687212	687427	-	CDS	Rsph17025_0680	hypothetical protein							OG18	685502	686647	-	CDS	Rsph17025_0679	benzoate transporter
68	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein							OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
69	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein							OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
70	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein							OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
71	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein							OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE							RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
72	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein								OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
73	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein								OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
74	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein								OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
75	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein								OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
76	CIN1	Rhodobacteraceae	OG1	776187	776402	-	CDS	Rsph17029_0768	hypothetical protein								OG18	773895	775040	-	CDS	Rsph17029_0767	benzoate transporter
77	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
78	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
79	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
80	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
81	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
82	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
83	CIN1	Rhodobacteraceae	OG1	389295	389447	-	CDS	RSKD131_0402	hypothetical protein								OG18	387228	388373	-	CDS	RSKD131_0401	Benzoate transporter
84	CIN1	Rhodobacteraceae	OG1	3236591	3236827	+	CDS	RD1_3372	hypothetical protein									3237115	3237792	-	CDS	RD1_3373	hypothetical protein
85	CIN1	Rhodobacteraceae	OG1	3236591	3236827	+	CDS	RD1_3372	hypothetical protein									3237115	3237792	-	CDS	RD1_3373	hypothetical protein
86	CIN1	Rhodobacteraceae		2650174	2651247	-	CDS	RLO149_c025820	hypothetical protein	OG1	2651466	2651705	+	CDS	RLO149_c025830	hypothetical protein		2651998	2652699	-	CDS	RLO149_c025840	hypothetical protein
87	CIN1	Rhodobacteraceae	OG1	2651466	2651705	+	CDS	RLO149_c025830	hypothetical protein									2651998	2652699	-	CDS	RLO149_c025840	hypothetical protein
88	CIN1	Rhodobacteraceae	OG1	1448664	1448888	-	CDS	ISM_07085	hypothetical protein									1447445	1448407	+	CDS	ISM_07080	Sugar phosphate Isomerase
89		Rhodobacteraceae		1795806	1796783	-	CDS	ISM_08740	hypothetical protein									1794506	1795438	-	CDS	ISM_08735	Putative transporter, AEC family protein
90	CIN1	Rhodobacteraceae	OG1	61009	61233	-	CDS	ROS217_16875	hypothetical protein									60216	60506	+	CDS	ROS217_16870	hypothetical protein
91	CIN1	Rhodobacteraceae	OG1	61009	61233	-	CDS	ROS217_16875	hypothetical protein									60216	60506	+	CDS	ROS217_16870	hypothetical protein
92	CIN1	Rhodobacteraceae	OG1	1229631	1229855	-	CDS	SPO1177	hypothetical protein									1228427	1229203	-	CDS	SPO1176	Ser/Thr protein phosphatase
93	CIN1	Rhodobacteraceae	OG1	1229631	1229855	-	CDS	SPO1177	hypothetical protein									1228427	1229203	-	CDS	SPO1176	Ser/Thr protein phosphatase
94	CIN1	Rhodobacteraceae	OG1	1229631	1229855	-	CDS	SPO1177	hypothetical protein									1228427	1229203	-	CDS	SPO1176	Ser/Thr protein phosphatase
95	CIN1	Rhodobacteraceae	OG1	2128003	2128224	+	CDS	TM1040_2023	hypothetical protein								OG17	2128764	2131208	-	CDS	TM1040_2024	ATP-dependent DNA helicase Rep
96	CIN1	Rhodobacteraceae	OG1	2128003	2128224	+	CDS	TM1040_2023	hypothetical protein								OG17	2128764	2131208	-	CDS	TM1040_2024	ATP-dependent DNA helicase Rep
97	CIN1	Rhodobacteraceae	OG1	289036	289251	-	CDS	SSE37_24084	hypothetical protein									285278	288367	-	CDS	SSE37_24079	valyl-tRNA synthetase
98	CIN1	Rhodobacteraceae	OG1	289036	289251	-	CDS	SSE37_24084	hypothetical protein									285278	288367	-	CDS	SSE37_24079	valyl-tRNA synthetase
99	CIN1	Rhodobacteraceae	OG1	289036	289251	-	CDS	SSE37_24084	hypothetical protein									285278	288367	-	CDS	SSE37_24079	valyl-tRNA synthetase
100		Rhizobiaceae		1975071	1975880	-	CDS	Smed_1916	hypothetical protein									1974057	1974461	-	CDS	Smed_1915	hypothetical protein
101	CIN1	Rhodobacteraceae		572745	573815	-	CDS	EE36_17022	Putative Mrp (Multidrug resistance-associated proteins) family protein		574053	574133	-	CDS	EE36_17027	hypothetical protein	OG1	574330	574542	+	CDS	EE36_17032	hypothetical protein
102	CIN1	Rhodobacteraceae		476145	477215	-	CDS	NAS141_07243	Putative Mrp (Multidrug resistance-associated proteins) family protein								OG1	477730	477942	+	CDS	NAS141_07248	hypothetical protein
103		Rhodobacteraceae		13199	14455	+	CDS	NAS141_04568	putative sigma-54-dependent transcriptional regulator									10870	12810	+	CDS	NAS141_04563	type IV secretion system coupling protein
104		Rhodobacteraceae		2565184	2565402	+	CDS	Gal_02545	putative small protein								OG17	2565748	2568159	-	CDS	Gal_02546	Superfamily I DNA and RNA helicase
105		Rhodobacteraceae		2565184	2565402	+	CDS	Gal_02545	putative small protein								OG17	2565748	2568159	-	CDS	Gal_02546	Superfamily I DNA and RNA helicase
106		Rhizobiaceae		1229427	1230176	+	CDS	Atu4110	serine dehydrogenase		1230231	1230494	+	CDS	Atu4111	hypothetical protein		1230719	1231906	+	CDS	Atu4112	proline dipeptidase
107	CIN5	Rhizobiaceae	OG3	596785	597666	+	CDS	Arad_0725	oxidoreductase								OG4	598187	599503	+	CDS	Arad_0727	hypothetical protein
108	CIN1	Rhizobiaceae		1693731	1694870	+	CDS	Arad_2145	hypothetical protein								OG1	1692677	1692823	-	CDS	Arad_2144	hypothetical protein
109	CIN2	Rhizobiaceae	OG6	3946044	3946844	+	CDS	Arad_4883	molybdate ABC transporter substrate-binding protein		3945517	3945657	+	CDS	Arad_4881	hypothetical protein	OG5	3944888	3945469	+	CDS	Arad_4880	nicotinic acid mononucleotide adenylyltransferase
110		Rhizobiaceae		108794	109252	-	CDS	AGROH133_02958	hypothetical protein		109262	109456	-	CDS	AGROH133_02959	hypothetical protein		109733	109942	+	CDS	AGROH133_02961	cold shock protein
111		Rhizobiaceae		1614286	1615035	+	CDS	AGROH133_12938	serine dehydrogenase		1615057	1615386	+	CDS	AGROH133_12939	hypothetical protein		1615591	1616778	+	CDS	AGROH133_12940	proline dipeptidase
112		Rhizobiaceae		6113	7192	+	CDS	Avi_9007	two component sensor kinase									7500	8633	-	CDS	Avi_9008	phage integrase family protein
113		Rhizobiaceae		113190	114716	-	CDS	Avi_0122	sulfatase		114968	115156	-	CDS	Avi_0125	hypothetical protein		115395	116840	+	CDS	Avi_0126	phosphomannomutase
114		Rhizobiaceae		2042548	2043660	-	CDS	Avi_2480	membrane protein									2044292	2044441	+	CDS	Avi_2481	hypothetical protein
115	CIN6	Brucellaceae	OG14	915965	916684	-	CDS	BAA13334_II01436	regulatory protein LysR								OG13	917303	918367	-	CDS	BAA13334_II01437	permease
116	CIN5	Brucellaceae	OG16	2058328	2059035	-	CDS	BAA13334_I03398	LrgB-like protein								OG4	2056541	2057788	-	CDS	BAA13334_I03396	hypothetical protein

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE						RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
117	CIN6	Brucellaceae	OG14	764923	765642	-	CDS	BAbS19_II07190	regulatory protein TetR								OG13	766261	767346	-	CDS	BAbS19_II07200	hypothetical protein
118	CIN5	Brucellaceae	OG16	357382	358089	+	CDS	BAbS19_I03260	LrgB-like protein								OG4	358635	359876	+	CDS	BAbS19_I03270	esterase/lipase/thioesterase
119	CIN5	Brucellaceae	OG16	358997	359704	+	CDS	BruAb1_0352	hypothetical protein								OG4	360250	361491	+	CDS	BruAb1_0354	lipoprotein
120	CIN5	Brucellaceae	OG16	337093	337800	+	CDS	BCAN_A0335	LrgB family protein		337974	338309	+	CDS	BCAN_A0336	hypothetical protein	OG4	338347	339588	+	CDS	BCAN_A0337	hypothetical protein
121	CIN5	Brucellaceae	OG16	716593	717300	-	CDS	BCA52141_I1159	LrgB family protein								OG4	714805	716052	-	CDS	BCA52141_I1158	hypothetical protein
122	CIN5	Brucellaceae	OG16	358048	358755	+	CDS	BMEA_A0364	LrgB family protein		358929	359264	+	CDS	BMEA_A0365	hypothetical protein	OG4	359302	360543	+	CDS	BMEA_A0366	hypothetical protein
123	CIN5	Brucellaceae	OG16	358043	358750	+	CDS	BM28_A0358	LrgB family protein								OG4	359291	360538	+	CDS	BM28_A0359	esterase/lipase/thioesterase
124	CIN5	Brucellaceae	OG16	358296	359003	+	CDS	BM590_A0355	LrgB family protein								OG4	359550	360791	+	CDS	BM590_A0356	hypothetical protein
125	CIN5	Brucellaceae	OG16	358238	358945	+	CDS	BMNI_I0353	hypothetical protein								OG4	359486	360733	+	CDS	BMNI_I0354	lipoprotein
126	CIN5	Brucellaceae	OG16	355365	356072	+	CDS	BAB1_0356	LrgB-like protein								OG4	356618	357859	+	CDS	BAB1_0358	esterase/lipase/thioesterase
127	CIN5	Brucellaceae	OG16	1644494	1645201	-	CDS	BMEI1596	LrgB protein		1643985	1644371	-	CDS	BMEI1595	hypothetical protein	OG4	1642706	1643914	-	CDS	BMEI1594	hypothetical protein
128	CIN5	Brucellaceae	OG16	338771	339478	+	CDS	BMI_I332	LrgB family protein		339601	339987	+	CDS	BMI_I333	hypothetical protein	OG4	340025	341266	+	CDS	BMI_I334	lipoprotein, putative
129	CIN5	Brucellaceae	OG16	358754	359461	+	CDS	BOV_0342	hypothetical protein									361342	361653	+	CDS	BOV_0344	transposase OrfA
130	CIN5	Brucellaceae	OG16	358865	359572	+	CDS	BPI_I361	LrgB family protein		359695	360081	+	CDS	BPI_I362	hypothetical protein	OG4	360119	361360	+	CDS	BPI_I363	lipoprotein
131	CIN6	Brucellaceae	OG14	433486	434205	+	CDS	BPI_II444	TetR family transcriptional regulator		432995	433183	+	CDS	BPI_II443	hypothetical protein	OG13	431809	432867	+	CDS	BPI_II442	hypothetical protein
132	CIN6	Brucellaceae	OG14	448672	449391	+	CDS	BS1330_II0459	TetR family transcriptional regulator		448181	448369	+	CDS	BS1330_II0458	hypothetical protein	OG13	446995	448053	+	CDS	BS1330_II0457	hypothetical protein
133	CIN5	Brucellaceae	OG16	337090	337797	+	CDS	BS1330_I0327	hypothetical protein		337920	338306	+	CDS	BS1330_I0328	hypothetical protein	OG4	338344	339585	+	CDS	BS1330_I0329	putative lipoprotein
134	CIN6	Brucellaceae	OG14	449774	450493	+	CDS	BSUIS_B0463	hypothetical protein		449283	449471	+	CDS	BSUIS_B0462	hypothetical protein		447158	447865	-	CDS	BSUIS_B0460	hypothetical protein
135	CIN5	Brucellaceae	OG16	354629	355336	+	CDS	BSUIS_A0355	LrgB family protein		355510	355845	+	CDS	BSUIS_A0356	hypothetical protein		357194	357562	+	CDS	BSUIS_A0358	transposase for insertion sequence element IS6501
136	CIN6	Brucellaceae	OG14	448644	449363	+	CDS	BSVBI22_B0458	TetR family transcriptional regulator		448153	448341	+	CDS	BSVBI22_B0457	hypothetical protein	OG13	446967	448025	+	CDS	BSVBI22_B0456	hypothetical protein
137	CIN5	Brucellaceae	OG16	337051	337758	+	CDS	BSVBI22_A0327	hypothetical protein		337881	338267	+	CDS	BSVBI22_A0328	hypothetical protein	OG4	338305	339546	+	CDS	BSVBI22_A0329	putative lipoprotein
138		Phyllobacteriaceae		33959	34477	+	CDS	Meso_4137	hypothetical protein		32011	32697	+	CDS	Meso_4135	hypothetical protein		31210	31944	+	CDS	Meso_4134	hypothetical protein
139		Phyllobacteriaceae		135539	136099	-	CDS	Meso_4236	hypothetical protein									134555	135097	-	CDS	Meso_4235	hypothetical protein
140	CIN1	Phyllobacteriaceae	OG1	1916546	1916686	+	CDS	Meso_1791	hypothetical protein								OG7	1916819	1918300	+	CDS	Meso_1792	tRNA (uracil-5-)-methyltransferase Gid
141		Phyllobacteriaceae		3977363	3978682	+	CDS	Meso_3688	NAD-binding homoserine dehydrogenase									3975340	3976962	-	CDS	Meso_3687	alpha amylase
142	CIN1	Rhodobacteraceae		1584816	1584983	+	CDS	KVU_1472	hypothetical protein								OG18	1585271	1586425	+	CDS	KVU_1473	benzoate transporter
143	CIN1	Rhodobacteraceae		363726	363893	-	CDS	EIO_0391	hypothetical protein								OG18	362284	363438	-	CDS	EIO_0390	benzoate transporter
144		Rhodobacteraceae																					
145	CIN1	Rhodobacteraceae	OG1	20582	20797	+	CDS	SKA53_07326	hypothetical protein								OG2	21202	21663	-	CDS	SKA53_07331	transcriptional regulator, AsnC family
146		Phyllobacteriaceae		2513677	2514135	+	CDS	Mesau_02453	phasin									2514487	2514563	+	tRNA	Mesau_02454	tRNA-His
147	CIN1	Phyllobacteriaceae	OG1	3843005	3843145	-	CDS	Mesau_03779	uncharacterized conserved small protein	OG7	3841019	3842611	-	CDS	Mesau_03778	tRNA:m(5)U-54 methyltransferase		3840645	3840947	-	CDS	Mesau_03777	putative addiction module antidote protein, CC2985 family
148	CIN1	Phyllobacteriaceae	OG1	3843005	3843145	-	CDS	Mesau_03779	uncharacterized conserved small protein								OG7	3841019	3842611	-	CDS	Mesau_03778	tRNA:m(5)U-54 methyltransferase
149	CIN1	Phyllobacteriaceae	OG1	3843005	3843145	-	CDS	Mesau_03779	uncharacterized conserved small protein								OG7	3841019	3842611	-	CDS	Mesau_03778	tRNA:m(5)U-54 methyltransferase
150		Phyllobacteriaceae		5249354	5250376	+	CDS	Mesau_05196	ABC-type sugar transport system, periplasmic component									5250687	5251277	-	CDS	Mesau_05197	transcriptional regulator
151		Phyllobacteriaceae		241784	242047	-	CDS	Mesci_6303	hypothetical protein									241107	241262	-	CDS	Mesci_6302	hypothetical protein
152		Phyllobacteriaceae		2545134	2545592	+	CDS	Mesci_2426	phasin									2545962	2546038	+	tRNA	Mesci_R0032	tRNA-His
153	CIN1	Phyllobacteriaceae	OG1	3675321	3675461	-	CDS	Mesci_3514	hypothetical protein								OG7	3673344	3674753	-	CDS	Mesci_3513	hypothetical protein
154	CIN1	Phyllobacteriaceae	OG1	3675321	3675461	-	CDS	Mesci_3514	hypothetical protein								OG7	3673344	3674753	-	CDS	Mesci_3513	hypothetical protein
155	CIN1	Phyllobacteriaceae	OG1	3675321	3675461	-	CDS	Mesci_3514	hypothetical protein								OG7	3673344	3674753	-	CDS	Mesci_3513	hypothetical protein
156		Phyllobacteriaceae		5264750	5265772	+	CDS	Mesci_5119	LacI family transcriptional regulator		5265709	5265903	-	CDS	Mesci_5120	hypothetical protein		5266103	5266693	-	CDS	Mesci_5121	TetR family transcriptional regulator
157	CIN1	Phyllobacteriaceae		890180	890389	+	CDS	msr1062	hypothetical protein								OG7	891150	892568	+	CDS	mlr1064	tRNA (uracil-5-)-methyltransferase Gid
158	CIN1	Phyllobacteriaceae		890180	890389	+	CDS	msr1062	hypothetical protein								OG7	891150	892568	+	CDS	mlr1064	tRNA (uracil-5-)-methyltransferase Gid
159	CIN1	Phyllobacteriaceae		890180	890389	+	CDS	msr1062	hypothetical protein								OG7	891150	892568	+	CDS	mlr1064	tRNA (uracil-5-)-methyltransferase Gid

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE							RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
160		Phyllobacteriaceae		4952439	4952903	-	CDS	mll6119	transcriptional regulatory protein									4951975	4952181	+	CDS	mlr6118	cold-shock protein
161		Phyllobacteriaceae		5350228	5350686	+	CDS	mlr6541	hypothetical protein									5351042	5351115	+	tRNA	MAFFt41	tRNA-His
162		Phyllobacteriaceae		6092659	6093681	-	CDS	mll7360	hypothetical protein									6091731	6092324	+	CDS	mlr7359	transcriptional regulator
163		Phyllobacteriaceae		2663198	2663656	+	CDS	Mesop_2561	phasin									2664008	2664084	+	tRNA	Mesop_R0033	tRNA-His
164	CIN1	Phyllobacteriaceae	OG1	4112624	4112764	-	CDS	Mesop_4003	hypothetical protein								OG7	4110639	4112048	-	CDS	Mesop_4002	gid protein
165	CIN1	Phyllobacteriaceae	OG1	4112624	4112764	-	CDS	Mesop_4003	hypothetical protein								OG7	4110639	4112048	-	CDS	Mesop_4002	gid protein
166	CIN1	Phyllobacteriaceae	OG1	4112624	4112764	-	CDS	Mesop_4003	hypothetical protein								OG7	4110639	4112048	-	CDS	Mesop_4002	gid protein
167		Phyllobacteriaceae		5829273	5830295	+	CDS	Mesop_5703	LacI family transcriptional regulator									5830639	5831229	-	CDS	Mesop_5704	TetR family transcriptional regulator
168	CIN1	Rhodobacteraceae	OG1	158763	158990	+	CDS	OG2516_05838	hypothetical protein									159616	160842	-	CDS	OG2516_05843	heat shock protein, Hsp70 family protein
169	CIN5	Brucellaceae	OG16	447656	448351	+	CDS	Oant_0422	LrgB family protein									448748	450301	+	CDS	Oant_0423	glyoxalase/bleomycin resistance protein/dioxygenase
170		Brucellaceae		275652	276380	+	CDS	Oant_2970	septum formation inhibitor									272174	273850	-	CDS	Oant_2969	hypothetical protein
171		Brucellaceae		272174	273850	-	CDS	Oant_2969	hypothetical protein									275652	276380	+	CDS	Oant_2970	septum formation inhibitor
172	CIN1	Brucellaceae	OG1	1275426	1275572	+	CDS	Oant_3865	hypothetical protein									1275787	1277010	-	CDS	Oant_3866	major facilitator superfamily transporter
173	CIN1	Rhodobacteraceae		805909	806127	-	CDS	OA238_c07730	hypothetical protein								OG2	805130	805633	+	CDS	OA238_c07720	putative AsnC family transcriptional regulator
174		Hyphomicrobiaceae		2111274	2112173	+	CDS	KKY_2127	LysR family transcriptional regulator									2113135	2114337	-	CDS	KKY_2128	aspartate aminotransferase
175		Hyphomicrobiaceae		2111274	2112173	+	CDS	KKY_2127	LysR family transcriptional regulator									2113135	2114337	-	CDS	KKY_2128	aspartate aminotransferase
176				2331701	2331850	-	CDS	SL003B_2210	hypothetical protein									2330776	2331393	+	CDS	SL003B_2209	hypothetical protein
177	CIN5	Rhizobiaceae	OG3	461301	462182	+	CDS	RHE_CH00449	oxidoreductase								OG4	462794	464071	+	CDS	RHE_CH00450	hypothetical protein
178		Rhizobiaceae		1926684	1927778	+	CDS	RHE_CH01839	hypothetical protein									1925699	1926187	+	CDS	RHE_CH01838	hypothetical protein
179	CIN2	Rhizobiaceae	OG6	4314798	4315589	+	CDS	RHE_CH04071	molybdenum ABC transporter, substrate-binding protein								OG5	4313781	4314359	+	CDS	RHE_CH04070	nicotinic acid mononucleotide adenylyltransferase
180		Rhizobiaceae		22159	22494	-	CDS	RHE_PF00022	hypothetical protein									23286	23726	+	CDS	RHE_PF00023	hypothetical protein
181	CIN5	Rhizobiaceae	OG3	512732	513613	+	CDS	RHECIAT_CH0000515	oxidoreductase		513699	514148	+	CDS	RHECIAT_CH0000516	hypothetical protein	OG4	514221	515498	+	CDS	RHECIAT_CH0000517	hypothetical protein
182		Rhizobiaceae		1912923	1914026	+	CDS	RHECIAT_CH0001926	hypothetical protein									1911937	1912446	+	CDS	RHECIAT_CH0001925	hypothetical protein
183	CIN2	Rhizobiaceae		4445118	4445327	-	CDS	RHECIAT_CH0004360	hypothetical protein								OG5	4444289	4444867	+	CDS	RHECIAT_CH0004359	nicotinic acid mononucleotide adenylyltransferase
184	CIN5	Rhizobiaceae	OG3	459092	459973	+	CDS	REMIM1_CH00460	aldo/keto reductase protein								OG4	460586	461863	+	CDS	REMIM1_CH00462	alpha/beta hydrolase family protein
185		Rhizobiaceae		1884795	1885889	+	CDS	REMIM1_CH01890	hypothetical protein									1883810	1884298	+	CDS	REMIM1_CH01888	hypothetical protein
186	CIN2	Rhizobiaceae	OG6	4217687	4218478	+	CDS	REMIM1_CH04188	molybdenum ABC transporter substrate-binding protein ModA								OG5	4216673	4217251	+	CDS	REMIM1_CH04187	nicotinate-nucleotide adenylyltransferase
187		Rhizobiaceae		19546	20625	-	CDS	REMIM1_PF00021	virulence factor BrkB family protein		23158	23391	-	CDS	REMIM1_PF00023	hypothetical protein		23630	24070	+	CDS	REMIM1_PF00024	GFA family glutathione-dependent formaldehyde-activating protein
188		Rhizobiaceae		111695	112336	+	CDS	Rleg_4742	hypothetical protein		112352	112612	+	CDS	Rleg_4743	hypothetical protein		113441	114331	-	CDS	Rleg_4745	protein-L-isoaspartate(D-aspartate) O-methyltransferase
189	CIN5	Rhizobiaceae	OG3	105825	106706	+	CDS	Rleg_0114	aldo/keto reductase								OG4	107377	108654	+	CDS	Rleg_0115	hypothetical protein
190	CIN1	Rhizobiaceae		1697482	1698585	+	CDS	Rleg_1701	hypothetical protein								OG1	1696657	1696803	-	CDS	Rleg_1700	hypothetical protein
191	CIN2	Rhizobiaceae	OG6	4297098	4297889	+	CDS	Rleg_4202	molybdenum ABC transporter periplasmic molybdate-binding protein								OG5	4295976	4296575	+	CDS	Rleg_4201	nicotinic acid mononucleotide adenylyltransferase
192		Rhizobiaceae		306976	307923	-	CDS	Rleg2_4670	transposase IS110 family protein		306298	306825	+	CDS	Rleg2_4669	hypothetical protein		305380	306273	+	CDS	Rleg2_4668	protein-L-isoaspartate(D-aspartate) O-methyltransferase
193	CIN5	Rhizobiaceae	OG3	96796	97677	+	CDS	Rleg2_0104	aldo/keto reductase								OG4	98282	99559	+	CDS	Rleg2_0105	hypothetical protein
194	CIN1	Rhizobiaceae		1534947	1536050	+	CDS	Rleg2_1503	hypothetical protein								OG1	1533929	1534075	-	CDS	Rleg2_1502	hypothetical protein

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE						RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
195	CIN2	Rhizobiaceae	OG6	4019781	4020572	+	CDS	Rleg2_3878	molybdenum ABC transporter periplasmic molybdate-binding protein								OG5	4018721	4019299	+	CDS	Rleg2_3877	nicotinic acid mononucleotide adenylyltransferase
196		Rhizobiaceae		407072	407087	-	repeat_region				405332	407214	+	repeat_region	405592	-		408099	409010	-	CDS	pRL120378	protein-L-isoaspartate O-methyltransferase
197	CIN5	Rhizobiaceae	OG3	511376	512272	+	CDS	RL0474	aldo-keto reductase									512816	513202	-	CDS	RL0475	hypothetical protein
198	CIN1	Rhizobiaceae		2175400	2176503	+	CDS	RL2060	transmembrane protein								OG7	2172416	2173849	-	CDS	RL2059	tRNA (uracil-5-)-methyltransferase Gid
199	CIN2	Rhizobiaceae	OG6	4988507	4989298	+	CDS	RL4685	solute-binding component of ABC transporter								OG5	4987413	4988012	+	CDS	RL4684	nicotinic acid mononucleotide adenylyltransferase
200	CIN5	Rhizobiaceae	OG3	541169	542050	+	CDS	RTCIAT899_CH02665	putative oxidoreductase								OG4	542600	543904	+	CDS	RTCIAT899_CH02670	putative esterase/lipase/thioesterase
201		Rhizobiaceae		1632031	1633170	+	CDS	RTCIAT899_CH08010	hypothetical protein		1631634	1631747	+	CDS	RTCIAT899_CH08005	hypothetical protein		1631395	1631511	-	CDS	RTCIAT899_CH08000	hypothetical protein
202	CIN2	Rhizobiaceae	OG6	3775772	3776569	+	CDS	RTCIAT899_CH18465	molybdate ABC transporter, substrate-binding protein		3775224	3775508	+	CDS	RTCIAT899_CH18460	hypothetical protein	OG5	3774593	3775210	+	CDS	RTCIAT899_CH18455	nicotinate nucleotide adenylyltransferase
203	CIN1	Rhodobacteraceae	OG1	289036	289251	-	CDS	SSE37_24084	hypothetical protein									285278	288367	-	CDS	SSE37_24079	valyl-tRNA synthetase
204	CIN1	Rhizobiaceae		1359706	1359849	+	CDS	SFHH103_01270	hypothetical protein								OG1	1358962	1359105	-	CDS	SFHH103_01269	hypothetical protein
205	CIN1	Rhizobiaceae		1360111	1361322	-	CDS	SFHH103_01271	hypothetical protein		1359706	1359849	+	CDS	SFHH103_01270	hypothetical protein	OG1	1358962	1359105	-	CDS	SFHH103_01269	hypothetical protein
206	CIN3	Rhizobiaceae		4014002	4014457	+	CDS	SFHH103_03688	putative endonuclease V								OG12	4014756	4015643	+	CDS	SFHH103_03689	hypothetical protein
207	CIN4	Rhizobiaceae	OG10	233767	234051	+	CDS	SFHH103_05074	acylphosphatase								OG11	232648	233319	-	CDS	SFHH103_05073	RNA polymerase sigma factor sigW Sigma-W factor
208		Rhizobiaceae		157772	157978	+	CDS	SFHH103_04704	hypothetical protein									158617	158883	-	CDS	SFHH103_04705	hypothetical protein
209		Rhizobiaceae		157772	157978	+	CDS	SFHH103_04704	hypothetical protein									158617	158883	-	CDS	SFHH103_04705	hypothetical protein
210	CIN4	Rhizobiaceae	OG10	2204845	2205168	-	CDS	NGR_b21490	acylphosphatase								OG11	2205588	2206316	+	CDS	NGR_b21500	RNA polymerase sigma factor
211	CIN1	Rhizobiaceae	OG8	1434843	1434925	-	tRNA	NGR_c13910	tRNA-Leu								OG1	1433785	1433985	-	CDS	NGR_c13890	hypothetical protein
212	CIN1	Rhizobiaceae	OG8	1434843	1434925	-	tRNA	NGR_c13910	tRNA-Leu								OG1	1433785	1433985	-	CDS	NGR_c13890	hypothetical protein
213	CIN3	Rhizobiaceae	OG9	3718015	3720336	-	CDS	NGR_c35080	penicillin-binding protein		3720525	3721688	+	CDS	NGR_c35090	transmembrane protein		3721900	3722382	+	CDS	NGR_c35100	hypothetical protein
214	CIN4	Rhizobiaceae	OG10	1712776	1713234	-	CDS	USDA257_c16100	acylphosphatase AcyP								OG11	1713523	1714206	+	CDS	USDA257_c16110	ECF subfamily RNA polymerase sigma-24 subunit
215	CIN1	Rhizobiaceae	OG8	3753302	3753384	-	tRNA	USDA257_c35860	tRNA-Leu								OG1	3752255	3752398	-	CDS	USDA257_c35850	hypothetical protein
216	CIN1	Rhizobiaceae	OG8	3753302	3753384	-	tRNA	USDA257_c35860	tRNA-Leu								OG1	3752255	3752398	-	CDS	USDA257_c35850	hypothetical protein
217		Rhizobiaceae		5733195	5733668	+	CDS	USDA257_c55250	3-demethylubiquinone-9 3-methyltransferase									5733999	5734190	+	CDS	USDA257_c55260	hypothetical protein
218	CIN3	Rhizobiaceae	OG9	6264591	6266813	-	CDS	USDA257_c60090	penicillin-binding protein 2D		6267110	6268270	+	CDS	USDA257_c60100	S-adenosylmethionine uptake transporter Sam		6268377	6268868	+	CDS	USDA257_c60110	hypothetical protein
219		Rhizobiaceae		158177	159061	+	CDS	USDA257_p01790	hypothetical protein		159299	159709	-	CDS	USDA257_p01800	hypothetical protein		159755	160021	-	CDS	USDA257_p01810	putative integrase IntA
220	CIN4	Rhizobiaceae	OG10	679315	679599	+	CDS	Smed_4198	acylphosphatase								OG11	678214	678885	-	CDS	Smed_4197	RNA polymerase sigma factor
221	CIN1	Rhizobiaceae	OG8	1258759	1258843	+	tRNA	Smed_R0020	tRNA-Leu								OG1	1257614	1257814	-	CDS	Smed_1180	hypothetical protein
222	CIN1	Rhizobiaceae	OG8	1258759	1258843	+	tRNA	Smed_R0020	tRNA-Leu								OG1	1257614	1257814	-	CDS	Smed_1180	hypothetical protein
223	CIN3	Rhizobiaceae		3590494	3590925	-	CDS	Smed_3387	pyrimidine dimer DNA glycosylase								OG12	3589318	3590205	-	CDS	Smed_3386	hypothetical protein
224		Rhizobiaceae		1219615	1220355	+	CDS	SMa2165	short chain									1221480	1221947	+	CDS	SMa2167	Hypothetical/Global homology
225	CIN3	Rhizobiaceae		207244	209547	+	CDS	SMc02856	cell envelope								OG12	205860	206783	-	CDS	SMc02855	hypothetical/global homology
226	CIN1	Rhizobiaceae	OG8	1668357	1668441	+	tRNA	SMc02125	tRNA-Leu									1667262	1667434	-	repeat_region	REPEAT SM-4	Sm-4 OR SMc04537
227	CIN1	Rhizobiaceae	OG8	1668357	1668441	+	tRNA	SMc02125	tRNA-Leu									1667262	1667434	-	repeat_region	REPEAT SM-4	Sm-4 OR SMc04537
228	CIN4	Rhizobiaceae	OG10	1605382	1605705	-	CDS	SM_b20590	Hypothetical/Partial homology		1605767	1606063	-	CDS	SM_b20591	Unknown		1606089	1606772	+	CDS	SM_b20592	Global functions
229		Rhizobiaceae		1217953	1218693	+	CDS	SM2011_a2165	short chain alcohol dehydrogenase-related dehydrogenase									1219818	1220285	+	CDS	SM2011_a2167	hypothetical protein
230	CIN3	Rhizobiaceae	OG9	207245	209548	+	CDS	SM2011_c02856	Putative penicillin-binding protein								OG12	205861	206784	-	CDS	SM2011_c02855	putative transmembrane protein
231	CIN1	Rhizobiaceae	OG8	1668066	1668150	+	tRNA	SM2011_c02125	tRNA-Leu									1666971	1667143	-	repeat_region	corresponds to SMc04537	Sm-4

			LEFT FLANKING FEATURE							OVERLAPPING FEATURE							RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
232	CIN1	Rhizobiaceae	OG8	1668066	1668150	+	tRNA	SM2011_c02125	tRNA-Leu									1666971	1667143	-	repeat_region	corresponds to SMc04537	Sm-4
233	CIN4	Rhizobiaceae	OG10	1605397	1605720	-	CDS	SM2011_b20590	Putative acylphosphatase		1605782	1606105	-	CDS	SM2011_b20591	Hypothetical protein	OG11	1606104	1606787	+	CDS	SM2011_b20592	RNA polymerase sigma factor,ECF subfamily protein
234	CIN1	Rhizobiaceae	OG8	1370668	1370752	+	tRNA	Sinme_R0020	tRNA-Leu		1369434	1369994	-	CDS	Sinme_1348	hypothetical protein	OG1	1369047	1369190	-	CDS	Sinme_1347	hypothetical protein
235	CIN1	Rhizobiaceae	OG8	1370668	1370752	+	tRNA	Sinme_R0020	tRNA-Leu									1369434	1369994	-	CDS	Sinme_1348	hypothetical protein
236	CIN3	Rhizobiaceae	OG9	3627309	3629612	+	CDS	Sinme_3508	penicillin-binding protein 1A family								OG12	3625925	3626848	-	CDS	Sinme_3507	hypothetical protein
237	CIN4	Rhizobiaceae	OG10	574319	574603	+	CDS	Sinme_4239	acylphosphatase								OG11	573216	573899	-	CDS	Sinme_4238	ECF subfamily RNA polymerase sigma-24 subunit
238		Rhizobiaceae		171097	171837	+	CDS	Sinme_6793	3-oxoacyl-(acyl-carrier-protein) reductase									172524	172853	-	CDS	Sinme_6794	hypothetical protein
239	CIN1	Rhizobiaceae	OG8	1232766	1232850	+	tRNA	SinmeB_R0020	tRNA-Leu								OG1	1231144	1231287	-	CDS	SinmeB_1177	hypothetical protein
240	CIN1	Rhizobiaceae	OG8	1232766	1232850	+	tRNA	SinmeB_R0020	tRNA-Leu								OG1	1231144	1231287	-	CDS	SinmeB_1177	hypothetical protein
241	CIN3	Rhizobiaceae	OG9	3479980	3482283	+	CDS	SinmeB_3285	penicillin-binding protein								OG12	3478596	3479519	-	CDS	SinmeB_3284	hypothetical protein
242	CIN4	Rhizobiaceae	OG10	1376696	1376980	+	CDS	SinmeB_4733	acylphosphatase								OG11	1375593	1376276	-	CDS	SinmeB_4732	ECF subfamily RNA polymerase sigma-24 subunit
243	CIN3	Rhizobiaceae	OG9	201981	204284	+	CDS	C770_GR4Chr0184	penicillin-binding protein, 1A family								OG12	200597	201520	-	CDS	C770_GR4Chr0183	Permeases of the drug/metabolite transporter (DMT) superfamily
244	CIN1	Rhizobiaceae	OG8	1637885	1637969	+	tRNA	C770_GR4Chr1565	tRNA-Leu								OG1	1636263	1636406	-	CDS	C770_GR4Chr1564	putative conserved small protein
245	CIN1	Rhizobiaceae	OG8	1637885	1637969	+	tRNA	C770_GR4Chr1565	tRNA-Leu								OG1	1636263	1636406	-	CDS	C770_GR4Chr1564	putative conserved small protein
246	CIN4	Rhizobiaceae	OG10	141613	141897	+	CDS	C770_GR4pD0122	Acylphosphatase								OG11	140510	141193	-	CDS	C770_GR4pD0121	RNA polymerase sigma factor, sigma-70 family
247		Rhizobiaceae		533163	533903	-	CDS	BN406_04043	3-oxoacyl-(acyl-carrier-protein) reductase									532183	532512	+	CDS	BN406_04042	hypothetical protein
248	CIN1	Rhizobiaceae	OG8	1309308	1309392	+	tRNA	BN406_RNA00021	tRNA-Leu		1308074	1308634	-	CDS	BN406_01277	hypothetical protein	OG1	1307688	1307831	-	CDS	BN406_01276	hypothetical protein
249	CIN1	Rhizobiaceae	OG8	1309308	1309392	+	tRNA	BN406_RNA00021	tRNA-Leu									1308074	1308634	-	CDS	BN406_01277	hypothetical protein
250	CIN3	Rhizobiaceae		3485983	3488286	+	CDS	BN406_03311	cell envelope								OG12	3484599	3485486	-	CDS	BN406_03310	hypothetical/global homology
251	CIN4	Rhizobiaceae	OG10	135464	135748	+	CDS	BN406_05204	Hypothetical/Partial homology								OG11	134361	135044	-	CDS	BN406_05203	ECF subfamily RNA polymerase sigma-24 subunit
252	CIN1	Rhizobiaceae	OG8	2000507	2000591	-	tRNA	SM11_chr2021	tRNA-Leu								OG1	2002070	2002213	+	CDS	SM11_chr2022	hypothetical protein
253	CIN1	Rhizobiaceae	OG8	2000507	2000591	-	tRNA	SM11_chr2021	tRNA-Leu								OG1	2002070	2002213	+	CDS	SM11_chr2022	hypothetical protein
254	CIN3	Rhizobiaceae	OG9	3713807	3716119	+	CDS	SM11_chr3653	penicillin-binding protein								OG12	3712432	3713355	-	CDS	SM11_chr3652	transmembrane protein
255	CIN4	Rhizobiaceae	OG10	141417	141701	+	CDS	SM11_pD0122	putative acylphosphatase		141167	141319	+	CDS	SM11_pD0121	hypothetical protein	OG11	140314	140997	-	CDS	SM11_pD0120	RNA polymerase sigma factor, ECF subfamily protein
256		Rhizobiaceae		108895	109353	-	CDS	Atu0104	hypothetical protein		109363	109557	-	CDS	Atu0105	hypothetical protein		109823	110032	+	CDS	Atu0106	cold shock protein
257		Rhizobiaceae		1831052	1831294	-	CDS	Atu4670	hypothetical protein									1831642	1832085	-	CDS	Atu4671	response regulator
258		Rhizobiaceae		957315	957461	+	CDS	Arad_8084	hypothetical protein									957909	958754	-	CDS	Arad_8086	hypothetical protein
259		Rhizobiaceae		1921485	1921631	-	CDS	Arad_9217	hypothetical protein									1920052	1920927	-	CDS	Arad_9216	glutathione S-transferase YghU
260		Rhizobiaceae		139226	140683	-	CDS	Arad_12193	Cytochrome c, mono- and diheme variant									137950	138255	+	CDS	Arad_12190	FAD dependent oxidoreductase
261	CIN1	Rhizobiaceae	OG1	164384	164530	-	CDS	AGROH133_09615	hypothetical protein									163498	163941	+	CDS	AGROH133_09614	response regulator
262		Rhizobiaceae		244945	247116	-	CDS	AGROH133_09819	hydroxamate-type ferrisiderophore receptor									243567	244646	+	CDS	AGROH133_09818	DNA polymerase IV
263	CIN1	Rhizobiaceae	OG1	598779	598925	-	CDS	Avi_5587	hypothetical protein									597555	598229	+	CDS	Avi_5586	hypothetical protein
264		Rhizobiaceae		899428	900909	+	CDS	Avi_5890	sulfate permease									901178	902659	-	CDS	Avi_5891	siroheme synthase
265		Rhizobiaceae		2794154	2794300	-	CDS	Avi_3375	hypothetical protein									2792636	2793793	+	CDS	Avi_3374	DNA polymerase IV
266	CIN1	Brucellaceae	OG1	1527241	1527387	+	CDS	BAA13334_I02542	hypothetical protein								OG7	1527593	1529029	+	CDS	BAA13334_I02543	tRNA:m(5)U-54 methyltransferase
267	CIN1	Brucellaceae	OG1	889041	889187	-	CDS	BAbS19_I08540	hypothetical protein								OG7	887399	888799	-	CDS	BAbS19_I08530	tRNA (uracil-5-)-methyltransferase Gid

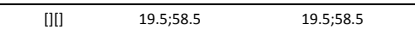
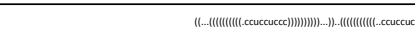
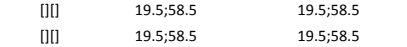
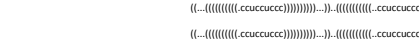
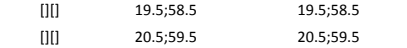
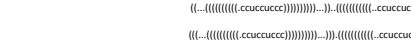
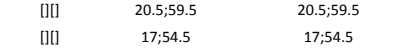
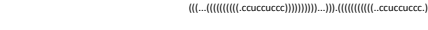
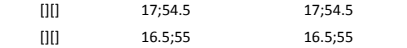
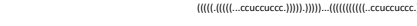
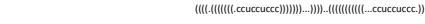
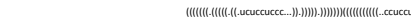
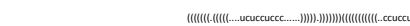
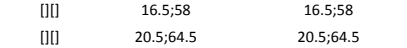
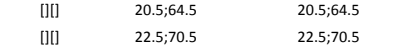
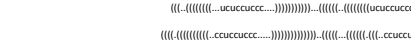
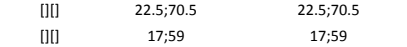
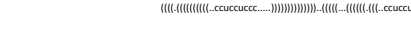
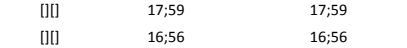
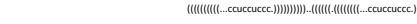
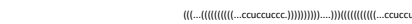
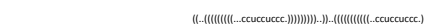
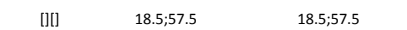
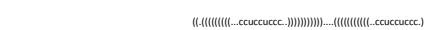
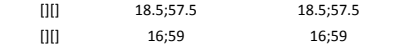
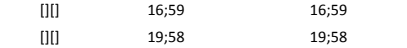
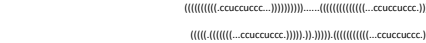
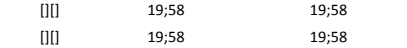
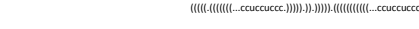
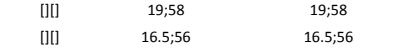
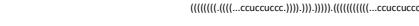
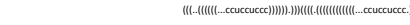
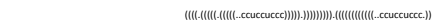
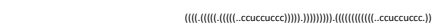
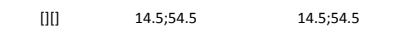
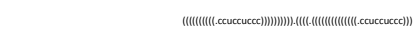
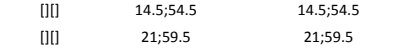
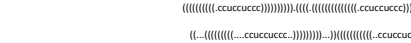
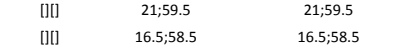
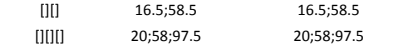
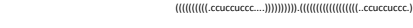
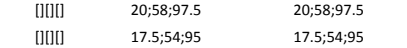
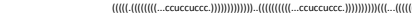
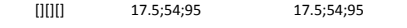
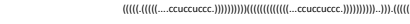
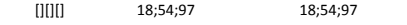
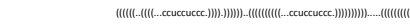
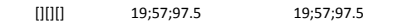
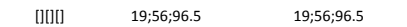
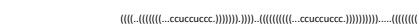
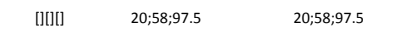
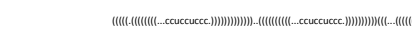
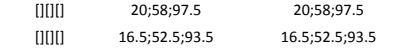
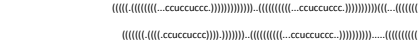
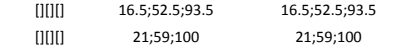
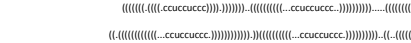
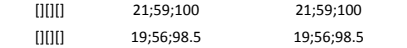
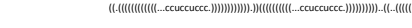
			LEFT FLANKING FEATURE							OVERLAPPING FEATURE							RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
268	CIN1	Brucellaceae	OG1	890740	890886	-	CDS	BruAb1_0907	hypothetical protein								OG7	889098	890498	-	CDS	BruAb1_0906	tRNA (uracil-5-)-methyltransferase Gid
269	CIN1	Brucellaceae	OG1	867399	867545	-	CDS	BCAN_A0909	hypothetical protein								OG7	865739	867139	-	CDS	BCAN_A0908	tRNA (uracil-5-)-methyltransferase Gid
270	CIN1	Brucellaceae	OG1	185798	185944	+	CDS	BCA52141_I0298	hypothetical protein								OG7	186168	187604	+	CDS	BCA52141_I0299	tRNA (uracil-5-)-methyltransferase Gid
271	CIN1	Brucellaceae	OG1	890507	890653	-	CDS	BMEA_A0934	hypothetical protein								OG7	888865	890265	-	CDS	BMEA_A0933	tRNA (uracil-5-)-methyltransferase Gid
272	CIN1	Brucellaceae	OG1	890452	890598	-	CDS	BM28_A0905	hypothetical protein								OG7	888810	890246	-	CDS	BM28_A0904	tRNA (uracil-5-)-methyltransferase Gid
273	CIN1	Brucellaceae	OG1	890766	890912	-	CDS	BM590_A0904	hypothetical protein								OG7	888971	890524	-	CDS	BM590_A0903	hypothetical protein
274	CIN1	Brucellaceae	OG1	887035	887181	-	CDS	BMNI_I0882	hypothetical protein								OG7	885393	886829	-	CDS	BMNI_I0881	hypothetical protein
275	CIN1	Brucellaceae	OG1	887018	887164	-	CDS	BAB1_0914	hypothetical protein								OG7	885376	886776	-	CDS	BAB1_0913	tRNA (uracil-5-)-methyltransferase Gid
276	CIN1	Brucellaceae	OG1	1116469	1116615	+	CDS	BMEI1072	hypothetical protein								OG7	1116821	1118257	+	CDS	BMEI1073	tRNA (uracil-5-)-methyltransferase Gid
277	CIN1	Brucellaceae	OG1	873231	873377	-	CDS	BMI_I893	hypothetical protein								OG7	871571	872971	-	CDS	BMI_I892	tRNA (uracil-5-)-methyltransferase Gid
278	CIN1	Brucellaceae	OG1	895931	896077	-	CDS	BOV_0891	hypothetical protein								OG7	894271	895671	-	CDS	BOV_0890	tRNA (uracil-5-)-methyltransferase Gid
279	CIN1	Brucellaceae	OG1	897467	897613	-	CDS	BPI_I934	hypothetical protein								OG7	895807	897207	-	CDS	BPI_I933	tRNA (uracil-5-)-methyltransferase Gid
280	CIN1	Brucellaceae	OG1	869015	869161	-	CDS	BS1330_I0891	hypothetical protein								OG7	867355	868755	-	CDS	BS1330_I0890	tRNA (uracil-5-)-methyltransferase Gid
281	CIN1	Brucellaceae	OG1	888895	889041	-	CDS	BSUIS_A0934	hypothetical protein								OG7	887235	888635	-	CDS	BSUIS_A0933	tRNA (uracil-5-)-methyltransferase Gid
282	CIN1	Brucellaceae	OG1	868982	869128	-	CDS	BSVBI22_A0891	hypothetical protein								OG7	867322	868722	-	CDS	BSVBI22_A0890	tRNA (uracil-5-)-methyltransferase Gid
283	CIN1	Rhodobacteraceae	OG1	253412	253627	-	CDS	OB2597_16115	hypothetical protein								OG17	250382	252970	+	CDS	OB2597_16110	Putative uvrD/DNA Helicase II
284	CIN1	Brucellaceae	OG1	2453758	2453904	+	CDS	Oant_2332	hypothetical protein								OG7	2454171	2455601	+	CDS	Oant_2333	tRNA (uracil-5-)-methyltransferase Gid
285		Rhodobacteraceae		1086993	1087208	-	CDS	OAN307_c10930	hypothetical protein									1085366	1086547	+	CDS	OAN307_c10920	putative phytanoyl-CoA dioxygenase
286		Rhodobacteraceae		1955857	1956072	-	CDS	OAN307_c19550	hypothetical protein									1953763	1955376	-	CDS	OAN307_c19540	GMC oxidoreductase
287		Rhodobacteraceae		1993118	1993552	+	CDS	OAN307_c19940	UV-repair and mutation protein UmuD									1991682	1991852	+	CDS	OAN307_c19930	hypothetical protein
288		Rhodobacteraceae		3698516	3698731	+	CDS	OAN307_c37600	hypothetical protein									3700041	3700493	-	CDS	OAN307_c37610	putative IS3-family mobile element-associated integrase
289		Rhodobacteraceae		671570	672592	-	CDS	OA238_c06440	ketol-acid reductoisomerase IlvC									669138	670139	-	CDS	OA238_c06430	hypothetical protein
290		Rhodobacteraceae		2783742	2784656	+	CDS	OA238_c26190	integrase/recombinase									2787435	2788697	+	CDS	OA238_c26210	MFS-type transporter protein
291		Rhodobacteraceae		3178924	3179139	+	CDS	OA238_c29930	hypothetical protein									3179935	3180480	-	CDS	OA238_c29940	hypothetical protein
292	CIN1	Rhodobacteraceae	OG1	2655172	2655465	+	CDS	JCM7686_2554	hypothetical protein									2655721	2656617	+	CDS	JCM7686_2555	hypothetical protein
293	CIN1	Rhodobacteraceae	OG1	2655172	2655465	+	CDS	JCM7686_2554	hypothetical protein	Cluster44	2655721	2656617	+	CDS	JCM7686_2555	hypothetical protein		2656642	2657070	-	CDS	JCM7686_2556	glutathione-dependent formaldehyde-activating GFA
294	CIN1	Rhodobacteraceae	OG1	551716	552015	-	CDS	Pden_0580	hypothetical protein									550394	551167	-	CDS	Pden_0579	hypothetical protein
295				2332239	2332388	-	CDS	SL003B_2211	hypothetical protein									2331701	2331850	-	CDS	SL003B_2210	hypothetical protein
296		Rhodobacteraceae		3461175	3461318	-	CDS	PSE_3225	hypothetical protein									3461660	3462184	-	CDS	PSE_3226	hypothetical protein
297		Rhizobiaceae		76971	77354	+	CDS	RHE_PD00068	hypothetical protein									77912	78484	+	CDS	RHE_PD00069	hypothetical protein
298	CIN1	Rhizobiaceae	OG1	443336	443482	-	CDS	RHE_PE00401	hypothetical protein								OG19	441962	442798	-	CDS	RHE_PE00400	5-keto-4-deoxyuronate isomerase
299		Rhizobiaceae		1172125	1173279	-	CDS	RHECIAT_CH0001166	polyhydroxybutyrate depolymerase		1173597	1173884	-	CDS	RHECIAT_CH0001167	hypothetical protein		1173948	1174214	+	CDS	RHECIAT_CH0001168	hypothetical protein
300		Rhizobiaceae		111975	112217	-	CDS	RHECIAT_PB0000101	hypothetical protein									112536	113108	+	CDS	RHECIAT_PB0000102	hypothetical protein
301	CIN1	Rhizobiaceae	OG1	346130	346366	-	CDS	RHECIAT_PA0000320	hypothetical protein								OG19	344808	345644	-	CDS	RHECIAT_PA0000319	5-keto-4-deoxyuronate isomerase

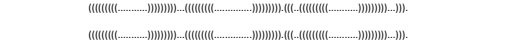
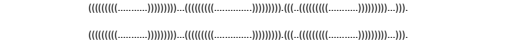
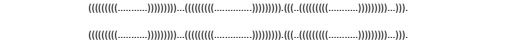
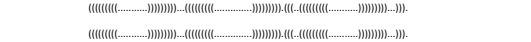
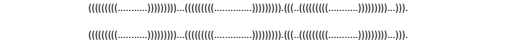
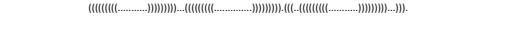
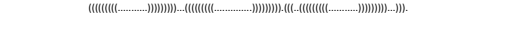
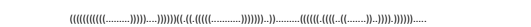
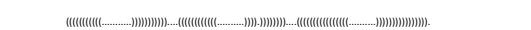
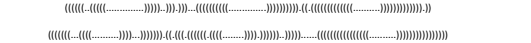
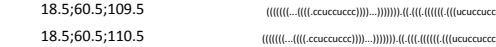
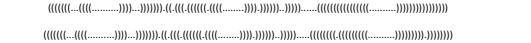
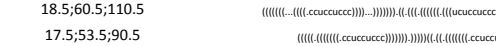
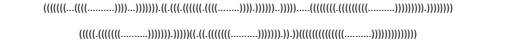
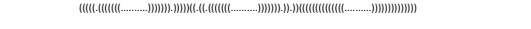
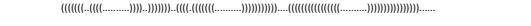
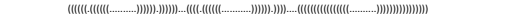
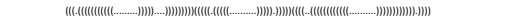
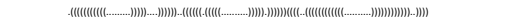
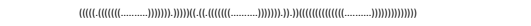
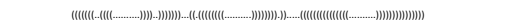
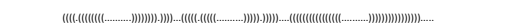
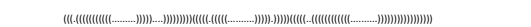
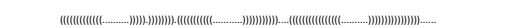
			LEFT FLANKING FEATURE							OVERLAPPING FEATURE							RIGHT FLANKING FEATURE					
# Cuckoo RNA	CIN	Family	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product	OG	Position		Strand	Region type	Locus tag	Product
302	CIN1	Rhizobiaceae	OG1	450047	450193	-	CDS	REMIM1_PD00423	hypothetical protein								OG19	448675	449511	-	CDS	REMIM1_PD00421	4-deoxy-L-threo-5-hexosulose-uronate ketol-isomerase
303		Rhizobiaceae		264545	265168	-	CDS	Rleg_4882	plasmid pRiA4b ORF-3 family protein									268316	268603	-	CDS	Rleg_4886	hypothetical protein
304	CIN1	Rhizobiaceae	OG1	118943	119089	+	CDS	Rleg_6084	hypothetical protein									119664	120056	-	CDS	Rleg_6085	hypothetical protein
305		Rhizobiaceae		2547	2873	-	CDS	Rleg_6289	hypothetical protein									122	1300	+	CDS	Rleg_6287	hypothetical protein
306	CIN1	Rhizobiaceae	OG1	28280	28426	+	CDS	Rleg_6602	hypothetical protein								OG19	29055	29891	+	CDS	Rleg_6603	5-keto-4-deoxyuronate isomerase
307	CIN1	Rhizobiaceae	OG1	50447	50593	+	CDS	Rleg2_5661	hypothetical protein								OG19	51199	52035	+	CDS	Rleg2_5662	5-keto-4-deoxyuronate isomerase
308		Rhizobiaceae		607180	607512	+	CDS	Rleg2_4962	hypothetical protein									609168	609533	+	CDS	Rleg2_4966	hypothetical protein
309	CIN1	Rhizobiaceae	OG1	574811	574957	-	CDS	pRL110532	hypothetical protein		574203	574637	-	CDS	pRL110531	hypothetical protein	OG19	573348	574184	-	CDS	pRL110530	5-keto-4-deoxyuronate isomerase
310	CIN1	Rhizobiaceae	OG1	1037924	1038070	+	CDS	RTCIAT899_PC04885	hypothetical protein									1038634	1039509	+	CDS	RTCIAT899_PC04890	glutathione S-transferase family protein
311		Rhizobiaceae		313859	314596	-	CDS	Smed_5352	putative adenylate/guanylate cyclase									316485	317621	-	CDS	Smed_5353	DNA polymerase IV
312	CIN1	Rhizobiaceae	OG1	338535	338681	+	CDS	Smed_5370	hypothetical protein									339017	339226	-	CDS	Smed_5371	hypothetical protein
313		Rhizobiaceae		1329978	1330670	+	CDS	SMa2357	Global functions									1327042	1328151	+	CDS	SMa2355	Protection responses
314		Rhizobiaceae		1328315	1329007	+	CDS	SM2011_a2357	adenylate/guanylate cyclase									1325379	1326488	+	CDS	SM2011_a2355	DNA polymerase IV
315		Rhizobiaceae		251307	251429	-	CDS	Sinme_5530	hypothetical protein									252215	253351	-	CDS	Sinme_5531	DNA-directed DNA polymerase
316		Rhizobiaceae		293847	293969	+	CDS	SinmeB_5363	hypothetical protein									291959	293068	+	CDS	SinmeB_5362	DNA-directed DNA polymerase
317		Rhizobiaceae		23436	23558	-	CDS	C770_GR4pC0025	hypothetical protein									24336	25445	-	CDS	C770_GR4pC0026	Nucleotidyltransferase/DNA polymerase involved in DNA repair
318		Rhizobiaceae		25550	25672	-	CDS	BN406_03525	hypothetical protein									26450	27586	-	CDS	BN406_03526	DNA polymerase IV 2
319		Rhizobiaceae		27984	28274	-	CDS	SM11_pC0027	hypothetical protein									29344	30480	-	CDS	SM11_pC0028	Nucleotidyltransferase/DNA polymerase
320	CIN1	Rhodobacteraceae	OG1	574330	574542	+	CDS	EE36_17032	hypothetical protein								OG17	574763	577183	-	CDS	EE36_17037	DNA helicase II, putative
321	CIN1	Rhodobacteraceae	OG1	477730	477942	+	CDS	NAS141_07248	hypothetical protein								OG17	478163	480583	-	CDS	NAS141_07253	DNA helicase II, putative

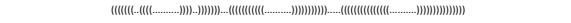
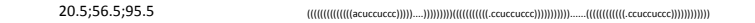
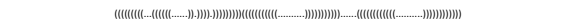
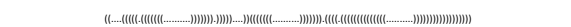
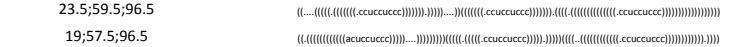
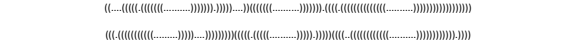
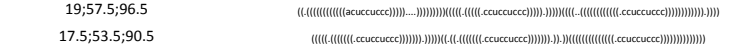
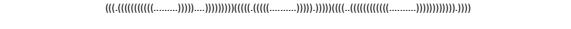
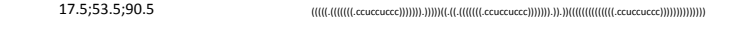
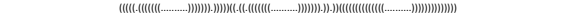
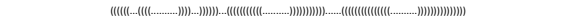
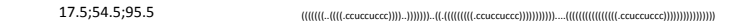
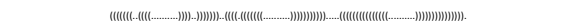
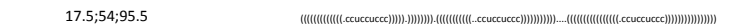
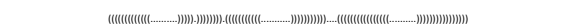
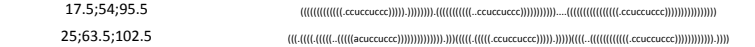
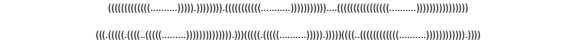
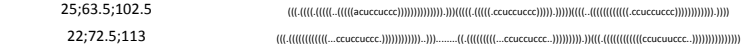
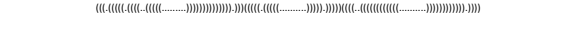
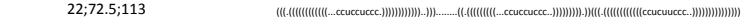
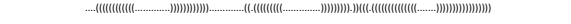
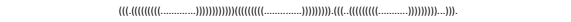
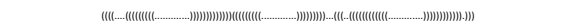
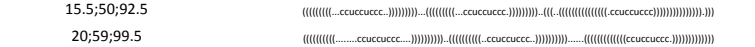
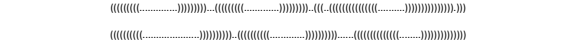
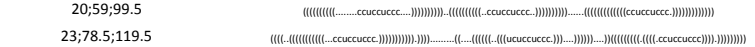
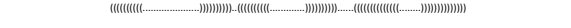
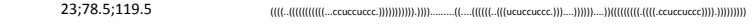
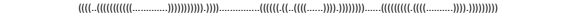
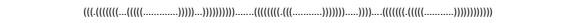
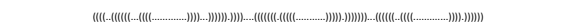
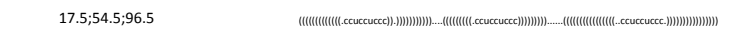
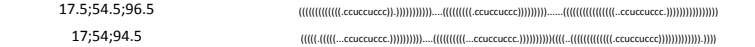
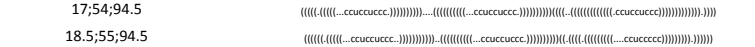
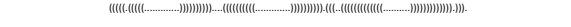
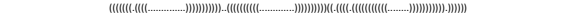
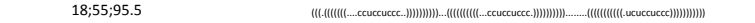
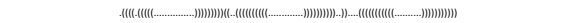
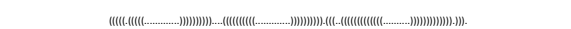
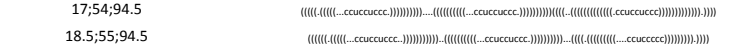
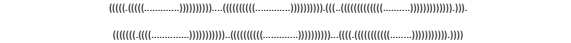
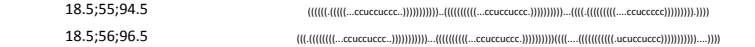
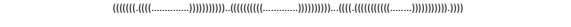
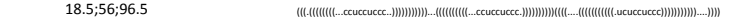
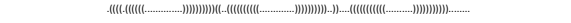
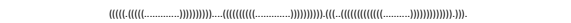
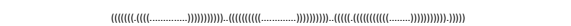
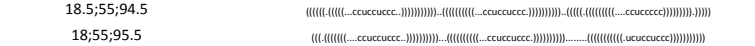
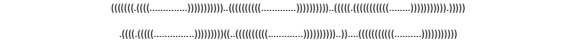
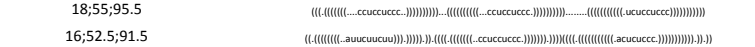
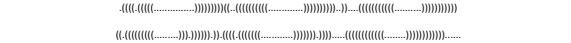
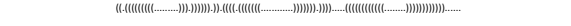
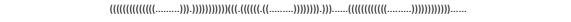
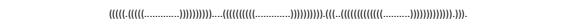
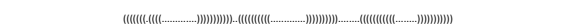
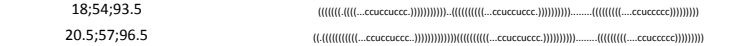
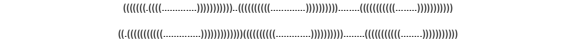
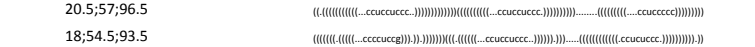
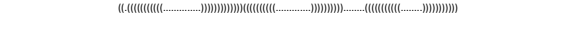
Table S3. Structure properties of cuckoo RNAs.

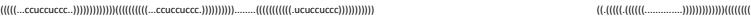
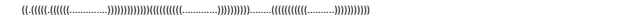
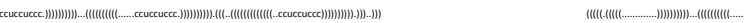
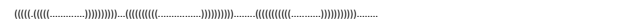
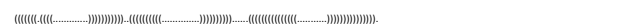
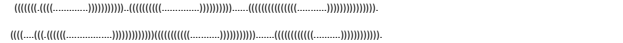
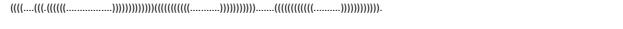
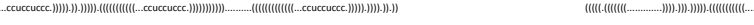
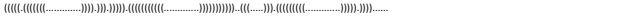
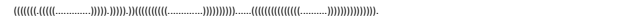
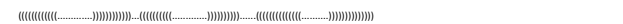
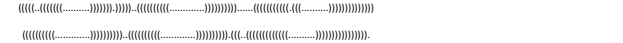
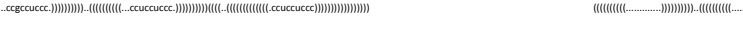
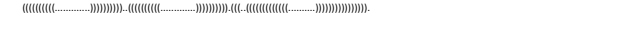
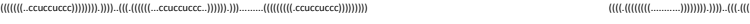
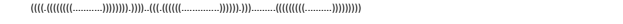
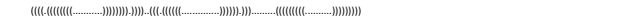
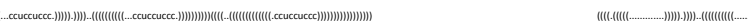
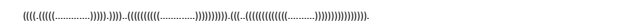
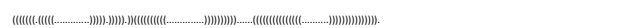
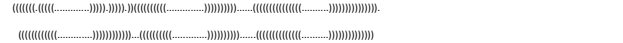
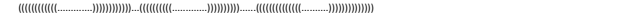
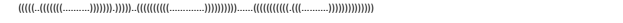
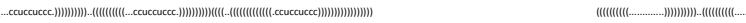
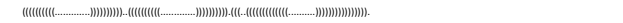
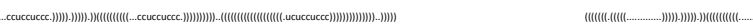
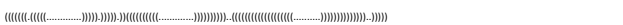
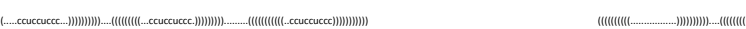
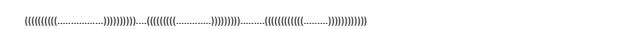
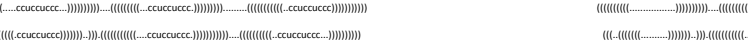
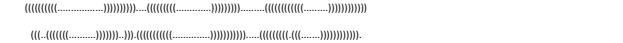
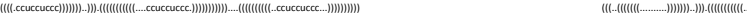
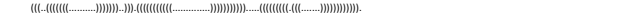
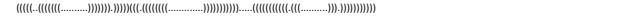
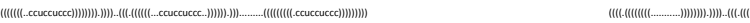
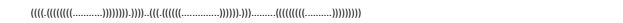
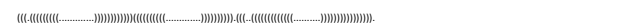
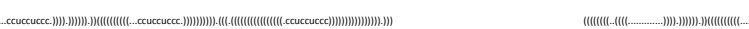
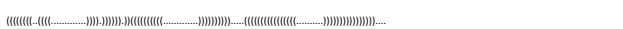
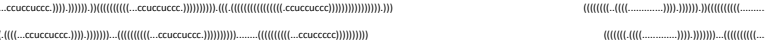
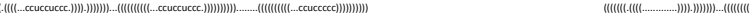
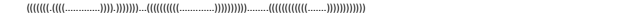
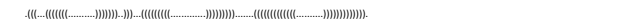
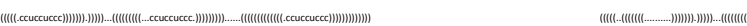
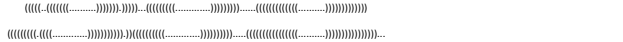
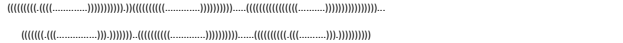
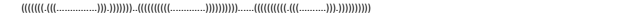
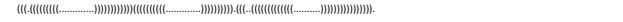
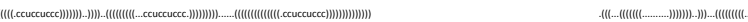
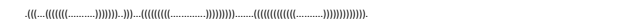
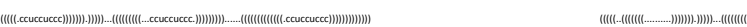
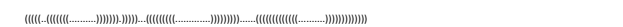
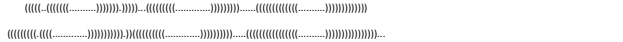
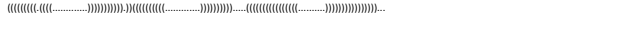
# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
1	-22.7	-21.7	1.05	[][]	[][]	19;59	19;59	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc......)))))))	(((((((((.....................))))))))).....(((((((.................)))))))
2	-22.7	-21.7	1.05	[][]	[][]	19;59	19;59	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc......)))))))	(((((((((.....................))))))))).....(((((((.................)))))))
3	-22.7	-21.7	1.05	[][]	[][]	19;59	19;59	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc......)))))))	(((((((((.....................))))))))).....(((((((.................)))))))
4	-19.5	-17.9	1.09	[][]	[][]	19;54	19;54	((.((((((((((...ccuccuccc.))))))))))))...(((.(((((ccuccuccc))))).)))	((.((((((((((.............))))))))))))...(((.(((((.........))))).)))
5	-19.5	-17.9	1.09	[][]	[][]	19;54	19;54	((.((((((((((...ccuccuccc.))))))))))))...(((.(((((ccuccuccc))))).)))	((.((((((((((.............))))))))))))...(((.(((((.........))))).)))
6	-23.2	-22.2	1.05	[][]	[][]	19;60.5	19;60.5	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc.........)))))))	(((((((((.....................))))))))).....(((((((....................)))))))
7	-23.2	-22.2	1.05	[][]	[][]	19;60.5	19;60.5	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc.........)))))))	(((((((((.....................))))))))).....(((((((....................)))))))
8	-23.1	-22.1	1.05	[][]	[][]	19;61	19;61	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc..........)))))))	(((((((((.....................))))))))).....(((((((.....................)))))))
9	-23.2	-22.2	1.05	[][]	[][]	19;60	19;60	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc........)))))))	(((((((((.....................))))))))).....(((((((...................)))))))
10	-22.7	-21.7	1.05	[][]	[][]	19;59	19;59	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc......)))))))	(((((((((.....................))))))))).....(((((((.................)))))))
11	-22.1	-20.5	1.08	[][]	[][]	19;54	19;54	((.((((((((((...ccuccuccc.))))))))))))...(((.(((((ccuccuccc))))).)))	((.((((((((((.............))))))))))))...(((.(((((.........))))).)))
12	-23.1	-22.1	1.05	[][]	[][]	19;61	19;61	(((((((((.......ccuccuccc.....))))))))).....(((((((..ucuccuccc..........)))))))	(((((((((.....................))))))))).....(((((((.....................)))))))
13	-26.8	-25.2	1.06	[][]	[][]	19;54	19;54	((.((((((((((...ccuccuccc.))))))))))))...(((((((((ccuccuccc)))))))))	((.((((((((((.............))))))))))))...(((((((((.........)))))))))
14	-22.1	-20.5	1.08	[][]	[][]	19;54	19;54	((.((((((((((...ccuccuccc.))))))))))))...(((.(((((ccuccuccc))))).)))	((.((((((((((.............))))))))))))...(((.(((((.........))))).)))
15	-29.3	-28.4	1.03	[][]	[][]	19;59	19;59	(((((((((.......ccuccuccc.....))))))))).(((((((((((..ucuccuccc......)))))))))))	(((((((((.....................)))))))))..((((((((((.................)))))))))).
16	-29.1	-28.2	1.03	[][]	[][]	19;61	19;61	(((((((((.......ccuccuccc.....))))))))).(((((((((((..ucuccuccc..........)))))))))))	(((((((((.....................)))))))))..((((((((((.....................)))))))))).
17	-29.0	-28.1	1.03	[][]	[][]	19;62	19;62	(((((((((.......ccuccuccc.....))))))))).(((((((((((..ucuccuccc............)))))))))))	(((((((((.....................)))))))))..((((((((((.......................)))))))))).
18	-28.9	-28.0	1.03	[][]	[][]	19;63.5	19;63.5	(((((((((.......ccuccuccc.....))))))))).(((((((((((.....ccucuccc.............)))))))))))	(((((((((.....................)))))))))..((((((((((..........................)))))))))).
19	-29.3	-28.4	1.03	[][]	[][]	19;59	19;59	(((((((((.......ccuccuccc.....))))))))).(((((((((((..ucuccuccc......)))))))))))	(((((((((.....................)))))))))..((((((((((.................)))))))))).
20	-28.9	-28.0	1.03	[][]	[][]	19;63.5	19;63.5	(((((((((.......ccuccuccc.....))))))))).(((((((((((.....ccucuccc.............)))))))))))	(((((((((.....................)))))))))..((((((((((..........................)))))))))).
21	-35.5	-38.0	0.93	[][]	[][]	15;51	15;51	((((((((.....ccuccuccc.))))))))..((((((((((((((.uuccuccc))))))))))))))	((((((((...............))))))))..(((((((((((((((.......)))))))))))))))
22	-39.6	-40.2	0.99	[][]	[][]	14;52.5	14;52.5	(((((((((...uuccuccc))))))))).....(((((((((((((...ucuccuccc)))))))))))))	(((((((((...........))))))))).....((((((((((((((..........))))))))))))))
23	-35.1	-34.5	1.02	[][]	[][]	15.5;54.5	15.5;54.5	((((((((((..ccuccuccc.))))))))))......(((((((((((..ccuccuccc.)))))))))))	((((((((((............))))))))))......(((((((((((............)))))))))))
24	-29.3	-28.2	1.04	[][]	[][]	15.5;54	15.5;54	((((((((((.uuccuccc...))))))).)))....((.((((((((.ccuccuccc...)))))))).))	((((((((((............))))))).)))....((.((((((((.............)))))))).))
25	-25.6	-25.1	1.02	[][]	[][]	16.5;58	16.5;58	((((((..((.uuccuccc...))..))))))........(((..((((((ucuccuccc..))))))..)))	((((((..((............))..))))))........(((..((((((...........))))))..)))
26	-42.1	-43.2	0.97	[][]	[][]	15.5;57.5	15.5;57	(((((.((((.uuccuccc...))))))))).......((((((((((((((.uuccuccc...))))))))))))))	(((((.((((............))))))))).......((((((((((((((((.......)).))))))))))))))
27	-35.9	-35.2	1.02	[][]	[][]	18.5;57.5	18.5;57.5	(((((((((((.ccuccuccc......)))))))))))((((((((..(((((.ccuccuccc)))))..)))))).))	(((((((((((...((......))...)))))))))))..((((((..(((((..........)))))..))))))....
28	-41.0	-41.3	0.99	[][]	[][]	20.5;69.5	20.5;69.5	((((((((((((((((.ccuccuccc))))))))))))))))........(((((((..((((((.ccuccuccc)))).))..)))).)))	((((((((((((((((..........))))))))))))))))...........((((..((((((..........))).)))..))))....
29	-33.3	-33.3	1.00	[][]	[][]	18.5;58.5	18.5;58.5	(((((((((((.ccuccuccc......)))))))))))((((((((...(((((.ccuccuccc)))))..)))))).))	(((((((((((...((......))...)))))))))))..((((((...(((((..........)))))..))))))...
30	-45.8	-47.1	0.97	[][]	[][]	20.5;69.5	20.5;69.5	((((((((((((((((.ccuccuccc)))))))))))))))).......((..((((..((((((.ccuccuccc)))).))..))))..))	((((((((((((((((..........))))))))))))))))...........((((..((((((..........)))).))..))))....
31	-39.1	-38.0	1.03	[][]	[][]	17;57	17;57	((((.((((((...ccuccuccc.)))))).)))).....(((((((((((...ccuccuccc.)))))))))))	((((.((((((.............)))))).)))).....(((((((((((.............)))))))))))
32	-33.3	-32.7	1.02	[][]	[][]	18;58.5	18;58.5	((.(((((((((...ccuccuccc.)))))))))))((((((..((((((((((.ccuccuccc))))))))))...))))))	((.(((((((((.............)))))))))))((((((..((((((((((..........))))))))))...))))))
33	-38.0	-36.7	1.04	[][]	[][]	17;54	17;54	(((((((((((...ccuccuccc.)))))))))))..(((((((((((...ccuccuccc.)))))))))))	(((((((((((.............)))))))))))..(((((((((((.............)))))))))))
34	-44.0	-42.2	1.04	[][]	[][][]	21;76	21;48;76	(((.((((((((((((..ccuccuccc)))))))))))).)))........((....((((.((((((((...ccuccuccc.))))))))))))...))	.((.((((((((((((...........)))))))))))).))(((.......)))..((((.((((((((.............))))))))))))....
35	-36.7	-36.7	1.00	[][]	[][]	22;73.5	22;73.5	(((.((((((((.(((...ccuccuccc.))).))))))))..))).........((((..(((((((.ccuccuccc..)))).))).))))	....((((((((.(((.............))).))))))))..............((((..(((((((............)))).))).))))
36	-38.2	-38.8	0.98	[][]	[][]	19;69	19;69	((.((((((((((...ccuccuccc.)))))))))))).......((...((((.((((((((...ccuccuccc.)))))))).))))))	.((((((((((((.............)))))))))).))...........((((.((((((((.............)))))))).))))..
37	-34.2	-38.9	0.88	[][]	[][]	14.5;58.5	16.5;58.5	(((((..(((ucuccuccc.)))....))))).......((((((((((((((((.ccuccuccc))))))))))))))))	(((((.((..((((......)))).))))))).......((((((((((((((((..........))))))))))))))))
38	-34.1	-39.5	0.86	[][]	[][]	23.5;63.5	23.5;63.5	(((((..((((.(((((((ucuccuccc.)))))))..)))))))))((((((((((((uuccuccc..))))))))))))	(((((..((((.((((((((........))))))))..)))))))))((((((((((((((......))))))))))))))

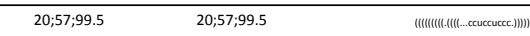
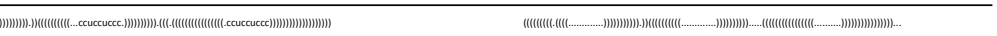
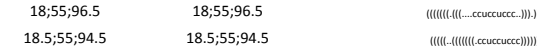
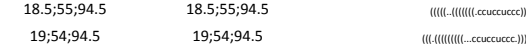
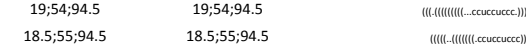
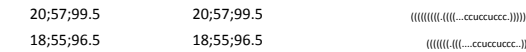
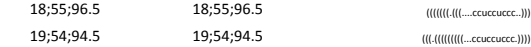
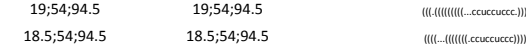
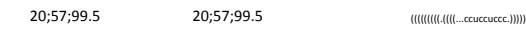
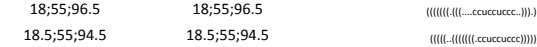
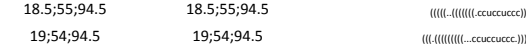
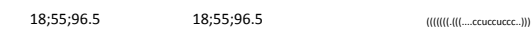
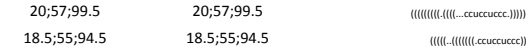
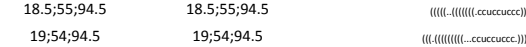
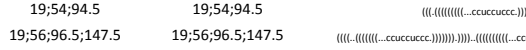
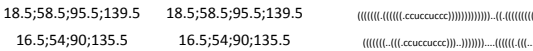
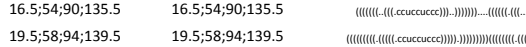
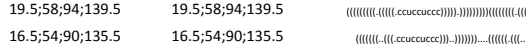
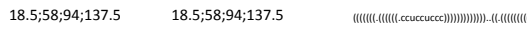
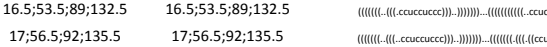
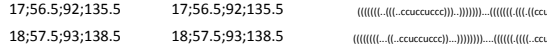
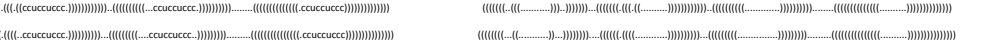
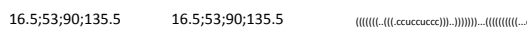
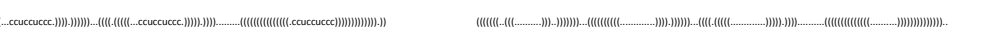
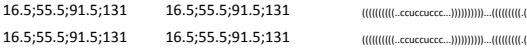
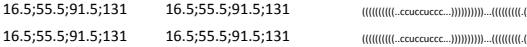
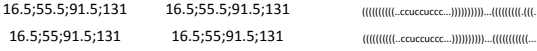
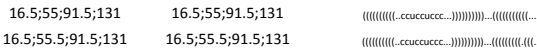
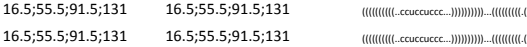
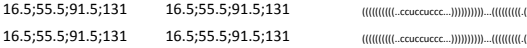
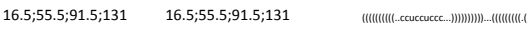
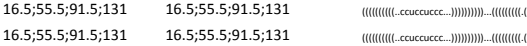
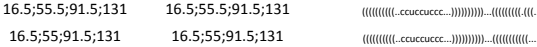
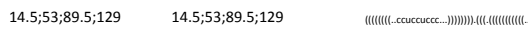
# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
39	-35.7	-40.9	0.87	[][]	[][]	22.5;62.5	22.5;62.5	((((..((((.((((((ucuccuccc..)))))))..)))))))(((((((((((uuccuccc..)))))))))))	((((..(((((.(((((((.........)))))))))..)))))))).(((((((((((.....)))))))))).
40	-23.1	-23.3	0.99	[][]	[][]	19;58.5	21.5;58.5	((.(((((((((((.uuccuccc))))))).))))))..))(((((.((((((..ccuccuccc.)))))..)).))))	((.(((((((....((((.....)))))..)))))))..))(((((.(((((.....)))))..)).))))
41	-32.3	-31.2	1.04	[][]	[][]	18.5;60.5	18.5;60.5	((((((..((((((.ccuccuccc))))))..))))))....(((((((..(((((.ccuccuccc))))..))))))))	((((((..((((((.........)))))..))))))....(((((((..(((((.....)))))..))))))))
42	-45.5	-44.9	1.01	[][]	[][]	20.5;60	20.5;60	((..(((.(((((((..ccuccuccc.)))))))))..)).((((((((((...ccuccuccc.))))))))))	((..(((.(((((((.....)))))))))..)).((((((((((.....))))))))))
43	-41.9	-41.8	1.00	[][]	[][]	14.5;54	14.5;54	(((((((((..ccuccuccc.)))))))))(((..(((((.(((((((..ccuccuccc)))))))))).)))))	(((((((((.....)))))))))(((..(((((.(((((.....)))))))))).))))
44	-37.7	-37.0	1.02	[][]	[][]	15.5;55	15.5;55	((((((((((..ccuccuccc.))))))))))......((((((..(((((.ccuccuccc.))))).)))))))	((((((((((.....)))))))))).....((((((..(((((.....)))))..))))))
45	-40.2	-39.4	1.02	[][]	[][]	19.5;58	19.5;58	((((.((.((((((..ccuccuccc.))))))).))))).((((((((((...ccuccuccc.))))))))))	((((.((.((((((.....)))))).)))))).((((((((((.....))))))))))
46	-40.9	-40.4	1.01	[][]	[][]	18;62	18;62	((((.(((((((..ccuccuccc)))))).)))))))....((((((((((.....ccuccuccc..))))))))))	((((.(((((((.....)))))).)))))))....((((((((((.....))))))))))
47	-40.6	-40.0	1.02	[][]	[][]	16;57.5	16;57.5	((((((.(((..ucuccuccc...))).)))))))..((((((((((((((..ccuccuccc.))))))))))))))..))))	((((((.(((.....))).)))))))..((((((((((((((.....)))))))))))))).))))
48	-35.6	-34.8	1.02	[][]	[][]	21;59.5	21;59.5	((...(((((((((....ccuccuccc..)))))))))...))(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))(((((((((.....)))))))))
49	-42.2	-41.1	1.03	[][]	[][]	16.5;58.5	16.5;58.5	((((((.(((.ucuccuccc....))).)))))).((((((((((((((..ccuccuccc.))))))))))))))..))))	((((((.(((.....))).)))))).((((((((((((((.....)))))))))))))..))))
50	-35.6	-34.8	1.02	[][]	[][]	21;59.5	21;59.5	((...(((((((((....ccuccuccc..)))))))))...))(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))(((((((((.....)))))))))
51	-39.2	-39.0	1.01	[][]	[][]	17;60	17;60	(((.(((((((.((ucuccuccc))))))).)))).....(((((((((((.ucuccuccc.....)))))))))))	(((.((((((.((.....)))))))).)))).....(((((((((((.....))))))))))))
52	-31.1	-33.9	0.92	[][]	[][][]	21.5;74	21.5;45;74	(((((..(((.(((((ucuccuccc...)))))).)))...))))...((((...(((((..((((acuccuccc.....)))))))))))))	.....(((.((((.....)))))).)))(((((.....))))).((((((..(((.....)))))))))...
53	-43.1	-42.5	1.01	[][]	[][]	21;60	21;60	((.(((..(((((((...ccuccuccc.))))))))))..)))(((((((((...ccuccuccc.)))))))))	((.(((((.(((((.....)))))))))).)))(((((((((.....)))))))))
54	-42.8	-42.0	1.02	[][]	[][]	16;55.5	16;55.5	((((((((((...ccuccuccc.))))))))).)))..(((((((((((((..ccuccuccc.)))))))))).)))))	((((((((((.....)))))))).))).(((((((((((((.....)))))))).))))).))))))
55	-39.9	-39.9	1.00	[][]	[][]	15;48.5	15;48.5	((((((((((...ccuccuccc.))))))))))..(((((((((((.ccuccuccc))))))))))	((((((((.....))))))))..(((((((((.....)))))))))
56	-41.5	-41.3	1.00	[][]	[][]	18;57	18;57	((((...((((...ccuccuccc.))))))..))))...(((((((((((...ccuccuccc.)))))))))))	((((...((((.....))))).))))...(((((((((.....)))))))))
57	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
58	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
59	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
60	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
61	-43.5	-42.5	1.02	[][]	[][]	20.5;59.5	20.5;59.5	((((...(((((((((.ccuccuccc))))))))))...))).(((((((((..ccuccuccc.)))))))))	((((...(((((((((.....)))))))))...))).(((((((((.....)))))))))
62	-36.8	-36.0	1.02	[][]	[][]	17;54.5	17;54.5	(((((.((((...ccuccuccc.)))))..))))...((((((((((..ccuccuccc.))))))))))	(((((.((((.....))))).))))...((((((((((.....))))))))))
63	-38.9	-37.9	1.03	[][]	[][]	16.5;55	16.5;55	((((.(((((((.ccuccuccc))))))).....))))..((((((((((...ccuccuccc.))))))))))	((((.(((((((.....)))))))).....))))..((((((((((.....))))))))))
64	-47.5	-46.1	1.03	[][]	[][]	19.5;59	19.5;59	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
65	-45.5	-44.9	1.01	[][]	[][]	19.5;59	19.5;59	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
66	-36.7	-35.6	1.03	[][]	[][]	18.5;56.5	18.5;56.5	((((((..((((..ccuccuccc.))))..)))).)))..(((((((((..ccuccuccc.)))))))))	((((((..((((.....))))..)))).)))..(((((((((.....)))))))))
67	-38.2	-37.9	1.01	[][]	[][]	16.5;55	16.5;55	((((.(((((((.ccuccuccc))))))).....))))..((((((((((...ccuccuccc.))))))))))	((((.(((((((.....)))))))).....))))..((((((((((.....))))))))))
68	-41.1	-40.1	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((.(((.ccuccuccc))).)))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((.(((.....))).)))))...))..(((((((((.....)))))))))
69	-42.3	-41.3	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
70	-42.3	-41.3	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
71	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
72	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
73	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
74	-46.2	-45.2	1.02	[][]	[][]	20.5;59.5	20.5;59.5	(((...(((((((((.ccuccuccc))))))))))...))).(((((((((..ccuccuccc.)))))))))	(((...(((((((((.....)))))))))...))).(((((((((.....)))))))))
75	-36.8	-36.0	1.02	[][]	[][]	17;54.5	17;54.5	(((((.((((...ccuccuccc.))))).))))...((((((((((..ccuccuccc.))))))))))	(((((.((((.....))))).))))...((((((((((.....))))))))))
76	-38.3	-37.3	1.03	[][]	[][]	16.5;55	16.5;55	((((.(((((((.ccuccuccc))))))).....))))..((((((((((...ccuccuccc.))))))))))	((((.(((((((.....)))))))).....))))..((((((((((.....))))))))))
77	-45.0	-44.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((..ccuccuccc.)))))))))	((...(((((((((.....)))))))))...))..(((((((((.....)))))))))
78	-43.0	-42.0	1.02	[][]	[][]	19.5;60.5	19.5;60.5	((...(((((((((.ccuccuccc))))))))))...))..(((((((((.(....ccuccuccc.))))))))))	((...(((((((((.....)))))))))...))..(((((((((.(.....))))))))))

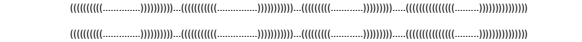
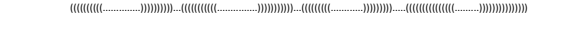
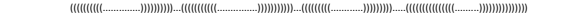
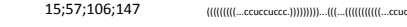
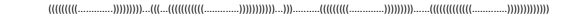
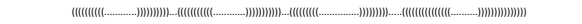
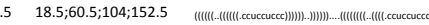
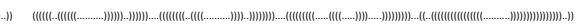
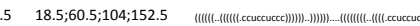
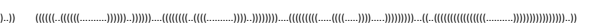
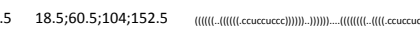
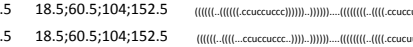
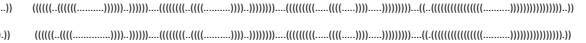
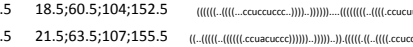
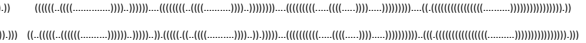
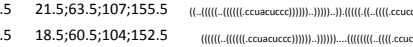
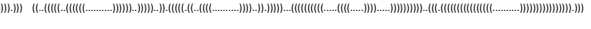
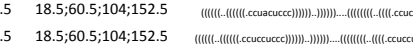
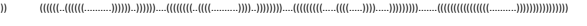
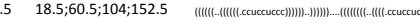
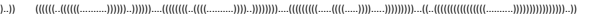
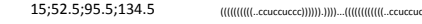
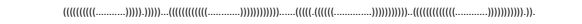
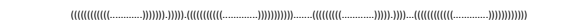
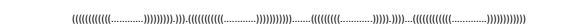
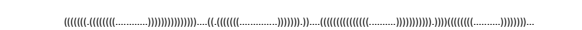
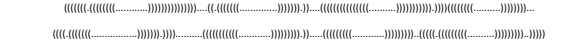
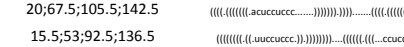
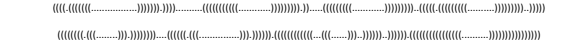
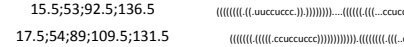
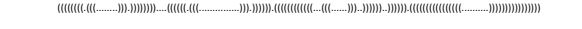
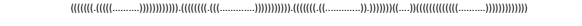
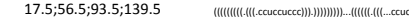
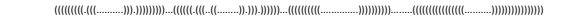
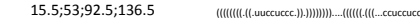
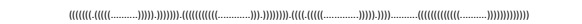
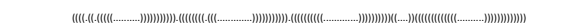
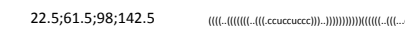
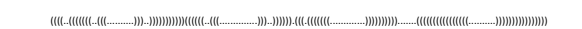
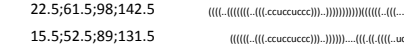
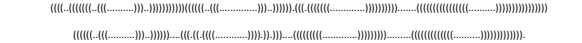
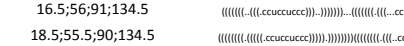
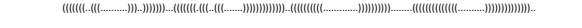
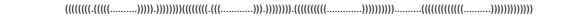
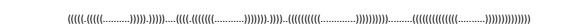
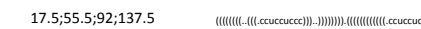
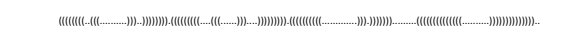
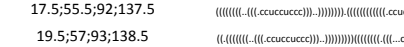
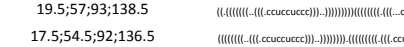
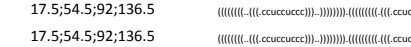
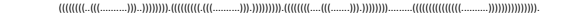
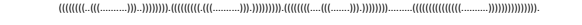
# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
79	-43.0	-42.0	1.02	[][]	[][]	19.5;58.5	19.5;58.5		
80	-42.3	-41.3	1.02	[][]	[][]	19.5;58.5	19.5;58.5		
81	-46.2	-45.2	1.02	[][]	[][]	20.5;59.5	20.5;59.5		
82	-36.8	-36.0	1.02	[][]	[][]	17;54.5	17;54.5		
83	-38.9	-37.9	1.03	[][]	[][]	16.5;55	16.5;55		
84	-37.3	-38.2	0.98	[][]	[][]	22;61	22.5;61		
85	-45.8	-44.8	1.02	[][]	[][]	20.5;62	20.5;62		
86	-33.4	-34.8	0.96	[][]	[][]	22;61	23.5;61		
87	-42.5	-41.5	1.02	[][]	[][]	16.5;58	16.5;58		
88	-37.1	-35.5	1.05	[][]	[][]	20.5;64.5	20.5;64.5		
89	-38.6	-37.5	1.03	[][]	[][]	22.5;70.5	22.5;70.5		
90	-43.6	-43.2	1.01	[][]	[][]	17;59	17;59		
91	-39.1	-38.5	1.02	[][]	[][]	16;56	16;56		
92	-41.1	-40.5	1.01	[][]	[][]	15;57	15;57		
93	-49.7	-47.6	1.04	[][]	[][]	22;63	22;63		
94	-39.8	-39.2	1.02	[][]	[][]	19;57.5	19;57.5		
95	-37.7	-36.0	1.05	[][]	[][]	18.5;57.5	18.5;57.5		
96	-40.5	-40.0	1.01	[][]	[][]	16;59	16;59		
97	-37.2	-36.6	1.02	[][]	[][]	19;58	19;58		
98	-43.4	-42.6	1.02	[][]	[][]	19;58	19;58		
99	-42.2	-41.5	1.02	[][]	[][]	16.5;56	16.5;56		
100	-39.3	-37.8	1.04	[][]	[][]	16;52	16;52		
101	-32.5	-31.4	1.04	[][]	[][]	21;60.5	21;60.5		
102	-32.5	-31.4	1.04	[][]	[][]	21;60.5	21;60.5		
103	-40.4	-40.3	1.00	[][]	[][]	14.5;54.5	14.5;54.5		
104	-35.6	-34.8	1.02	[][]	[][]	21;59.5	21;59.5		
105	-46.6	-45.5	1.02	[][]	[][]	16.5;58.5	16.5;58.5		
106	-56.4	-55.8	1.01	[][][]	[][][]	20;58;97.5	20;58;97.5		
107	-52.9	-52.3	1.01	[][][]	[][][]	17.5;54;95	17.5;54;95		
108	-54.2	-53.2	1.02	[][][]	[][][]	18;54;97	18;54;97		
109	-49.8	-49.5	1.01	[][][]	[][][]	19;57;97.5	19;57;97.5		
110	-53.4	-51.9	1.03	[][][]	[][][]	19;56;96.5	19;56;96.5		
111	-57.0	-55.8	1.02	[][][]	[][][]	20;58;97.5	20;58;97.5		
112	-51.3	-50.9	1.01	[][][]	[][][]	16.5;52.5;93.5	16.5;52.5;93.5		
113	-58.3	-57.1	1.02	[][][]	[][][]	21;59;100	21;59;100		
114	-58.0	-57.0	1.02	[][][]	[][][]	19;56;98.5	19;56;98.5		
115	-50.7	-50.1	1.01	[][][]	[][][]	19;53;95	19;53;95		
116	-43.5	-43.1	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
117	-50.7	-50.1	1.01	[][][]	[][][]	19;53;95	19;53;95		
118	-43.5	-43.1	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		

# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
119	-43.5	-43.1	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
120	-43.6	-43.2	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
121	-43.6	-43.2	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
122	-42.7	-42.3	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
123	-42.7	-42.3	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
124	-42.7	-42.3	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
125	-42.7	-42.3	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
126	-43.5	-43.1	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
127	-42.7	-42.3	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
128	-45.4	-45.0	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
129	-45.4	-45.0	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
130	-45.4	-45.0	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
131	-50.7	-50.1	1.01	[][][]	[][][]	19;53;95	19;53;95		
132	-50.7	-50.1	1.01	[][][]	[][][]	19;53;95	19;53;95		
133	-39.6	-39.2	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
134	-50.7	-50.1	1.01	[][][]	[][][]	19;53;95	19;53;95		
135	-45.4	-45.0	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
136	-50.7	-50.1	1.01	[][][]	[][][]	19;53;95	19;53;95		
137	-39.6	-39.2	1.01	[][][]	[][][]	14;47.5;84	14;47.5;84		
138	-36.2	-41.2	0.88	[][][]	[][][]	15;53.5;95	15;51;95		
139	-45.6	-52.1	0.88	[][][]	[][][]	16.5;52;90.5	19;52;90.5		
140	-62.6	-61.6	1.02	[][][]	[][][]	16;53.5;96.5	16;53.5;96.5		
141	-59.6	-59.0	1.01	[][][]	[][][]	18;55.5;96.5	18;55.5;96.5		
142	-56.8	-55.8	1.02	[][][]	[][][]	19.5;60.5;99.5	19.5;60.5;99.5		
143	-56.8	-55.8	1.02	[][][]	[][][]	19.5;60.5;99.5	19.5;60.5;99.5		
144	-60.5	-62.8	0.96	[][][]	[][][]	18.5;60.5;109.5	18.5;60.5;109.5		
145	-58.1	-61.0	0.95	[][][]	[][][]	18.5;60.5;110.5	18.5;60.5;110.5		
146	-54.4	-54.1	1.01	[][][]	[][][]	17.5;53.5;90.5	17.5;53.5;90.5		
147	-59.2	-58.3	1.02	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
148	-65.1	-64.7	1.01	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
149	-62.8	-61.7	1.02	[][][]	[][][]	17.5;55;96.5	17.5;55;96.5		
150	-56.0	-55.4	1.01	[][][]	[][][]	19;57.5;96.5	19;57.5;96.5		
151	-53.7	-52.7	1.02	[][][]	[][][]	16;54.5;94.5	16;54.5;94.5		
152	-56.6	-56.3	1.01	[][][]	[][][]	17.5;53.5;90.5	17.5;53.5;90.5		
153	-58.4	-57.5	1.02	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
154	-64.8	-63.7	1.02	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
155	-61.1	-59.4	1.03	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
156	-54.2	-53.6	1.01	[][][]	[][][]	19;57.5;97.5	19;57.5;97.5		
157	-70.2	-69.2	1.01	[][][]	[][][]	17.5;54;95.5	17.5;54;95.5		
158	-62.5	-60.9	1.03	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		

# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
159	-61.5	-60.6	1.01	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
160	-56.7	-57.6	0.98	[][][]	[][][]	18;56.5;95.5	20.5;56.5;95.5		
161	-57.6	-57.2	1.01	[][][]	[][][]	23.5;59.5;96.5	23.5;59.5;96.5		
162	-54.1	-53.5	1.01	[][][]	[][][]	19;57.5;96.5	19;57.5;96.5		
163	-54.4	-54.1	1.01	[][][]	[][][]	17.5;53.5;90.5	17.5;53.5;90.5		
164	-57.8	-56.9	1.02	[][][]	[][][]	17.5;54.5;96.5	17.5;54.5;96.5		
165	-61.0	-60.0	1.02	[][][]	[][][]	17.5;54.5;95.5	17.5;54.5;95.5		
166	-70.6	-69.4	1.02	[][][]	[][][]	17.5;54;95.5	17.5;54;95.5		
167	-54.4	-53.6	1.01	[][][]	[][][]	25;63.5;102.5	25;63.5;102.5		
168	-64.5	-72.3	0.89	[][][]	[][][]	22;72.5;113	22;72.5;113		
169	-45.8	-45.9	1.00	[][][]	[][][]	19;53.5;90	19;53.5;90		
170	-49.8	-49.2	1.01	[][][]	[][][]	23;58;100	23;58;100		
171	-53.4	-52.6	1.02	[][][]	[][][]	15.5;50;92.5	15.5;50;92.5		
172	-49.8	-53.4	0.93	[][][]	[][][]	20;59;99.5	20;59;99.5		
173	-55.4	-62.1	0.89	[][][]	[][][]	23;76.5;119.5	23;78.5;119.5		
174	-43.4	-45.2	0.96	[][][]	[][][]	25;76;118	25;74;118		
175	-47.0	-46.5	1.01	[][][]	[][][]	25;72;112	25;72;112		
176	-63.7	-63.8	1.00	[][][]	[][][]	17.5;54.5;96.5	17.5;54.5;96.5		
177	-53.0	-52.7	1.01	[][][]	[][][]	17;54;94.5	17;54;94.5		
178	-58.3	-64.0	0.91	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
179	-46.0	-45.3	1.02	[][][]	[][][]	18;55;95.5	18;55;95.5		
180	-48.1	-53.5	0.90	[][][]	[][][]	16;52.5;91.5	16;52.5;91.5		
181	-55.3	-55.0	1.01	[][][]	[][][]	17;54;94.5	17;54;94.5		
182	-56.0	-61.9	0.90	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
183	-48.2	-48.0	1.00	[][][]	[][][]	18.5;56;96.5	18.5;56;96.5		
184	-53.0	-52.7	1.01	[][][]	[][][]	17;54;94.5	17;54;94.5		
185	-56.5	-62.8	0.90	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
186	-46.0	-45.3	1.02	[][][]	[][][]	18;55;95.5	18;55;95.5		
187	-48.9	-53.7	0.91	[][][]	[][][]	16;52.5;91.5	16;52.5;91.5		
188	-58.6	-59.9	0.98	[][][]	[][][]	18;55;94	18;55;94		
189	-49.6	-49.3	1.01	[][][]	[][][]	17;54;94.5	17;54;94.5		
190	-51.4	-57.3	0.90	[][][]	[][][]	18;54;93.5	18;54;93.5		
191	-46.3	-52.9	0.88	[][][]	[][][]	20.5;57;96.5	20.5;57;96.5		
192	-49.2	-57.0	0.86	[][][]	[][][]	18;54.5;93.5	18;54.5;93.5		
193	-55.3	-55.0	1.01	[][][]	[][][]	17;54;94.5	17;54;94.5		
194	-55.4	-61.3	0.90	[][][]	[][][]	18.5;56;95.5	18.5;56;95.5		
195	-43.8	-50.4	0.87	[][][]	[][][]	22.5;60;99.5	22.5;60;99.5		
196	-60.5	-60.1	1.01	[][][]	[][][]	17.5;53;92	17.5;53;92		
197	-51.5	-51.2	1.01	[][][]	[][][]	17;54;94.5	17;54;94.5		
198	-49.1	-55.0	0.89	[][][]	[][][]	18;54;93.5	18;54;93.5		

# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
199	-48.4	-48.1	1.01	[][][]	[][][]	21.5;58;98.5	21.5;58;98.5		
200	-48.1	-48.1	1.00	[][][]	[][][]	17;54.5;97	17;54.5;97		
201	-57.2	-56.2	1.02	[][][]	[][][]	18;54.5;98	18;54.5;98		
202	-52.4	-52.1	1.01	[][][]	[][][]	26;64;104.5	26;64;104.5		
203	-55.5	-57.6	0.96	[][][]	[][][][]	19;58;105	19;58;83;105		
204	-59.8	-60.2	0.99	[][][]	[][][]	19;56;98.5	19;56;98.5		
205	-59.7	-58.7	1.02	[][][]	[][][]	18;56;97.5	18;56;97.5		
206	-56.9	-55.9	1.02	[][][]	[][][]	18.5;55;97.5	18.5;55;97.5		
207	-60.2	-59.5	1.01	[][][]	[][][]	16;51;91.5	16;51;91.5		
208	-45.2	-43.9	1.03	[][][]	[][][]	18;55.5;95.5	18;55.5;95.5		
209	-45.2	-43.9	1.03	[][][]	[][][]	18;55.5;95.5	18;55.5;95.5		
210	-56.4	-55.7	1.01	[][][]	[][][]	16;51;91.5	16;51;91.5		
211	-57.4	-57.8	0.99	[][][]	[][][]	19;56.5;99.5	19;56.5;99.5		
212	-61.0	-60.0	1.02	[][][]	[][][]	18;56;97.5	18;56;97.5		
213	-57.1	-56.1	1.02	[][][]	[][][]	18.5;55;97.5	18.5;55;97.5		
214	-58.6	-57.9	1.01	[][][]	[][][]	16;51;91.5	16;51;91.5		
215	-60.6	-60.5	1.00	[][][]	[][][]	19;56;98.5	19;56;98.5		
216	-46.4	-49.1	0.95	[][][]	[][][]	18;56;97	18;56;97		
217	-42.1	-48.0	0.88	[][][]	[][][]	16.5;52.5;91.5	16.5;52.5;92		
218	-56.0	-55.0	1.02	[][][]	[][][]	18.5;55;97.5	18.5;55;97.5		
219	-45.2	-43.9	1.03	[][][]	[][][]	18;55.5;95.5	18;55.5;95.5		
220	-56.8	-56.1	1.01	[][][]	[][][]	19;54;94.5	19;54;94.5		
221	-59.0	-59.0	1.00	[][][]	[][][]	20;57;99.5	20;57;99.5		
222	-49.5	-54.3	0.91	[][][]	[][][]	18;56;96	18;56;96		
223	-54.2	-53.2	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
224	-50.2	-49.5	1.01	[][][]	[][][]	18.5;54;94.5	18.5;54;94.5		
225	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
226	-65.0	-65.4	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
227	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
228	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
229	-50.2	-49.5	1.01	[][][]	[][][]	18.5;54;94.5	18.5;54;94.5		
230	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
231	-65.0	-65.4	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
232	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
233	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
234	-65.0	-65.4	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
235	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
236	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
237	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
238	-50.5	-49.8	1.01	[][][]	[][][]	18.5;54;94.5	18.5;54;94.5		

# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
239	-65.0	-65.4	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
240	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
241	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
242	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
243	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
244	-65.0	-65.4	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
245	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
246	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
247	-50.5	-49.8	1.01	[][][]	[][][]	18.5;54;94.5	18.5;54;94.5		
248	-62.2	-62.6	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
249	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
250	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
251	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
252	-49.5	-48.5	1.02	[][][]	[][][]	18;55;96.5	18;55;96.5		
253	-65.0	-65.4	0.99	[][][]	[][][]	20;57;99.5	20;57;99.5		
254	-53.6	-52.6	1.02	[][][]	[][][]	18.5;55;94.5	18.5;55;94.5		
255	-57.2	-57.2	1.00	[][][]	[][][]	19;54;94.5	19;54;94.5		
256	-61.5	-61.0	1.01	[][][][]	[][][][]	19;56;96.5;147.5	19;56;96.5;147.5		
257	-64.8	-64.7	1.00	[][][][]	[][][][]	18.5;58.5;95.5;139.5	18.5;58.5;95.5;139.5		
258	-67.2	-66.2	1.02	[][][][]	[][][][]	16.5;54;90;135.5	16.5;54;90;135.5		
259	-74.6	-73.5	1.01	[][][][]	[][][][]	19.5;58;94;139.5	19.5;58;94;139.5		
260	-69.6	-68.6	1.01	[][][][]	[][][][]	16.5;54;90;135.5	16.5;54;90;135.5		
261	-65.0	-64.6	1.01	[][][][]	[][][][]	18.5;58;94;137.5	18.5;58;94;137.5		
262	-64.0	-63.1	1.01	[][][][]	[][][][]	16.5;53.5;89;132.5	16.5;53.5;89;132.5		
263	-70.0	-68.9	1.02	[][][][]	[][][][]	17;56.5;92;135.5	17;56.5;92;135.5		
264	-69.5	-68.5	1.01	[][][][]	[][][][]	18;57.5;93;138.5	18;57.5;93;138.5		
265	-66.2	-65.3	1.01	[][][][]	[][][][]	16.5;53;90;135.5	16.5;53;90;135.5		
266	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
267	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
268	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
269	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
270	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
271	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
272	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
273	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
274	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
275	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
276	-73.0	-72.4	1.01	[][][][]	[][][][]	16.5;55.5;91.5;131	16.5;55.5;91.5;131		
277	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
278	-71.0	-70.4	1.01	[][][][]	[][][][]	14.5;53;89.5;129	14.5;53;89.5;129		

# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
279	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
280	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
281	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
282	-75.5	-74.9	1.01	[][][][]	[][][][]	16.5;55;91.5;131	16.5;55;91.5;131		
283	-81.5	-81.4	1.00	[][][][]	[][][][]	15;57;106;147	15;57;106;147		
284	-71.6	-71.0	1.01	[][][][]	[][][][]	15.5;51.5;88;129.5	15.5;51.5;88;129.5		
285	-75.9	-78.4	0.97	[][][][]	[][][][]	18.5;60.5;102.5;152.5	18.5;60.5;104;152.5		
286	-74.6	-77.1	0.97	[][][][]	[][][][]	18.5;60.5;102.5;152.5	18.5;60.5;104;152.5		
287	-77.2	-79.7	0.97	[][][][]	[][][][]	18.5;60.5;102.5;152.5	18.5;60.5;104;152.5		
288	-67.5	-69.4	0.97	[][][][]	[][][][]	18.5;60.5;102.5;152.5	18.5;60.5;104;152.5		
289	-68.9	-71.5	0.96	[][][][]	[][][][]	21.5;63.5;105.5;155.5	21.5;63.5;107;155.5		
290	-69.4	-71.9	0.97	[][][][]	[][][][]	18.5;60.5;102.5;152.5	18.5;60.5;104;152.5		
291	-73.2	-75.7	0.97	[][][][]	[][][][]	18.5;60.5;102.5;152.5	18.5;60.5;104;152.5		
292	-80.9	-80.1	1.01	[][][][]	[][][][]	15;52.5;95.5;134.5	15;52.5;95.5;134.5		
293	-76.0	-75.5	1.01	[][][][]	[][][][]	17.5;55;94.5;132	17.5;55;94.5;132		
294	-75.3	-74.4	1.01	[][][][]	[][][][]	17.5;54.5;93.5;131	17.5;54.5;93.5;131		
295	-74.9	-74.3	1.01	[][][][]	[][][][]	21.5;63.5;104.5;138.5	21.5;63.5;104.5;138.5		
296	-66.2	-66.0	1.00	[][][][]	[][][][]	20;67.5;105.5;142.5	20;67.5;105.5;142.5		
297	-64.7	-70.3	0.92	[][][][]	[][][][]	15.5;53;91.5;136.5	15.5;53;92.5;136.5		
298	-64.9	-64.9	1.00	[][][][]	[][][][][]	17.5;54;89;131.5	17.5;54;89;109.5;131.5		
299	-74.1	-74.4	1.00	[][][][]	[][][][]	17.5;56;93.5;139.5	17.5;56.5;93.5;139.5		
300	-64.7	-70.3	0.92	[][][][]	[][][][]	15.5;53;91.5;136.5	15.5;53;92.5;136.5		
301	-69.1	-68.7	1.01	[][][][]	[][][][]	17.5;53.5;89;133.5	17.5;53.5;89;133.5		
302	-64.2	-64.2	1.00	[][][][]	[][][][][]	17.5;53;88;130.5	17.5;53;88;108.5;130.5		
303	-72.6	-72.2	1.01	[][][][]	[][][][]	22.5;61.5;98;142.5	22.5;61.5;98;142.5		
304	-56.4	-55.5	1.02	[][][][]	[][][][]	15.5;52.5;89;131.5	15.5;52.5;89;131.5		
305	-72.4	-74.1	0.98	[][][][]	[][][][]	16.5;55;91;134.5	16.5;56;91;134.5		
306	-70.7	-69.7	1.01	[][][][]	[][][][]	18.5;55.5;90;134.5	18.5;55.5;90;134.5		
307	-72.4	-71.4	1.01	[][][][]	[][][][]	18.5;55.5;91;135.5	18.5;55.5;91;135.5		
308	-67.6	-66.9	1.01	[][][][]	[][][][]	15.5;51.5;88;132.5	15.5;51.5;88;132.5		
309	-68.6	-67.6	1.01	[][][][]	[][][][]	18.5;55.5;90;134.5	18.5;55.5;90;134.5		
310	-66.6	-65.4	1.02	[][][][]	[][][][]	15.5;53;89;133.5	15.5;53;89;133.5		
311	-67.3	-69.7	0.97	[][][][]	[][][][]	17.5;53.5;92;137.5	17.5;55.5;92;137.5		
312	-68.0	-67.1	1.01	[][][][]	[][][][]	19.5;57;93;138.5	19.5;57;93;138.5		
313	-66.6	-69.2	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5		
314	-66.6	-69.2	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5		
315	-66.4	-69.2	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5		
316	-66.3	-68.9	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5		
317	-66.6	-69.2	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5		
318	-64.4	-67.2	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5		

# Cuckoo RNA	Energy cuckoo TDM	MFE (RNAfold -d2)	Energy TDM / MFE	Abstract shape TDM structure	Abstract shape MFE structure	TDM hairpin centers	MFE hairpin centers	TDM structure and cuckoo motifs	MFE structure
319	-64.4	-67.2	0.96	[][][][]	[][][][]	17.5;54.5;90.5;136.5	17.5;54.5;92;136.5	((((((((..(((.ccuccuccc)))..)))))))).(((((((((.(((.ccuccuccc))).))))))))).((((((((.....ccuccuccc....))))))))........(((((((((((((((.ccuccuccc)))))))))))))))	((((((((..(((..........)))..)))))))).(((((((((.(((..........))).))))))))).((((((((....(((.......))).))))))))........(((((((((((((((..........))))))))))))))).
320	-74.8	-79.2	0.94	[][][][]	[][][][]	15;55.5;101.5;146.5	15;55.5;103;146.5	((((((((((acccucccu)).))))))))..(((((((...((((((..ccuccuccc.))))))...)))))))....((((((((.(((....uuccuccc....)))..))))))))((((.(((((((((((((uuccuccc..))))))))))).)))..))))	((((((((((((.......)).))))))))))..(((((((...((((((............))))))...)))))))....((((((((.....((..((.....))..))...))))))))((((.(((((((((((((((......))))))))))))).))))..))))
321	-74.3	-78.7	0.94	[][][][]	[][][][]	15;55.5;101.5;146.5	15;55.5;103;146.5	((((((((((acccucccu)).))))))))..(((((((...((((((..ccuccuccc.))))))...)))))))....((((((((.(((....uuccuccc....)))..))))))))((((.(((((((((((((uuccuccc..))))))))))).)))..))))	((((((((((((.......)).))))))))))..(((((((...((((((............))))))...)))))))....((((((((.....((..((.....))..))...))))))))((((.(((((((((((((((......))))))))))))).))))..))))

Table S4. Sequences of cuckoo RNAs.

# Cuckoo RNA	Cuckoo RNA sequence
1	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGGCACUCUCCUCCCCCCCCAAGUCCGGU
2	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGGCACUCUCCUCCCCCCCAAGUCCGGU
3	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGGCACUCUCCUCCCCCCCAAGUCCGGU
4	GGUGUUCGGUUUUACUCCUCCUCCCAAAAAUCGAACCUGAGCGCGGCACUCCUCCUCCCAGUGCAGCG
5	GGUGUUCGGUUUUACUCCUCCUCCCAAAAAUCGAACCUGAGCGCGGCACUCCUCCUCCCAGUGCAGCG
6	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGACACUCUCCUCCCCCCCCCCCAAGUCCGGU
7	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGACACUCUCCUCCCCCCCCCCAAGUCCGGU
8	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGACACUCUCCUCCCCCCCCCCCAAGUCCGGU
9	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGACACUCUCCUCCCCCCCCCAAGUCCGGU
10	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGGCACUCUCCUCCCCCCCAAGUCCGGU
11	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUGCAGCG
12	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAAACCGGACACUCUCCUCCCCCCCCCCCAAGUCCGGU
13	GGCGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCUGCACUCCUCCUCCCAGUGCAGCG
14	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUGCAGCG
15	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAGACCGGACACUCUCCUCCCCCCCCAAGUCCGGUCUUU
16	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAGACCGGACACUCUCCUCCCCCCCCCCCCAAGUCCGGUCUUU
17	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAGACCGGACACUCUCCUCCCCCCCCCCCCCCAAGUCCGGUCUUU
18	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAGACCGGACACUCUCCUCUCCCCCCCCCCCCCCCAAGUCCGGUCUUU
19	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAGACCGGACACUCUCCUCCCCCCCCAAGUCCGGUCUUU
20	AUCGCCGGGUGUUUCUCCUCCUCCCAUUCCCUCGGCGAUCAAAGACCGGACACUCUCCUCUCCCCCCCCCCCCCCCAAGUCCGGUCUUU
21	GGGGUCGGUACUCCCUCCUCCCCUCCGAUCCCUUAGAAAAAGACCGGGGUUCCUCCCCCCGGUCUUUUUCU
22	UCACCGCGUCCCUUCCUCCCGCGCGGUGACUCCAGCCGACGAGGGGUGUUUCUCCUCCCGCCUCUCGUCGGC
23	CAGAAAGCCCCUCCUCCUCCCUGGGUUUUCUGUAAUAUGCGGCGGCGCUUUCCUCCUCCCUAGCGUCGCCGC
24	AUCCGGCCUUCUUCCUCCCAUUGAGGCCGUGAUCAGCGGAACCGCUCCUCCUCCUCCCUUCGGAGCGGUGCC
25	CAGACCGCGCCUUUCCUCCCAUCGGAUCGGUCUGGAUCAUACGGCAAGCGUUCUCUCCUCCCUUGGACGUGCGCC
26	GGCCCUGCCCUUUCCUCCCAUUGGGCGGGCCAGAUUUCGGCGGUGAUGAUGUCUUCCUCCCAGAACAUCGUCACCGCC
27	UCGGAUCUGCCGCCUCCUCCCUGAAAAGGCAGAUCUGACAGACCCCACGCCUUACCUCCUCCCAGGGCACGGGGUCAUG
28	UAAAGCGGCGGCAUCCACCUCCUCCCGGGUGCCGCCGCUUUAUGAAACAAGUUUCGGAACCGCCCACCUCCUCCCGGGUUGGAACCGAUGAU
29	UCGGAUCUGCUGCCUCCUCCCUGAAAAGGCAGAUCUGACAGACCCCCGCGCUCUACCUCCUCCCGGAGCCAGGGGUCAUG
30	UAAGGCGGCGGCGCCCACCUCCUCCCGGGUGCCGCCGCUUUAUGACACAGGUUUCGGAACCGCCCACCUCCUCCCGGGCUGGGACCGAUUUU
31	UCAGGCGGUCCUCUCCUCCUCCCUGGACCGACUGAAACUCGCGGCGGCAUCUCUCCUCCUCCCUGAUGCCGCCGC
32	UGUGAUCGGUUCUCUCCUCCUCCCUGAGCCGAUCCGGAAUAAUCGGCGGCAUCCACCUCCUCCCGGAUGUCGCCUUUUUAUUU
33	UCGGAGCCUUCUCUCCUCCUCCCUGAAGGCUCUGACCGCGGCUCGCUCUCUCCUCCUCCCUGAGCGGGUCGC
34	AGAAGCGGCGGCGUCCAUCCUCCUCCCGGGCGUCGUCGCCUCUCCAAGACACGGAAUUCGCAGGUCGUUCUCUCCUCCUCCCUGAACGGCCGCGAUAGCG
35	AAGACGCGGCGGCGCCUCUCCUCCUCCCUGGCAUCGUCGCGCGCUUCGGACCACAUCGCAGGGCGCCCUCCUCCUCCCUUGGGCAGCCGGCGA
36	AGACGGCGGCGCCUCUCCUCCUCCCUGGCGUCGCCGCUCGACAUUCAGAUUCGGCGGCCGUUCCCUCCUCCUCCCUGAACGGUCCCCGAUG
37	GGGCCUGCUUUCUCCUCCCAGAGAUGUGGCCCACACAUGAAAGUGACGAGACCUACCUCCUCCCGGGUCUCGUCGCUUUU
38	AGAAAAUAGAUACGCGCUUUCUCCUCCCGAAGCGUGAAGUCUUUUCUAAGGGCGUGCUGUUCCUCCCGACAGCACGCCCUU
39	GAAAAUAGAUACGCGCUUUCUCCUCCCGAAGCGCGACGUCUUUUCAAAGGGCGUGCUGUUCCUCCCGACAGCACGCCCUUU
40	GAAACGGGGCUUUCUCUUCCUCCCAGAAGGUGUUCCGUGAUCGUGCCCACCCCUUCCUCCUCCCUGGGGUCUGAGCAC
41	UUUCGGAACCGCCCACCUCCUCCCGGGUGGAACCGAAAAUACCGCUGACGGCGCUCACCUCCUCCCGAGCAAUGUUGGCG
42	GAUACGGUGAAGCCCCUCCUCCUCCCUGGGCUUCCCGGUUCAGGCGGCACCCUCCCUCCUCCUCCCUGAGGGUGCCGCC
43	GCGAGACCCCUCCUCCUCCCUGGGUCUCGCGGUUCCGGCGGCCGCCUCUCUCCUCCUCCCGGAGGCGCCGCCAAACC
44	GCGAAGUCUGUUCCUCCUCCCUCAGGCUUCGCGUUCCAGGCGGCUCCCCCUCCUCCUCCCUGGGGAUGCCGCC
45	GAACACCCGACCCACUCCUCCUCCCUUGGGUCCGGGUUCAGGCGGCAUCCUCCCUCCUCCUCCCUGAGGAUGCCGCC
46	GAAACGUCGGUCGAUCCUCCUCCCCGACCUGACUUUCAGAAUGCCGCCGGUGCCAUCCUCCCUCCUCCCCCGGCGCCGGCGGCA

# Cuckoo RNA	Cuckoo RNA sequence
47	ACACCCUGCCUUCUCCUCCCCUUUGGCCGGGUGUUGUACAGAACGGCGGUGCCCUCCUCCUCCCCUGGCACCGCCGUUUUUUUGUG
48	GAGUUCAGGCUCUCUUCUCCUCCUCCCCUUGAGGGCCUGUAAUCGCGGUGACAUCCUCCUCCUCCCCUGAUGUCACCGC
49	ACACCUUGCCUUCUCCUCCCCUUUUGGCCGGGUGUUGUACAGAACGGCGGUGCCCUCCUCCUCCCCUGGCACCGCCGUUUUUUGUGC
50	GAGUUCAGGCUCUCUUCUCCUCCUCCCCUUGAGGGCCUGUAAUCGCGGUGACAUCCUCCUCCUCCCCUGAUGUCACCGC
51	GACGGGCAGCACUUCUCCUCCCAGGCUGUCGGUCACUAUCGAAGCCCGGCGCAUCUCUCCCCCCCCCCCGCGCCGGGCUUC
52	UCUGAAAGCCCGUCCGUCUCCUCCCCUCCCGGACCGGCCUAUUGGAAUGCAGUAGAGCCCGCUCGAGCACUCCUCCCCUUUGAGCUCGCGGGCAUUG
53	GACUUCCGGAGACCCUCUCCUCCUCCCCUGGGUCUCGGAGAUCGGCGGCAUCCUCUCUCCUCCUCCCCUGAGGAUGCCGCC
54	AUCAAGCCCCUCUCCUCCUCCCCUGGGGCUUCGAUAGAAGACGGCGGCCUCGUCCUCCUCCCAGAGGCCGCCCGUCUUC
55	CUGCCGCCCUCUCCUCCUCCCCUGGGCGGCGGUGUGGUGCUGCCCACCUCCUCCCGGGCGGCACCG
56	AACCCGAGGCCCUCUCCUCCUCCCCUGGGCCGAGGUUAUCGCGGCGGCGCUCUCUCCUCCUCCCCUGAGCGCCGCCGC
57	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
58	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
59	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
60	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
61	UGGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGUCGC
62	UUCGAACGGCCUCUCCUCCUCCCCUGGCCGAUCGGAACCGCAGCGGCCCCCUCCUCCUCCCCUGGGGUCGCUGC
63	CUGCGAGGUCCCACCUCCUCCCGGGACCUGUAGCAGCAGCGGCGACGCCUCUCCUCCUCCCCUGGUGUCGCCGU
64	GGGCUUCGGCGCUGCACCUCCUCCCCGCGGCGCCGAUGACCAGGCGGCGGCUCCCCUCCUCCUCCCCUGGAGCCGCCGC
65	GGGCUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCCUCCUCCUCCCCUGGAGCCGCCGC
66	GUUCGAAAGGCCCCUCCUCCUCCCCUGGGCCGAUCGCAACCGCAGCGACCCCCUCCUCCUCCCCUGGGGUCGCUGC
67	CUGCGAGGUCCCACCUCCUCCCGGGACCUGUAGCAGCAGCGGCGACGCCUCUCCUCCUCCCCUGGUGUCGCCGU
68	GGACUUCGGCACUGCACCUCCUCCCCGCGGCGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
69	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGUCGC
70	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGUCGC
71	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
72	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
73	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
74	UGGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
75	UUCGAACGGCCUCUCCUCCUCCCCUGGCCGAUCGGAACCGCAGCGGCCCCCUCCUCCUCCCCUGGGGUCGCUGC
76	CUGCGAGGUCCCACCUCCUCCCGGGGCCUGUAGCAGCAGCGGCGACGCCUCUCCUCCUCCCCUGGUGUCGCCGU
77	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
78	GGACUUCGGCACUGCACCUCCUCCCCGCAGUGCCGAUGACCAAGCGGCGGCUUCCUCCUCCUCCUCCCCUGGAGCCGCCGC
79	GGACUUCGGUACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
80	GGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGUCGC
81	UGGACUUCGGCACUGCACCUCCUCCCCGCGGUGCCGAUGACCAAGCGGCGGCUCCCUCCUCCUCCCCUGGAGCCGCCGC
82	UUCGAACGGCCUCUCCUCCUCCCCUGGCCGAUCGGAACCGCAGCGGCCCCCUCCUCCUCCCCUGGGGUCGCUGC
83	CUGCGAGGUCCCACCUCCUCCCGGGACCUGUAGCAGCAGCGGCGACGCCUCUCCUCCUCCCCUGGUGUCGCCGU
84	CUGACGUUCGGGCAUCCUCUCCUCCCUGAGACGCCCGCAUGUUGGCGGCGGCAUCUAUCCUCCUCCCAGAUGCCGCCG
85	GGAUCAGGUCAACCCCUCCUCCUCCCUGGGUUGAUCUGUACCAAGGCGGUGGGCGCCUAUCCUCCUCCCAGGCGCCACCGUC
86	CUGACGUUCGGGCUUUAUCUCCUCCCUGAGACGCCCGCAUGUUGGCGGCGGCAUCUAUCCUCCUCCCAGAUGUCGCCG
87	CAGAUCAUUCCUUCCUCCUCCCUGGGAUGGUCUGUUACAAGGCGGUGGCGCCUAUCCUCCUCCCGGGCGCCACCGUC
88	GUUUAGAUGCCCCGUUUCUCCUCCCUUUAGGGGCAUCAACAUACCGGAGCUCAGUGGUUUCUCCUCCCUUUAGCCACUGUCCACUCCGG
89	CCGGACGGCUUCUGCCUCCUCCUCCCAUUUAGCAGGGGUCGCCGGAACGGUUUCGAUGGCGUGCAUACCUCCUCCCUUGCCCGUCAUAAGCGACCG
90	GCGAAUGGCCCUCUCCUCCUCCCUGGGCCGGACGUAUAGGAAACGGCGGCACCUCUCCUCCUCCCUGGUGCCGCCGUUUUUUAU
91	CAGAUACCCCCCUCCUCCUCCCUGGGGUAUCUGUUACGGUCACGGGCAUCUCUCCUCCUCCCUGAUGCCUGGGGCCGU
92	ACAUUCGGGCGCCUCCUCCCUGCCUGGAUGUUGCAAUGAACGGCGGUGCCCCCUCCUCCUCCCUGGGCGCCGCCGUUU
93	CGCGGAUACACCGGGCUCUCCUCCUCCCUGCCCGGUGUAGAAAGCGCGCGGCGGUGCUCUCCUCCUCCCUGCACCGCCGCG
94	GGAAUCAGGCCCUUCUCCUCCUCCCUGGGGCCUGAGACUACGCGGCGGCAUCCUCCUCCUCCCCUGAUGCCGCCGC
95	GAUCAGGCCCUUUCUCCUCCUCCCUUAAGGGCCUGUCCUAAGCGGUGGCAUCCUCCUCCUCCCCUGAUGCCACCGC

# Cuckoo RNA	Cuckoo RNA sequence
96	GCAUCAGGUUUCCUCCUCCCUUUAACCUGAUGUGCAACAGAACGGCGGUGCCCCCUCCUCCUCCCUGGGCGCCGCCGUUU
97	UAUGCCUGACCCCUCUCCUCCUCCCUGGGGUUCGAGCAUAAGCGGCGGUGCCUCUCCUCCUCCCUGGCACCGUCGC
98	GAUGCAAGCCCCCUCUCCUCCUCCCUGGGGUCUUAGCAUCAGCGGCGGCGCCUCUCCUCCUCCCUGGCGCCGCCGC
99	CGGCUAGGGGCACUCCUCCUCCCGCCCCUUCCGUCUUAGGCGGUGCAUCCUCUCCUCCUCCCUGGAUGCACCGCCACAAGA
100	UUGAGCGCUUUCACCUCCUCCCGAGGCGCUCAACGCAGGUCCCGGUCCUCCUCCUCCCGAUCGGGGCCUGC
101	AAGACCAAACUCAUCCAUCCUCCUCCCGGAUGUGUUUGUUUUCGGCGGCGAUACCCUCCUCCUCCCUGGUAUCGUCGCC
102	AAGACCAAACUCAUCCAUCCUCCUCCCGGAUGUGUUUGUUUUCGGCGGCGAUACCCUCCUCCUCCCUGGUAUCGUCGCC
103	GAUUGGCUCUACCUCCUCCCAGAGCCAAUCGACAGUAAUAGGCGGCAUCCACCUCCUCCCGGAUGCCGCCUUUAUUCUGU
104	GAGUUCAGGCUCUCUUCUCCUCCUCCCUUGAGGGCCUGUAAUCGCGGUGACAUCCUCCUCCUCCCUGAUGUCACCGC
105	ACACCAUGCCUCCUCCUCCCUGAUGGUAUGGUGUUGCACAGAACGGCGGUGCCCUCCUCCUCCCUGGCACCGCCGUUUUUUGUGC
106	CAUCGAAGCGACGCACUCCUCCUCCCAGUGUCGCUCGAUGUGGAUCGGUGGUACUCCUCCUCCCAAUCGCCGAUCAAGUUUGAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCCUU
107	GAAGGCAGCGCAUCUCCUCCUCCCAGCGCUCCUUCAUCGAUUGGCAACUCUCCUCCUCCCUGUUGCCAAUCCGGAUCAAGAGCCCGAUGCAUCCUCCUCCCGCAUCGGGCUCUU
108	UCGGGGCCGCACACUCCUCCUCCCAGUGCACUCCGAUAGAUUGACGACACUCCUCCUCCCAGUCGUCAAUCACCACAAAUGACGCCCGCCGCAUCCUCCUCCCGCGGUGGGCGUUAUUU
109	AUCGGAACGGCGAUCUCCUCCUCCCAAUGCCUUCCGAUAACGAUCGGCAACUCUCCUCCUCCCUGUUGCUGGUCAGGUUUGAAAGCCCGACGGAUCUCCUCCCCCGUCGGGCUUUUCAUUUCU
110	AUCGAAGCGACGCACUCCUCCUCCCAGCGUCGCCCGAUUGGACUGACAAUACUCCUCCUCCCAAUUGUCAGUCAGUUUCAAGAACCCGGCGCACCUCCUCCCGCGCCGGGUUUUUG
111	CAUCGAAGCGACGCACUCCUCCUCCCAGUGUCGCUCGAUGCGGAUCGGUGGUACUCCUCCUCCCAAUCACCGAUCAAGUUUGAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCCUU
112	ACAAGGCCGCCCACCUCCUCCCGGGCCGCUUUGUCCGACUGGCAGCACUCCUCCUCCCAAGUUGUCAGUCAUAAUCGAAAGCCCGGUGCACCUCCUCCCGCACCGGGUUUUUUUCG
113	UCAUCGAAGCGACGCACUCCUCCUCCCAGUGUCGCUUUGAAGGGAUCGGCGAUACUCCUCCUCCCAAUUGCCGAUCAAGUUCAAGAGCCCGACGCAUCCUCCUCCCGCGUCGGGCUCUUUUGC
114	UUCGGCGCCGCAUACUCCUCCUCCCAAUGCGCGCCGAACGGGCUGACAACCCUCCUCCUCCCAGUUGUCGCCCAUUUCAAAUGACGCCCGCCGGAUCUCCUCCCCCGGUGGGCGUUAUU
115	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUCGCGCUUAUCAGAUCAGCCCGCUGCACACUCCUCCUCCCAGUGCAGCGGGCGUUCU
116	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGUGCGGCCUUUUUCUU
117	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUCGCGCUUAUCAGAUCAGCCCGCUGCACACUCCUCCUCCCAGUGCAGCGGGCGUUCU
118	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGUGCGGCCUUUUUCUU
119	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGUGCGGCCUUUUUCUU
120	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUAUGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
121	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUAUGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
122	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGUCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
123	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGUCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
124	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGUCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
125	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGUCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
126	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGUGCGGCCUUUUUCUU
127	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGUCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
128	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
129	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
130	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
131	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUCGCGCUUAUCAGAUCAGCCCGCUGCACACUCCUCCUCCCAGUGCAGCGGGCGUUCU
132	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUCGCGCUUAUCAGAUCAGCCCGCUGCACACUCCUCCUCCCAGUGCAGCGGGCGUUCU
133	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCUCGGCCUUUUUCUU
134	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUCGCGCUUAUCAGAUCAGCCCGCUGCACACUCCUCCUCCCAGUGCAGCGGGCGUUCU
135	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
136	GGUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCUGAGCGCGGCACUCCUCCUCCCAGUCGCGCUUAUCAGAUCAGCCCGCUGCACACUCCUCCUCCCAGUGCAGCGGGCGUUCU
137	AUCGAGUUCGCCUCCUCCCAGAACUCGAUAAGGAAUACGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCUCGGCCUUUUUCUU
138	GUCGGCCAUCUACUCCUCCCAGAUGCGAUGCCGAUGCUGGAUGCGGUACACCUCCUCCCGCGCCUUGUCCAUAGAUCGAGCCCGCUGCGACCUCCUCCCGGCAGCGGGGGGCUUUUUUC
139	UGUCGAUUGUGCACCUCCUCCCGAGCGGCCGACGCUGAAUGUGGUGCACCUCCGCGGCGCGCCGCAUUUUGAAUAGAGCCCGCCGCACCUCCUCCCGCGGCGGGCUUUUUC
140	UUCGUCGAGAUAUCCUCCUCCCGUCUCGACGGAUAAACGGCCGGCUUUCUCCUCCUCCCGAAACGCCGGUCGAUCAAAACGACACCCGCCGGACCUCCUCCCCCGGCGGGUGUUGUUUU
141	CUCGACGGGGCUCCUCCUCCCAAAAAUCCCUGUCGGGUCGCGGUUAGCCUUUCCUCCUCCCUAGGCUGACCGACUUCAAAAGCACCCGCUGGACCUCCUCCCCCAGCGGGUGCUUUU
142	UCCCGGAGCUCUCUCUCCUCCUCCCUCGAGAGACCCGUGGACCCGCAACCUGCGCCUCCUCCUCCCAUCGCAGGUUGCCACAAGACGGUGGCGUCACCUCCUCCCGGCGCCACCGUCUCGU
143	UCCCGGAGCUCUCUCUCCUCCUCCCUCGAGAGACCCGUGGACCCGCAACCUGCGCCUCCUCCUCCCAUCGCAGGUUGCCACAAGACGGUGGCGUCACCUCCUCCCGGCGCCACCGUCUCGU
144	CGCCGGCGGCGCCCACCUCCUCCCGGGCAAAGUUGGCGAGGACGCGCCUUGCUUCUUCUCCUCCCGAGACGCAAGGAGGCGCUGAUAAUAAGAACGGUCAUGCCCACCUCCUCCCGGGCAUGGCCGUUUUU

# Cuckoo RNA	Cuckoo RNA sequence
145	CGCCGACGGCGCCCACCUCCUCCCCGGGCAAAGUUGGCGAGGACGCGCCUUGCUUCUUCUCCCUCCCGAGACGCAAGGAGGCGCUGAUAAAAGAGAACGGUCAUGCCCACUUCCUCCCGGGCAUGGCGGUUUUUUU
146	CCCGGCGAGUGGAACCUCCUCCCUCUGCUCUUCGGGGUGACCAGCCAGCACCUCCUCCCGCUGGCUCGUAACAGGAAAAGGCCGGCACCUCCUCCCGCCGGCCUUUUUCU
147	UUCGUCUGAGCCGACCUCCUCCCCGGCGAUGACGAAUACGGUCGGCCUUCACCUCCUCCCGAGGGUCGACCCCCAAAACGACACCCGCUGGACCUCCUCCCCCGGCGGGUGUUGUU
148	UUCGUCAAAGCCGACCUCCUCCCCGGCGAUGACGAAUAGGCCCAACCUUCACCUCCUCCCGAAGGUUGGCCACCCAAACGGCGCCCGCCGCACCUCCUCCCCGCGGCGGGCGCUGUUUCCCCGG
149	UUCGCUGGGGUCGACCUCCUCCCCGACCCAAGCGAAUACGGUCCGCCCUUACCCUCCUCCCAAGGGCUGACCAUCAAAACGGCGCCCGCUGCACCUCCUCCCGCGGCGGGCGUUGUUU
150	GGUUGUCGGCCAUCUACUCCUCCCAGAUGCGAUGCCGACGCUGAAUGGGGCGCACCUCCUCCCGCGCCACAUUCGAAAUCGAGCCCGCUGCCACCUCCUCCCGGCAGCGGGCUUUUUUC
151	UGUCGGCCAUCUACUCCUCCCAGAUGCGAUGCCGGCGCUGAAUGAGGCGCACCUCCUCCCGCGCCACAUUCGAAAAUCGAGCCCGCUGCCACCUCCUCCCGGCAGCGGGCUUUUUUUU
152	CCCGGUGAGUGGAACCUCCUCCCUCUGCUCCCCGGGGUGACCAGCCAGCACCUCCUCCCGCUGGCUCGUAACAGGAAAAGGCCGGCACCUCCUCCCGCCGGCCUUUUUCU
153	UUCGUCAAAGCCGACCUCCUCCCCGGCGAUGACGAAUAUGGCCGGCCUUCACCUCCUCCCGAAGGUCGACCCCAAAAACGACACCCGCCGGACCUCCUCCCCCGGCGGGUGUUGUU
154	UUCGUCAAAGCCGACCUCCUCCCCGGCGAUGACGAAUCGGCCCGACCUUCACCUCCUCCCGAGGGUUGGCCACAAAAACGGCGCCCGCCGCACCUCCUCCCGCGGCGGGCGCUGUUU
155	UUCGCCAGGGUCGACCUCCUCCCCGACCUUGACGAAUACGGUCACCCCUUACCUCCUCCCAAGGGUUGACCACCAAAACGGCGCCCGCCGCACCUCCUCCCGCGGCGGGCGUUGUUUCCCGG
156	GGUUGUCGGCCAUCUACUCCUCCCAGAUGCGAUGCCGACGCUGAAUGGGGUGCACCUCCUCCCGCGCCACAUUCGAAAAUCGAGCCCGCUGCCACCUCCUCCCGGCAGCGGGCUUUUUUC
157	UUCGCUGGGGUCGACCUCCUCCCCGACCUCCAGCGAACGGUCAGCCCUUAUCCUCCUCCCGAGGGUUGGCCAACCAAACGGCGCCCGCCGCACCUCCUCCCGCGGCGGGCGUUGUUUCCCCGG
158	UUCGUCAAAGCCGACCUCCUCCCCGGCAAUGACGAAUAGGCCCAACCUUCACCUCCUCCCGAGGGUUGGCCAACCAAACGGCGCCCGCCGCACCUCCUCCCGCGGCGGGCGUUGUUUCCCUGG
159	UUCGUCAAAGCCGACCUCCUCCCCGGCGAUGACGAAUACGGUCGAUCUUCACCUCCUCCCGAGGAUCGACCCCCAAAACGACACCCGCCGGACCUCCUCCCCCGGCGGGUGUUGUU
160	GGUGUCGGCCAUCUACUCCUCCCAGAUGUGGUGCCGACGCUGAAUGGGGCGCACCUCCUCCCGCGUCUCAUUCUAAAUCGAGCCCGCUGCCACCUCCUCCCGGUAGCGGGCUU
161	GGAAUACCCGGCGAGUGGAACCUCCUCCCUCUGCUCCCCGGGGUGACCAGCCAGCUCCUCCUCCCCGCUGGCUCGUAACAGGAAAAGGCCGGCACCUCCUCCCGCCGGCCUUUUUCUUUGC
162	GGUUGUCGGCCAUCUACUCCUCCCAGAUGCGAUGCCGACGCUGAAUGGGGUGCACCUCCUCCCGCGCCACAUUCGAAAUCGAGCCCGCUGCCACCUCCUCCCGGCAGCGGGCUUUUUUC
163	CCCGGCGAGUGGAACCUCCUCCCUCUGCUUCCCGGGGUGACCGGCCAGCACCUCCUCCCGCUGGCUCGUAACAGGAAAAGGCCGGCACCUCCUCCCGCCGGCCUUUUUCU
164	UUCGUCAAAGCCGACCUCCUCCCCGGCAACGACGAAUACGGUCGAUCUUCACCUCCUCCCGAGGGUCGACCCCCAAAAACGACACCCGCCGGACCUCCUCCCCCGGCGGGUGUUGUU
165	UUCGUCAAAGCCGACCUCCUCCCCGGCAAUGACGAAUAGGCCCGACCUUCACCUCCUCCCGAGGGUUGGCCACACAAACGGCGCCCGCCGCACCUCCUCCCGCGGCGGGCGUUGUUU
166	UUCGCUGGGGUCGACCUCCUCCCCGACCUCCAGCGAACGGUCAGCCCUUAUCCUCCUCCCGAGGGUUGACCACCAAAACGGCGCCCGCCGCACCUCCUCCCGCGGCGGGCGUUGUUU
167	GGUUCUGGUUGUCGGCCAUCUACUCCUCCCAGAUGCGAUGCCGGCGCUGAGUGGGGUGCACCUCCUCCCGCACCACAUUCGAAAUCGAGCCCGCUGCCACCUCCUCCCGGCAGCGGGCUUUUUUC
168	AAGACGCGGCGGUGCCUCUCCUCCUCCCUGGCACCGUCGCGCCCUUCGACCAGACGCCGGGCGCCCCUCCUCCUCCCUUGGGUGCCUGACGAGACAAGCGGCGGCGCCCUCUUCCCGGGCGUCGCCGUUUUCU
169	CUUCAUCGAGUUCACUCCUCCUCCCAGAACUCGAUAAGGAAUGCGGCACUCCUCCUCCCAAGCCGUAUUCAAGAUCAGGCCGCGCAUCCUCCUCCCGCGCGGCCUUUUUCUU
170	UGGGCUUGUUCGGUUUUACUCCUCCUCCCAAAAACCGAACCCAAAGCGCGAUACUCCUCCUCCCAAUCGCGCUUUAUAGAUCCGCCCACUGCACAUUCCUCCUCCCAGUGCAGUGGGCGCUCU
171	GUCCGGUUCACUCCUCCUCCCAAGAACCGGACCCAAAGCGCGAUACUCCUCCUCCCAAUCGCGCUUACAGAUUAAGCCCACAACGUUCUCCUCCUCCCGAGCGUUGUGGGCUUUUCU
172	AUCACCGGGGUGCUUUCUCCUCCUCCCAUUUCCUCGGUGAUUCAAGACCGGAUGUCCUCCUCCCAAGUCCGGUCUUCCCCAUAAAACACCCGUCGCCUCCUCCCGCGACGGGUGUUUU
173	CAAGACGCGGCGGUGUCUUUCCUCCUCCCUGACACCGCCGCACUUGAUGAUCGACUAAGACUGGGCCUGCUUUCUCCUCCCCAGAGAUGUGGCCCACACAUAAAGCGGGCGAAACCCACCUCCUCCCGGGUCUCGUCGCUU
174	CACUGACGCGGCGCGCUUUUCCUCCUCCUCCCAAAGCCCCCUGUGUCGUGACGACAAGAGCGGGAUGGGUUCCUCCUCCUCCCUCCCUGAACGCUCCUAAGGCCGUAAUUCGAAUCCUCCUCCCUCGAAUGCGGCC
175	GUCGAUGAGCGACGCGCCCUCUCCUCCUCCCCUGGGCCCCUCGCUUCCGGCACCCGAGUGAACGAUGUAUCCUCCUCCCACAUCCUUCGCUCAACCGACCUGGGCCGUCUCCUCCUCCCUCGGCAGGGUCG
176	CUGAGGUGCAGGUUCCUCCUCCCACUCUGCACCUCGGAUCCGACCGGUCCUCCUCCUCCCGGACCGGUCUUCUGUAAGAAGCGCUCGCCGAAUCCUCCUCCCAUCGGCGAGCGCUUUUU
177	GUAAGCAGCGCACUCCUCCUCCCAGCGCUCUUACAUCGGAUUGACAACACUCCUCCUCCCAGUUGUCAGUCAGGAUCAAGAGCCUGGCGCACCUCCUCCCGCGCCAGGCUCUUUUCUU
178	UCGCAGCCGCGCACUCCUCCUCCCAAGCGCGCUGCGAUGGACUGGCAACACUCCUCCUCCCAGUUGCCAGUCGCUAUAAUGCGCCCGCCGGAUCCUCCCCCGGCGGGCGUUUUAUGC
179	UCGAAACGGCUUUCUCCUCCUCCCAUAGCCGUUCGACAGGAUCGGCAACACUCCUCCUCCCAGUUGUCGGUCGAGUUUAUAAGCCCGACGGAUCUCCUCCCCCGUCGGGCUU
180	GCCGAAGCGCUGUAUUCUUCUUAGCCGCUUCCGCCUGAUGGACAGCACUCCUCCUCCCAUGCUGUCGGUCACUAUCGAAGCCCGGCGCACUCUCCCGCGCCGGGCUUC
181	GUAAGCAGCGCACUCCUCCUCCCAGCGCUCUUACAUCGGACUGACAACACUCCUCCUCCCAGUUGUCAGUCAGGAUCAAGAGCCUGGCGCACCUCCUCCCGCGCCAGGCUCUUUUCUU
182	UCGCAGCCGCGCACUCCUCCUCCCAAGCGCGCUGCGAUGGACUGGCAACACUCCUCCUCCCAGUUGCCAGUCACUAUAAUGCGCCCGCCGGAUCCUCCCCCGGCGGGCGUUUUAU
183	UCGAAACGGCUUUCUCCUCCUCCCAUAAGCCGUUCGACAGGAUCGACAACACUCCUCCUCCCAGUUGUCGAGUUUAUAAGCCCGACGGAUCUCCUCCCCCGUCGGGCUUUCUCAUUU
184	GUAAGCAGCGCACUCCUCCUCCCAGCGCUCUUACAUCGGAUUGACAACACUCCUCCUCCCAGUUGUCAGUCAGGAUCAAGAGCCUGGCGCACCUCCUCCCGCGCCAGGCUCUUUUCUU
185	UCGCAGCCGCGCACUCCUCCUCCCAAGCGCGCUGCGAUGGACUGGCAACACUCCUCCUCCCAGUUGCCAGUCGCUAUAAUGCGCCCGCCGGAUCCUCCCCCGGCGGGCGUUUUAUG
186	UCGAAACGGCUUUCUCCUCCUCCCAUAGCCGUUCGACAGGAUCGGCAACACUCCUCCUCCCAGUUGUCGGUCGAGUUUAUAAGCCCGACGGAUCUCCUCCCCCGUCGGGCUU
187	GCCGAAGCGCUGUAUUCUUCUUAGCCGCUUCCGCCUGAUGGACAGCACUCCUCCUCCCAUGCUGUCGGUCACUAUCGAAGCCCGGCGCACUCUCCCGCGCCGGGCUUCUGUCAG
188	GGACUGAAGCGCUUAACCCCUCCGAGCCGCUUCGGUCCGACGGACAGCACUCCUCCUCCCAGGCUGUCGGUCACUAUCGAAGCCCGGCGCACCUCUCCCGCGCCGGGCUUUUGUCGU
189	GUAAGCAGCGCACUCCUCCUCCCAGUGCUCUUACAUCGGACUGACAACACUCCUCCUCCCAGUUGUCAGUCAGGAUCAAGAGCCCGGCGCACCUCCUCCCGCGUCGGGCUUUUUUCUU
190	UCGCAGCUGCGCACUCCUCCUCCCAGCGCGCUGCGAUAGACUGACAACACUCCUCCUCCCAGUUGUCAGUCACCAUAACACGCCCGCCGGAUCCUCCCCCGGCGGGCGU
191	CUCAUCGAACGGCUUCUCCUCCUCCCAUAGCCGUUCGAUAGGGUCGACAACACUCCUCCUCCCAGUUGUCGAUCGAGUUUAUAAGCCCGACGGAUCCUCCCCCGUCGGGCUU
192	GGACCGACGCGCUCACCCCCUCCGAGCCGCUUCGGUUCGACGGACAGCAUCCCUCCUCCCAGGCUGUCGGUCACUAUCGAAGCCCGGCGCCCUCUCCCGCGCCGGGCUUUCG
193	GUAAGCAGCGCACUCCUCCUCCCAGCGCUCUUACAUCGGACUGACAACACUCCUCCUCCCAGUUGUCAGUCAGGAUCAAGAGCCUGGCGCACCUCCUCCCGCGCCAGGCUCUUUUCUU

# Cuckoo RNA	Cuckoo RNA sequence
194	UCGCAGCCGCGCACUCCUCCUCCCAAGCGCGCUGCGAUAAGACUGGCAACACUCCUCCUCCCAGUUGCCAGUCAUCAUAAUGCGCCCGCCGGAUCCUCCCCCGGCGGGCGUUUUAU
195	CCUAUCGAAACGGCUUUCUCCUCCUCCCAUAAGCCGUUCGACAGGGUCGACAACACUCCUCCUCCCAGUUGUCGAUCGAGUUUAUAAGCCCGACGGAUCCUCCCCCGUCGGGCUU
196	GGACCGAAGCGCUUUCCCCUCCUAGCCGCUUCGGUCCGACGGACAGCACUUCUCCUCCCAGCUGUCGGUCACUUUCGAAGCCCGGCGCAUCUCUCCCGCGCCGGGCUUU
197	GUAAGCAGCGCACUCCUCCUCCCAGCGCUCUUACAUCGGACUGACAACACUCCUCCUCCCAGUUGUCAGUCAGGAUCAAGAGCCCGGCGCACCUCCUCCCGCGUCGGGCUUUUUUCUU
198	UCGUAGCCGCGCACUCCUCCUCCCAGCGCGCUGCGAUAGACUGGCAACACUCCUCCUCCCAGUUGUCAGUCACCAUAACGCGCCCGCCGGAUCCUCCCCCGGCGGGCGU
199	CUCAUCGACACGGCUUCUCCUCCUCCCAUAGCCGUUCGAUAGGGUCGACAACACUCCUCCUCCCAGUUGUCGAUCGAGUUUAUAAGCCCGACGGAUCUCCUCCCCCGUCGGGCUU
200	GAAGGUAGCGCACUCCUCCUCCCAGCGCUCCUUCAAUGAUUGGCAACACUCCUCCUCCUCCCAGUUGCCAAUCCGGAUCAAGAGCCCGAUGCAUCCUCCUCCCGCGUCGGGCUUCUUUUUUUU
201	UCGGAGCCGCAUACUCCUCCUCCCAAUGCGCUCCGAUCGAUUGGCGACGCUCCUCCUCCCAAGUCGUCAAUCACCACAAAUGACGCCCACCGCAUCCUCCUCCCGCGGUGGGCGUUAUUU
202	CAUAAUCAUCGAGACGGCGAUCUCCUCCUCCCAAUGCCGUCCGAUAUGGAUCAGCAACUCUCCUCCUCCCAGUUGCUGAUCAGGUUCAAAAGCCCGACGCACCUCCUCCCGCGUCGGGCUUUU
203	UAUGCCUGACCCCUCUCCUCCUCCCUGGGGUUCGAGCAUAAGCGGCGGCACCUCUCCUCCUCCCUGGUGCCGCCGCACUCCAUUUCGGAUCGAGGCCCCUCUCCUCCUCCCUGGGGCGCUCGUAUACU
204	CGGUCGGCAGCGCACUCCUCCUCCCAGCGCUCCCGAUACGGAUUGGCAACACUCCUCCUCCCAGUUGCCAAUCAGAACAGGCAACGCCCGCUGGAUCUCCUCCCCCAGCGGGCGUUGUUU
205	UCGAAACAGCGUACUCCUCCUCCCAGCGCUGUUUCGAUAGGGUUGGCAACACUCCUCCUCCCGGUUGCCAAUCAUUCUCAUGACGCCCGCUGGAUCUCCUCCCCCAGCGGGCGUCGU
206	CAUCGAAGCGCUGCACCUCCUCCCGCGGCGCCCGAUGCGGGUCGGUUUCACUCCUCCUCCCAGGAACCGGCCGAGUUUGAAGACCCCGACGCCACCUCCUCCCGGCUCGGGGUCUUU
207	UCGAUGGAGCACUCCGCCUCCCAGCUCUGUCGAGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGAUCAGGAUCGAAGGCCCGGCGCACCUCCUCCCGCGCCGGGCCUUCUCUU
208	ACCGAGGCGAUUUCACCUCCUCCCGAGUCGUUGCGGUCCGACGGACAGCACUCCUCCUCCCAAGCUGUCAGUCACUUUUGAAGCCCGGCGCACCUCCUCCCGCGCCGGGC
209	ACCGAGGCGAUUUCACCUCCUCCCGAGUCGUUGCGGUCCGACGGACAGCACUCCUCCUCCCAAGCUGUCAGUCACUUUUGAAGCCCGGCGCACCUCCUCCCGCGCCGGGC
210	UCGACGAAGCACUCCUCCUCCCAGCUUCAUCGAGGGAUCGGCGACCCUCCUCCUCCCAGUUGCCGAUCAGGAUCGAAGGCCCGGCGCACCUCCUCCCGCGCCGGGCCUUCUCUU
211	CGGUCGGCAGCGCACUCCUCCUCCCAGCGCUCCCGAUACGGAUUGGCGACAACUCCUCCUCCCGGUUGCCAAUCAGAACAGGCAACGCCCGCUGGACCUCCUCCCCCAGUGGGCGUUGUUU
212	UCGAAACAGCGCACUCCUCCUCCCAGCGCUGUUUCGAUAGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCAUUCUUAUGACGCCCGCCGGAUCUCCUCCCUCGGCGGGCGUCGU
213	CAUCGAAGCGCUGCACCUCCUCCCGCGGCGCCCGAUGCGGGUCGGUUUCACUCCUCCUCCCAGGAACCGGCCAAGUUUGAAGACCCCGACGCCACCUCCUCCCGGCUCGGGGUCUUU
214	UCGGUAGAGCACUCCUCCUCCCGGCUCUAUCGAGGGAUCGGCAACCCUCCUCCUCCCAGUUGCUGAUCAGGAUCGAAGGCCCGGCGCACCUCCUCCCGCGCCGGGCCUUCUCUU
215	CGGUCGGCAGCGCACUCCUCCUCCCGGCGCUCCCGAUACGGAUUGGCGACACUCCUCCUCCCAGUUGCCAAUCAGAACAGGCAACGCCCGCUGGAUCUCCUCCCCCAGCGGGCGUUGUUUUUGUU
216	UCGAAACAGCACAUUCCUCCUCCCAUCGCUGUUUCGAUAGCAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCACCUUAAUGACGCCCGCCGGACCUCCUCCCCGGCGGGCGUU
217	GUCAAGUGCAGCUCCUCCUCCCGCUGCGCACGACCUCGAUCGGUUCCACUCCUCCUCCCAGGACCGAUUGGUUUCAAGACCCCGACGCCUCCUCCCGGCUCGGGGUCUU
218	CAUCGAAGCGCUGCACCUCCUCCCGCGGCGCCCGAUGCGGAUCGGUUUCACUCCUCCUCCCAGGAACCGGCCGAGUUUGAAGACCCCGACGCCACCUCCUCCCGGCCUCGGGGUCUUU
219	ACCGAGGCGAUUUCACCUCCUCCCGAGUCGUUGCGGUCCGACGGACAGCACUCCUCCUCCCAAGCUGUCAGUCACUUUUGAAGCCCGGCGCACCUCCUCCCGCGCCGGGC
220	UUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCCGUUGCCGGUCAGGAUCGGAAGCCCGGCGCACCUCCUCCCGCGCCGGGCUUUCUCUU
221	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCACCCGAUACGGAUUGGCAGCACUCCUCCUCCCAGUUGCCAAUCAGAACAAGCGACGCCUGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUUU
222	UCGAAGCAGCGCACUCCUCCUCCCAGCGCCGCUUUGAUAGGAUUGGCAGCACUCCUCCUCCCGGUUGCCAAUCGCCUUUGUGACGCCCGCCGGUCCUCCCCCGGCGGGCGUU
223	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGAUCGGUUCACUCCUCCUCCCAGAACCGAUCAGGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
224	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCAAGACGCCGAUCGGUUCACUCCUCCUCCCAGGACCGAUCUAGUUCAGAGACCCCGAUGCACCUCCUCCCGCAUCGGGGUCUUU
225	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
226	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAGCAACGCCCGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUU
227	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCCCCGACGGGCGUCAU
228	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU
229	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCAAGACGCCGAUCGGUUCACUCCUCCUCCCAGGACCGAUCUAGUUCAGAGACCCCGAUGCACCUCCUCCCGCAUCGGGGUCUUU
230	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
231	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAGCAACGCCCGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUU
232	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCCCCCGACGGGCGUCAU
233	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU
234	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAACAACGCCCGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUU
235	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCUCCCCCCGACGGGCGUCAU
236	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
237	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU
238	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCAAGACGCCGAUCGGUUCACUCCUCCUCCCAGGACCGAUCUAGUUCAGAGACCCCGAUGCACCUCCUCCCGCAUCGGGGUCUUUCUG
239	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAGCAACGCCCGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUU
240	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCUCCCCCCGACGGGCGUCAU
241	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
242	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU

# Cuckoo RNA	Cuckoo RNA sequence
243	UGUCGAAGCGCUGUACCUCCUCCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
244	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAGCAACGCCCGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUU
245	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCUCCCCCGACGGGCGUCAU
246	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU
247	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCAAGACGCCGAUCGGUUCACUCAUCCUCCCAGGACCGAUCUAGUUCAGAGACCCCGAUGCACCUCCUCCCGCAUCGGGGUCUUUCUG
248	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAACAACGCCCGCUGGACCUCCUCCCUCAGCGGGCGUUGUUUAUU
249	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCUCCCCCGACGGGCGUCAU
250	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
251	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU
252	UCGAAGCAGCGCACUCCUCCUCCCAUCGCCGCUUCGAUGGAUUGGCAACACUCCUCCUCCCGGUUGCCAAUCGCCUUUAUGACGCCCGCCGGUCCUCCUCCCCCGACGGGCGUCAU
253	CGAUCGGGCAGCGCACUCCUCCUCCCAGCGCGCCCGAUACGGAUUGGCGACACUCCUCCUCCCGGUUGCCAAUCAGAUCAAGCAACGCCCGCUGGACCUCCUCCCCCAGCGGGCGUUGUUUAUU
254	UGUCGAAGCGCUGUACCUCCUCCCACGGCGCCCGGCAUUCGGUCGGUUCACUCCUCCUCCCAGAACCGAUCAAGUUUAAGACCCCGAGCCACCUCCUCCCGGCUCGGGGUCUU
255	CUGUCGAUGGAACACUCCUCCUCCCAGUUCCAUCGCGGGAUCGGCAACCCUCCUCCUCCCAGUUGCCGGUCAGGAUCGAAAGCCCGGCGCACCUCCUCCCGCGCCGGGUUUUCUCUU
256	AUCGAAGCGACGCACUCCUCCUCCCAGCGUCGCCCGAUUGGACUGACAAUACUCCUCCUCCCAAUUGUCAGUCAGUUUCAAGAACCCGGCGCACCUCCUCCCGCGCCGGGUUUUUGCGUUUUUGGCGAUCUGGUUGUCUUUUUAUCCCUCCUCUCUGAGACGCUGCGCU
257	AUCGAAACGGAUGUACCUCCUCCCACAUCCUUUCGGUAAUGCGGGUGAUCCUACUCCUCCUCCCAAAGGAUUGCCCCGGGGACAGCGGUUUUCCUCCUCCCAUAUCGCUGUUCAUCUUUUCAGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUU
258	UCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAAUUUCAGACGGCCCACUCCUCCUCCCAGGGACGUCUGUAGGAACAGCGACACUCCUCCUCCCAGUCGCUGUUCGGUUCUUUUCGAAAAACCUGCCGCACCUCCUCCCGCGGCAGGUUUUUUCG
259	UUAUCGAAGCGAUGCACCUCCUCCCGCGUCCCUUCGAUGAUGCAGGCGCUCUUAUCCUCCUCCCAAGGUCGCCUGCGGGAACAGCAGCACUCCUCCUCCCAGCUGCUGUUCGGUUCUUUUCGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
260	UCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAAUUUCAGACGGCCCACUCCUCCUCCCAGGGACGUCUGUAGGAACAGCGACACUCCUCCUCCCAGUCGCUGUUCGGUUCUUUUCGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUUCG
261	AUCGAAACGGAUGUACCUCCUCCCACACUCCUUUCGGUAAUGCGGGUGAUCCUACUCCUCCUCCCAAGGAUUGCCCCGGGGACAGCGGUUUUCCUCCUCCCAUAUCGCUGUUCAAUCUUUCAAGAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUU
262	UCGAAGCGAUGCACCUCCUCCCGCAAAGCUUCGGAUUGAGAUGACCCUAUCCUCCUCCCAAGGGUUGUCUUGUGAACAAUGGCACUCCUCCUCCCAGCCGUUGUUCGAAAUUUCGGAAAGCCUGCCGCACCUCCUCCCGCGGCGGGCUUUUUUCG
263	ACGAAGCGAUGCAUCCUCCUCCCGCAAAGCUUCGUCUCUCGGACGACCCACUCCUCCUCCCUAGGGGCGUCCGAUGGAACGGUGGCACUCCUCCUCCCAGCCGCUGUUCACUCUUUUAAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUU
264	AUCGAAGCGAUGCAUCCUCCUCCCGCUGAGCUUCGAUACACCGGGCCAGCUUCUCCUCCUCCCAGAGCGGCCCGUCGGAAUGACGGAACUCCUCCUCCCAGCCGUCGUUCGGUUCUUUUCGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
265	UCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAAUUCAGACGGCCUACUCCUCCUCCCAGGGCACGUCUGUCGGAACUGCGGCACUCCUCCUCCCAGCCGUUGUUCGGUUCUUUUCGGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
266	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
267	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
268	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
269	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
270	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
271	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
272	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
273	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
274	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
275	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
276	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGACUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
277	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
278	GGGCCUGGUUCCUCCUCCCAAUUCAGGCCCAGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
279	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
280	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
281	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
282	CCGGGCCUGGUUCCUCCUCCCAAUUCAGGCCCGGUUCGUCGCAAAGCUCUCCACCUCCUCCCAGGCUUUGCGAUAACAAGACCGGUUCUCCUCCCAAUGCCGGUCUUCCCCUAAUGGCAUCCGUCGCCCUCCUCCCGCGACGGAUGCCAUU
283	CAUCGGCCCUCUCCUCCUCCCUGGGUCGGUGAUAGCAAGACCGGCGGCCCCUCUCCUCCUCCCUGGGGUCGCCGGAACUGCACAACCGGAUCGGUGGCCCUCUCCUCCUCCCUGGGUCAUCGUGACAUGAACGGCGGCGCCUCUCCUCCUCCCUGGCGUCGCCGUUU
284	CCAAGUCUGGAUCCUCCUCCCACCAGACUUGGUUCAUCGCAGAACCAUCCUCCUCCCAGGUUUUGCGAUAACAAGACCGGUUCUCCUCCUCCCAAUGCCGGUCUUACCAUAAUGGCAUCCGUCGCUCCUCCUCCCGCGACGGAUGCCAUU
285	UUUCGGAACCGCCCACCUCCUCCCGGGUGGAACCGAAAAUACCGCUGACAGCGCUCACCUCCUCCCGAGCAAUGUUGGCGAAGACGCGCCUUGCUUCUUCUCCUCCCGAGACGCACCGAGGCGCGGAUACAUAAGAACGGUCAUGCUCAACUCCUCCCGAGCAUGACCGUUUUUUCGU
286	UUUCGGAACCGCCCACCUCCUCCCGGGUGGAACUGAAAAUACCGCUGACAGCGCUCACCUCCUCCCGAGCAAUGUUGGCGAAGACGCGCCUUGCCUCUUCUCCUCCCGAGACGCACCGAGGCGCGGAUACAUAAGAACGGUCAUGCUCACCUCCUCCCGAGCGUGACCGUUUUUUGGU
287	UUUCGGAACCGCCCACCUCCUCCCGGGUGGAACCGAAAAUACCGCUGACAGCGCUCACCUCCUCCCGAGCAAUGUUGGCGAAGACGCGCCUUGCUUCUUCUCCUCCCGAGACGCACCGAGGCGCGGAUACAUAAGAACGGUCAUGCUCACCUCCUCCCGAGCAUGACCGUUUUUUGGU
288	UUUCGGAACCGCCCACCUCCUCCCGAGUGGAACCGAAAAUACCGCUGAUAGCGCUCACCUCUUCCCGAGCAAUGUUGGCGAAGACGCGCCUUGCUUCUUCUCCUCCCGAGACGCACCGAGGCGCGGAUACAUAAGAACGGUCAUGCUCACCUCCUCCCGAGCAUGACCGUUUUUUUG
289	CAGUUUCGGAACCGCUCACCUACUCCCGAGUGGAACUGAAUAUGCCGCUGCCGGAGCUCACCUCCUCCCGAGCAAUGUCAGCGUAGACGCGCCUUGCUUCUUCUCCUCCCGAGACGCACCGAGGCGCGUAUAUAUAAGAACGGUCAUGUUCACCUCCUCCCGAGCAUGACCGUUUUUUUGU
290	UUUCGGAACCGCUCACCUACUCCCGAGUGGAACCGAAAAUACCGCUGACGGCGCUCACCUCCUCCCGAGCAAUGUUGGCGAAGGCGCGCCUUGCUUCUUCUCCUCCCGAGACGCACCGAGGCGCGGAUAUAUAAGAACGGUCAUGUUCACCUCCUCCCGAGCAUGACCGUUUUU
291	UUUCGGAACCGCCCACCUCCUCCCGGGUGGAACCGAAAAUACCGUUGACGGCGCUCACCUCCUCCCGAGCAAUGUUGGCGAAGACGCGCCUUGCUUCUUCUCCUCCCGAGACGCACCGAGGCGCGGAUACAUAAGAACGGUCAUGCUCACCUCCUCCCGAGCAUGACCGUUUUUUGGU

# Cuckoo RNA	Cuckoo RNA sequence
292	ACCCGCCCCGCUCCUCCUCCCUGGGGCCGGGUUCAGGCGACAUCCUCCUCCUCCUCCCUGAGGAUGUCGCCGCACCAACACGGAAGCCCUCUCCUCCUCCCUUGGGCUUCGUGUCAAGGCGGCGACCCCCUCCUCCUCCCUGGGGUCGCCGCACUU
293	UACGAUGGCCCCCUCCUCCUCCCUGGGGUCGCUCGUGAGCGGUAAUGGCACUCCUCCUCCCAGCCAUUGCCGCACCCUAUACGCGGCCCCUCCUCCUCCCUGGGCCAGCGUUGCGCGGCGGUGCCCCCUCCUCCUCCCUGGGCACCGCCGC
294	UGCGACGGUCCUCUCCUCCUCCCUGGGAUCGUCAGCACGCGGUAAUGGCCUCCUCCUCCCUGCCAUUGCCGCACCCCAUACGCGGCCCCUCCUCCUCCCUGGGCCAGCGUUGCGCGGCGGUGCCCCCUCCUCCUCCCUGGGCACCGCCGC
295	CGCGUUCCACGGGGCUCUCCUCCUCCCAAGCCUCGUGAGCGUGCAACGCCGGCGGGACCUCCUCCUCCCAAUCCCGCCAGCUCCAACGACGCCCGCCAGUACCUCCUCCCACUGGCGGGCGUUCGUGUGUCUGCAGCCUCCCCCGCGGGCGCCCG
296	AGGCCGCUGAGGAACUCCUCCCAAUCAAACCUCGGCAGCCUAACAUACAAUCCUCAAGUGGCACCUCCUCCCAAGCCGCUUGAUGGUUUCAAAACAGAGAUUUCCUCCCAGUUCUCUGUUUACUAGCUUCGCCCGUCGUUCCUCCCAUCGACGGGCGUUAGCUG
297	UCGAAGCGAUGCUUCCUCCCGCAACGCUUCGAAGUUUAGACGGCCCACUCCUCCUCCCAAAGGGACGUCUGUGGGAACAGCGGCACUCCUCCUCCCAGGUCGCCGUUCGGUUCUUUUAGGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUCUA
298	AUCGAAGCGAUGCACCUCCUCCCGCAUCCUUCGAUAUGCAGGCGCUCCAUCCUCCUCCCAGGGACGUCUGCGGGAACGACCGCACUCCUCCUCCCAGCUGUCGUUCGGUUUUCCGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUU
299	CUCGAAGCGAUGCUCCUCCUCCCGCACCGCUUCGAGAUUCAGAUGGCCCACUCCUCCUCCCGAAGGGACGUCUGUUGGAACAGCGGCACUCCUCCUCCCAAGUCGCUGUUCGGUUCUUUUAGGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUCUA
300	UCGAAGCGAUGCUUCCUCCCGCAACGCUUCGAAGUUUAGACGGCCCACUCCUCCUCCCAAAGGGACGUCUGUGGGAACAGCGGCACUCCUCCUCCCAGGUCGCCGUUCGGUUCUUUUAGGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUCUA
301	AUCGAAGCGAUGCACCUCCUCCCGCAUCUCUUCGAUAUGCAGGCGCCCAUCCUCCUCCCAGGGUCGCCUGCGGGAACAACAGCACUCCUCCUCCCAGCUGUCGUUCGGUUCUUUUCGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUU
302	AUCGAAGCGAUGCACCUCCUCCCGCAUCCUCGAUAUGCAGGCGCUCCAUCCUCCUCCCAGGGACGUCUGCGGGAACGACGGCACUCCUCCUCCCAGCUGUCGUUCGGUUUUCCGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUU
303	GGCUCAACGAAGCAAUGCACCUCCUCCCGCAGAGCUUCGUGGUUUCAGGCGACCCACUCCUCCUCCCAAGGGGAGCCUGACGGAACAGCGGCACUCCUCCUCCCAGCCGUUGUCCAAUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGCGGGCUUUUUCA
304	CGAAGCAAUGCACCUCCUCCCGCAAAGCUUCGCUUUCAGCCGACCCACUUCUCCUCCCAUGGGACGUCUGUAAAAACAGCGGCACUCCUCCUCCCAGUCGCUGUUCGAUCUUCAGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUU
305	ACGAAGCAAUGCACCUCCUCCCGCAGAGCUUCGUGUCUCAGGCGACCCAUUCCUCCUCCCGGGGGGCGCCUGACGGAACAGCGGCGCUCCUCCUCCCAGCCGUUGUUCAAUAUUUCGAGAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
306	UAUCGAAGCGAUGCACCUCCUCCCGCAUCCCUUCGAUAUACAGGCGCCCCAUCCUCCUCCCAGGGUCGUCUGUGGAAUGACAGCACUCCUCCUCCCAGCUGUCGUUCGGUUUUUUUACGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCGU
307	UAUCGAAGCGAUGCACCUCCUCCCGCAUCCCUUCGAUAUGCAGGCGCCCCAUCCUCCUCCCAGGGUCGUCUGCGGGAACGGCAGCACUCCUCCUCCCAGCUGUCGUUCGGUUUUUUUCGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUU
308	CGAAGUGAUGCACCUCCUCCCGCAAAGCUUCGUGUUAGGCGACCCGCUCCUCCUCCCAAGGGCCGCCUUACAGAACAGCGGCACUCCUCCUCCCAGCCGUUGUUCAAUUCUUUCGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
309	UAUCGAAGCGAUGCACCUCCUCCCGCAUCCCUUUGAUAUACAGGCGCCCCAUCCUCCUCCCAGGGUCGUCUGUGGAAUGACAGCACUCCUCCUCCCAGCUGUCGUUCGGUUUUUUUACGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCGU
310	CGAAGCGAUGCAUCUCCUCCCGCAUCCCUUCGCUUGGCAGACGUCCUUAUCCUCCUCCCAGGGACGGCUGCAGGAAUAGCGGAACUCCUCCUCCCAUCCGCUGUUCGGUUCUUGUAAAAAGCCUGCCGCUCCUCCUCCCGCGGCAGGCUUUUU
311	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGUGGGCGACCUUCCUCCUCCCGGGUUCUUCGCUCACGAGAUCAGCGCCACUCCUCCUCCCGGGCUGCUGAUCGGUUCUUUCGGAAAGCCUGCCGCACCUCCUCCCGCGGCGGGCUUUUUCG
312	UCAACGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGUGAUUCAGGCGGCCCACUCCUCCUCCCAGGGACGUCUGAAGGACCAGCGGCACUCCUCCUCCCUGUCGCUGAUCGGUUCUUUUAGGAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUU
313	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
314	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
315	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
316	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUGUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
317	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGCAGGCUUUUUCG
318	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGUAGGCUUUUUCG
319	AUCGAAGCGAUGCACCUCCUCCCGCAGAGCUUCGAUAUGCGAGCGACCUUUCCUCCUCCCGAGUUCGCUUGCGGGAUCAGCGCUACUCCUCCUCCCGGAAUGCUGAUCGGUUCUUUUGGAAAAGCCUGCCGCACCUCCUCCCGCGGUAGGCUUUUUCG
320	CGGGCACACGCACCCUCCCUGUUGUGUGCCUGUAGAAAGCUUCGGGUCUCCUCCUCCUCCCUGAGACCGGCGGCUUUCAUAAACGUCCCCUUCCCCCUUUCCUCCCGAUUGGAUUGGGGACGUAGAUAAAGACGGCGGUGCUUUCCUCCCAAAGCACCGCCGUUCUUGCAUCU
321	CGGGCACACGCACCCUCCCUGUUGUGUGCCUGUAGGAAGCUUCGGGUCUCCUCCUCCUCCCUGAGACCGGCGGCUUUCAUAAACGUCCCCUUCCCCCUUUCCUCCCGAUUGGAUUGGGGACGUAGAUAAAGACGGCGGUGCUUUCCUCCCAAAGCACCGCCGUUCUUGCAUCU

Table S5. Cuckoo RNAs discovered in other studies.

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23				RSs0680a homolog					
24									
25									
26									
27									
28									
29									
30									
31									
32									
33				RSs0680a homolog					
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44				RSs0680a homolog					
45									

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57				RSs0680d					
58				RSs0680c repeat3					
59				RSs0680c repeat2					
60				RSs0680c repeat1					
61				RSs0680c					
62				RSs0680b					
63				RSs0680a					
64									
65									
66									
67				RSs0680a homolog					
68									
69									
70									
71									
72									
73									
74									
75									
76				RSs0680a homolog					
77									
78									
79									
80									
81									
82									
83				RSs0680a homolog					
84									
85				RSs0680a homolog					
86									
87									
88									
89									
90									
91									
92									
93									

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
94				RSs0680a homolog					
95				RSs0680a homolog					
96									
97									
98									
99				RSs0680a homolog					
100									
101									
102									
103									
104				RSs0680a homolog					
105									
106							RNA10	Atr14C2	
107							RNA15	Arr14CI1	
108							RNA37	Arr14CI2	
109							RNA20	Arr14CI3	
110							RNA7	AH13r14C1	
111							RNA9		
112							RNA23	Avr14Atc	
113							RNA38	Avr14CI1	
114							RNA48	Avr14CI2	
115									
116									
117							RNA78		
118							RNA63	BaS19r14CI1	
119							RNA62	Ba19941r14CI1	
120							RNA59	Bcr14CI1	
121									
122							RNA66	Bm23457r14CI1	
123							RNA65		
124									
125									
126							RNA64	Bmar14CI1	
127							RNA67	Bm16Mr14CI2	
128							RNA57	Bmir14CI1	
129							RNA61	Bor14CI1	
130									
131									
132							RNA77		
133							RNA70	Bs1330r14CI1	
134							RNA79		
135							RNA58	Bs23445r14CI1	
136									
137									
138							RNA82		
139								MsBCNr14p1	
140							RNA28	MsBCNr14C1	
141							RNA32	MsBCNr14C2	

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
142									
143									
144									
145				RSs0680a homolog					
146									
147									
148									
149									
150									
151							RNA69	Mcr14p01	
152							RNA80	Mcr14C4	
153							RNA50	Mcr14C1	
154							RNA53	Mcr14C2	
155							RNA36	Mcr14C3	
156							RNA71	Mcr14C5	
157							RNA52	Mlr14C1	
158							RNA51	Mlr14C2	
159							RNA49	Mlr14C3	
160							RNA68		
161							RNA81	Mlr14C4	
162							RNA72	Mlr14C5	
163									
164									
165									
166									
167									
168									
169							RNA75	Oar14CI1	
170							RNA76		
171							RNA60	Oar14CII1	
172			Candidate_13_NC_009668				RNA56	Oar14CII2	
173									
174									
175									
176									
177			Candidate_154_NC_007761		ReC11		RNA13	ReCFNr14C1	
178			Candidate_69_NC_007761				RNA34	ReCFNr14C2	
179			Candidate_150_NC_007761				RNA24	ReCFNr14C3	
180								ReCFNr14f	
181							RNA11	ReCIATr14C1	
182							RNA29	ReCIATr14C3	
183							RNA14	ReCIATr14C4	
184									
185									
186									
187									
188							RNA55	Rlt1325r14p011	
189							RNA16	Rlt1325r14C1	

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
190							RNA31	Rlt1325r14C2	
191							RNA25	Rlt1325r14C3	
192							RNA73	Rlt2304r14p011	
193							RNA12	Rlt2304r14C1	
194							RNA35	Rlt2304r14C2	
195							RNA26	Rlt2304r14C3	
196							RNA54	Rlvr14p12	
197			Candidate_152_NC_008380				RNA17	Rlvr14C1	
198							RNA42	Rlvr14C2	
199							RNA19	Rlvr14C3	
200									
201									
202									
203									
204									
205									
206									
207									
208									
209									
210							RNA74	Sfr14b	
211							RNA33	Sfr14C1	
212							RNA39	Sfr14C2	
213							RNA6	Sfr14C3	
214									
215									
216									
217									
218									
219									
220							RNA43	Smedr14p01	
221							RNA27	Smedr14C1	
222							RNA47	Smedr14C2	
223			Candidate_35_NC_009636				RNA5	Smedr14C3	
224						SmelA075	SmelA075	Smr14A1	
225						SmelC025	RNA4	Smr14C1	
226	C14	smrC14				SmelC397	RNA22	Smr14C2	
227		sm7				SmelC398	RNA45	Smr14C3	
228						SmelB161	RNA30	Smr14B	
229									
230									
231									
232									
233									
234							RNA18		
235							RNA44		
236							RNA3		
237							RNA40		

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
238							RNA1		
239							RNA21		
240							RNA46		
241							RNA2		
242							RNA41		
243									
244									
245									
246									
247									
248									
249									
250									
251									
252									
253									
254									
255									
256							RNA8	Atr14C1	C1
257							RNA25	Atr14C3	L5
258							RNA6	Arr14CII1	
259							RNA5	Arr14CII2	
260							RNA8	Arr14Atc	
261							RNA20		
262							RNA19		
263				RSs0680a homolog			RNA12	Avr14CII1	
264							RNA11	Avr14CII2	
265							RNA10	Avr14CI3	
266									
267							RNA35	BaS19r14CI2	
268							RNA32	Ba19941r14CI2	
269							RNA28	Bcr14CI2	
270									
271							RNA36	Bm23457r14CI2	
272							RNA31		
273									
274									
275							RNA33	Bmar14CI2	
276				RSs0680a homolog			RNA34	Bm16Mr14CI1	
277							RNA29	Bmir14CI2	
278							RNA37	Bor14CI2	
279									
280							RNA30	Bs1330r14CI2	
281							RNA27	Bs23445r14CI2	
282									
283									
284							RNA26	Oar14CI2	
285									

# Cuckoo RNA	del Val et al. 2007	Valverde et al. 2008	Livny et al. 2008	Berghoff et al. 2009	Vercruysse et al. 2010	Schlüter et al. 2010	Reinkensmeier et al. 2011	del Val et al. 2012	Wilms et al. 2012
286									
287									
288									
289									
290									
291									
292									
293									
294									
295									
296									
297			Candidate_7_NC_004041				RNA22	ReCFNr14d	
298			Candidate_5_NC_007765				RNA15	ReCFNr14e	
299							RNA13	ReCIATr14C2	
300							RNA23	ReCIATr14B	
301							RNA7	ReCIATr14A	
302									
303							RNA21	Rlt1325r14p012	
304							RNA24	Rlt1325r14p04	
305							RNA18	Rlt1325r14p05	
306							RNA14	Rlt1325r14p02	
307							RNA9	Rlt2304r14p02	
308							RNA17	Rlt2304r14p012	
309							RNA16	Rlvr14p11	
310									
311							RNA3	Smedr14p021	
312			Candidate_14_NC_009621				RNA4	Smedr14p022	
313	A6					SmelA099	SmelA099	Smr14A2	
314									
315							RNA1		
316							RNA2		
317									
318									
319									
320									
321									