

The nucleotide sequence of Cymbidium ringspot virus RNA

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The complete nucleotide sequence of cymbidium ringspot virus (CyRSV, a tomosvirus) was determined using the dideoxy chain termination method (1) on pUC-cloned cDNA templates or purified RNA. Sequencing strategy of the RNA 3' region is reported elsewhere (2). The RNA is 4733 long and contains five open reading frames (ORF) coding for proteins with M_r 32,885 (33 K), M_r 91,678 (92 K), M_r 40,554 (41 K), M_r 21,295 (22 K), and M_r 13,373 (19 K). The corresponding gene positions are: 161-1048 (33 K); 161-2614 (92 K); 2629-3768 (41 K); 3813-4379 (22 K); 3845-4360 (19 K). The 92 K protein is derived by readthrough of the leaky amber termination codon of the 33 K protein. Computer analysis of the sequence encoding the 33 K and the 92 K proteins shows extensive similarity with the corresponding region of cucumber necrosis tomosvirus (CNV; 3); this region may therefore code for the viral replicase. The 41 K protein is the virus coat protein (2). The 22 and 19 K proteins are encoded by two nested ORFs, but only the 22 K product has been detected in vivo and in vitro (4, 5). Expression of the coat protein and 22 K genes requires two specific subgenomic RNAs which start at nucleotide position 2118 and 936 from the 3' end, respectively, as shown by primer extension experiments (2).

1 NGRATCCCTCCGACGACCTCCGACCTAGGTTGTGTATCCGGTGTATTCGCTACTGTTGCTTCCGTAGAGGATTTCTCCTGTTCCATGATATGAGG
201 GTTTAGAGCGAGGCTCACTTCTCCGGGGGATTAATTTGATACCTCTCCATATACGACAAATGACACATCAAGAGATTTATCTGGCCTAGAGAGAAA
101 TTTTGTAGGCGATTTCCGATCGCTGTTATAGGACGGTACCGGTGATGTCTCCATTTGTTCCGCTGTTGCTAGATATAGAGAGGAGAA
301 AATAGAGTGTGATGACACGACCTGTCTAGGTTGTTGTTGAGGATTTATAGAGACAAATGATGCTCCTAGTGGGATTTGATAGAGACGACCGACGAA
401 GGTATTTACATCTCCGCTCTATCTATACCCACCTCCCTCATCCGCTGTTGAGTTGTACCCACTCGATACCGCGAGCTCAGATCGGGGTTTGGGTT
501 GTGGGTTTACCTCCATATCCCATACCTGCTCTATCTGTTCCAGAGAAAGGTTTCTCCTCAGACCTGGCGGCGGCTACGTTACCTCTATATGAC
601 GCTGGGCTGTACCTACCTCCGACGGGAGGATTCCTGCTATATACCTTAGAGACGACCGACCGACACATGAGAGACGACGACGACCGACGAT
701 TCTTTAGTGGGAGTCGCTGTGACGACCGAGGATGATGATGATGCTGCTCAGCTGGTAGAGATGAGCAGAGTGTGGCTCCACGACGACCTC
801 GCTCCAGGACACCATATGACCGAGGATTTCCACGATGACGACCGACGATGGGTTACCTCAGGACACCTCGATAGATGCTGATCTACGAGGGT
901 AATCATGAAATCATGACGAGGATTCGCTCAGGATGTTGACGAGGATGTCATATGCCATGGCTATTGGATGCTCTGTTGCTACCGACGATGGAGTG
1001 GAGGACCTGGCGGACCTTTGGGCTCAGGACCTCCCTGGGTTGAAATAGGAGGACCTAGTGGCTTACCTGGGTTGTGACGACGATCATCGATG
1101 TCCCATCTGATGTTGTTCTCTCAGAGGTCGAGAGGTTCCGACGACCTCCCATAGCTAGAGACCGATATATATTTGATGTTGGAGTGGCCATC
1201 ACAGGACGAGGCTTTAGTTCATATACCTGCTGAAACCTTTAGAGAGGCTTGTGTGGAGAGGTTTCTGCTGCGAGAGACGCTTAGACTCCTCCG
1301 ACTCCACGACTACGAGGATCTTTGGGATCTTCCGCTGTCAGAGACGATTTGTAGAGAGGTTGGGTTGGCCATGCTTAGGATATGACGGGTT
1401 TCCGTGATACCTACGATGCTGGACACCTCCGATCTACGACGACCTGTCGAGACTGCTGATCTCCGCTTTCCAGAGGATGATGATCTGATC
1501 CTTGCTAGACGACGAGGATATCATGACCTTAGGCTGACGACGACCTGAGGCTGATACGCTCAGACCTTAGCTACATGTTGATGATTTGGAGAT
1601 CTACCGCATATGAAATCCCAATCATTAACGATGTTGATGATGCTTTCCGACGACGACGCTGATCAGAGGATTTACCGATGATGAGGACCGATCT
1701 TCAGAGAGAGTGGATAGGTTCCATTAACCTGTTGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATG
1801 TAGCTTCTGACGAGGCTTGTGCTGACGACACCTCTGATGATGATGTTGAAATGGACCTCATAGAGAGGATTAAGGATTTGCTCCATGATGACCC
1901 ATAACTTAGAGAGAGGCTGCTGATG
2001 TCTGGGATG
2101 TTTATTTCTAATCTAGGTTATATCATG
2201 GCTTGGAGATG
2301 CCCACACCATG
2401 TATTTAGACGATGACGACGATG
2501 ACCGGGATG
1901 ATTCGCGGATG
2701 GCTCAGGACCTCCGATG
2801 AGAGATG
2901 CCGTATG
3001 GGGACCTGATG
3101 TCCGATG
3201 ACGACCTGATG
3301 GTCGATG
3401 CTTCTACGACCTGATG
3501 ACCACGACGATG
3601 ACTTCCACCTGATG
3701 GAGCCGCTGATG
3801 CTTAGCATTTCTGATG
3901 GATG
4001 AAGATG
4101 TCTGATG
4201 CCGTCCCTCTGATG
4301 GAGGATG
4401 ACTGCTGATG
4501 ATTTGATG
4601 GATG
4701 GATG
4733 CCGACACCGATG

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