

## Supplementary Information

### Functional traits explain crayfish invasive success in the Netherlands

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## Supplementary Tables

**Supplementary Table S1**

Species	Websites																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>A. leptodactylus</i>	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>C. diminutus</i>	x	x	x	x	-	x	-	-	-	-	x	-	-	-	-	x	7
<i>C. patzcuarensis</i>	x	x	-	x	x	x	x	x	x	-	x	x	x	-	x	x	13
<i>C. puer</i>	-	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	3
<i>C. texanus</i>	-	x	-	-	-	x	-	-	-	-	-	-	-	-	-	-	2
<i>C. pecknyi</i>	-	-	-	-	-	-	-	x	-	-	-	-	x	-	-	-	2
<i>C. quadricarinatus</i>	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	-	3
<i>C. boesemani (Blue Moon)</i>	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	2
<i>C. boesemani (Hoa Creek)</i>	-	-	-	x	-	-	-	x	-	-	-	-	-	-	-	-	2
<i>C. boesemani (Red Brick)</i>	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>C. destructor</i>	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	2
<i>C. holthuisi</i>	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	1
<i>C. papuanus</i>	-	x	-	x	-	x	-	x	-	-	-	-	x	-	-	-	5
<i>O. limosus</i>	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>P. clarkii</i>	x	-	-	x	-	x	-	x	-	-	-	-	-	x	-	x	6
<i>P. alleni</i>	x	x	x	x	-	x	x	x	-	x	-	-	x	-	-	-	9
<i>P. virginalis</i>	x	-	-	-	-	-	-	-	-	-	-	x	-	x	-	-	3
<i>P. acutus</i>	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>P. troglodites</i>	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	1

1 marktplaats.nl, 2 heevis.nl, 3 aquafizz.nl, 4 aquariaveldhuis.nl, 5 aquariumvissenwinkel.nl, 6 gdaquarium.nl, 7 hornbach.nl, 8 chrisgarnalenshop.nl, 9 matavi.nl, 10 aquariumkoning.nl, 11 aquariumcentrum.nl, 12 dierenhandelexotica.nl, 13 ruinemans.com, 14 dierspecialzaakxxl.com, 15 koicompagnie.nl, 16 detropischeviskwekerij.nl

**Supplementary Table S1.** List of crayfish species found for sale online in the Netherlands on 20-06-2018. Website names can be found at the bottom.

Supplementary Table S2

Species	Traits	Habitat flow preference	Salinity tolerance	Parthenogenetic	Nr. of clutches per year	Nr. of eggs	Growth rate	Migration distance	Moving over land	Lifespan	Body size (TLmm)	Aggression	Crayfish plague resistance
<i>Astacus leptodactylus</i>		13	8,13,32	-	39	15,39	5	15	-	13,15,28	38	5,15	5,15,25
<i>Cambarellus diminutus</i>		7,24	a	-	c	e	g	24	-	13,37	24,51	n	q
<i>Cambarellus patzcuarensis</i>		7	a	-	c	e	12	j	-	13,37	12,51	n	25,34,36
<i>Cambarellus puer</i>		7	64	-	51,60	37,51	g	j	-	13,37	51	32	q
<i>Cherax boesemani</i>		16	b	-	d	16	h	k	-	m	16	o	r
<i>Cherax destructor</i>		13	20,59	-	13	13, 32	13	13	62	32,58	47	17, 65	25
<i>Cherax papuanus</i>		29	b	-	d	f	h	k	-	m	30	p	25
<i>Cherax quadricarinatus</i>		56	22	-	13	11,13,22,23	1,11	61	46	11,13	46	11	25
<i>Faxonius limosus</i>		7,49	9	31	40	3,15,23	40,49	15,61	49	49	31	13,15	13,15,25,33
<i>Faxonius virilis</i>		2,6,7	20	-	41	3,21,35	21	6	-	13,32	6,32,49	2,5	13,25,33
<i>Pacifastacus leniusculus</i>		7	8	-	52	15	5	15,61	48	13,15,28,32	42	13,15	13,15,25,33
<i>Procambarus acutus</i>		7	35	-	50	18,19	19	i	l	35	18	19,44	25,33
<i>Procambarus alleni</i>		7	53	-	d	26	26	58	57	54	14,26	26	25
<i>Procambarus clarkii</i>		7	63	-	32	3,4,23	4,19	4,13,32	45,57	13,32	43	13,43	4,13,25,33
<i>Procambarus virginalis</i>		7	62	10,13	27	13,23,26	10,23,26	58	58	13,27,28	14,26,27	10,13	13,25

**Supplementary Table S2 (continued)**

<b>Species</b>	<b>Native range</b>
<i>Astacus leptodactylus</i>	(13) Tributaries of the Caspian Sea (Volga, Ural) and the tributaries of the Ob River
<i>Cambarellus diminutus</i>	(7,24) Restricted ranges in southeastern Mississippi and southwestern Alabama
<i>Cambarellus patzcuarensis</i>	(7) Lago de Patzcuaro, Michoacan, Mexico
<i>Cambarellus puer</i>	(7) Texas, Arkansas, Mississippi and Tennessee.
<i>Cherax boesemani</i>	(16) Ajamaru Lakes, Vogelkop peninsula, West New Guinea
<i>Cherax destructor</i>	(13) Large parts of Australia, mainly the eastern half
<i>Cherax papuanus</i>	(29) Lake Kutubu, Papua New Guinea
<i>Cherax quadricarinatus</i>	(11) Queensland and the Northern Territory, northern Cape York, west of the Gulf and New Guinea.
<i>Faxonius limosus</i>	(7) The Atlantic watershed from Maine to the lower James River in Virginia.
<i>Faxonius virilis</i>	(7) Saskatchewan to Ontario, Canada, Montana and Wyoming to New York and southwestern Maine
<i>Pacifastacus leniusculus</i>	(7) British Columbia, California, Idaho, Nevada, Oregon, and Washington
<i>Procambarus acutus</i>	(7) Maine to Georgia, Florida to Texas, Minnesota to Ohio, southwestern Texas and northern Mexico
<i>Procambarus alleni</i>	(7) East of St. Johns River and all of peninsular Florida south of Levy and Marion counties
<i>Procambarus clarkii</i>	(7) Northern Mexico to Escambia County, Florida, and north to southern Illinois
<i>Procambarus virginalis</i>	(7) Tributaries of the Satilla River, Georgia, southward through peninsular Florida

**Supplementary Table S2.** Overview of trait information sources for Table 2. Numbers and letters refer to literature references and expert judgement, respectively, in Supplementary Table S3. Traits not present in a species are marked -.

### Supplementary Table S3

#### Literature references

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-	Only species possessing this trait are mentioned in literature, without references species are not expected to possess such traits
<b>Expert judgement</b>	
a	Similar to <i>C. puer</i> : 0-5
b	Only lives in single inland freshwater lake area, no salinity tolerance expected
c	Similar to <i>C. puer</i> : 2
d	Similar to other <i>Cherax</i> : 2
e	Similar to <i>C. puer</i> : Low
f	Similar to <i>C. papuanus</i> : Low
g	Similar to <i>C. patzcuarensis</i> : Low
	Reports of slow growth from aquarium pet owners: <a href="https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/blue-moon">https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/blue-moon</a> (slow), <a href="https://sites.google.com/site/rivierkreeften/aquariumhobby">https://sites.google.com/site/rivierkreeften/aquariumhobby</a> (slow), <a href="https://aquaticarts.com/products/supernova-crayfish">https://aquaticarts.com/products/supernova-crayfish</a> (slow),
h	<a href="https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/zebrakreeft">https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/zebrakreeft</a> (slow)
i	Mean of other <i>Procambarus</i> : medium
j	Similar to <i>C. diminitus</i> : restricted range
k	Only lives in single inland lake area, low migration
l	Similar to other <i>Procambarus</i> : yes
m	Similar to <i>C. quadricarinatus</i> : 4-5
n	Similar to <i>C. puer</i> : low aggression
	Reports of aggression from aquarium pet owners: <a href="https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/blue-moon">https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/blue-moon</a> (medium)
o	<a href="https://aquaticarts.com/products/supernova-crayfish">https://aquaticarts.com/products/supernova-crayfish</a> (medium), <a href="https://sites.google.com/site/rivierkreeften/aquariumhobby">https://sites.google.com/site/rivierkreeften/aquariumhobby</a> (low)
p	Reportedly not aggressive from aquarium pet owners: <a href="https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/zebrakreeft">https://tropischevissengids.jouwweb.nl/lagere-diersoorten/kreeften/zebrakreeft</a> (low/medium)
q	Similar to <i>C. patzcuarensis</i> : vector with low susceptibility
r	Similar to other <i>Cherax</i> : high susceptibility

**Supplementary Table S3.** Literature references and expert judgement descriptions for Supplementary Table S2