

***Killer shrimp* (*Dikerogammarus villosus*)**








Photos, left: M. Quigley. Right: S. Giesen.

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Common name(s) in English	Killer shrimp
... and in other languages	German: Großer Höckerflohkrebs. Großer Flohkrebs.
Scientific name	<i>Dikerogammarus villosus</i>
Organism group	Crustaceans. Amphipods, gammarids.
Size and appearance	The body is up to 3 cm long (which is large for a freshwater amphipod). The species is greyish brown, with either a striped or a uniform coloration pattern. The mouthparts (mandibles) are unusually powerful (see below). Populations consist predominantly of females.
May be confused with	–
Geographical origin	Ponto-Caspian region, in and around the Black and Caspian Seas.
First observed in Swedish waters	Has not yet been observed in Swedish waters.
Occurrence in Swedish seas and coastal areas	Has not yet been observed in Swedish waters.
Occurrence in other sea areas	<i>Dikerogammarus villosus</i> is to be found in the Baltic Sea, in the Oder/Odra Lagoon, where it was discovered in 1999. It found its way into the Baltic via the southern invasion corridor, spreading along the Danube, the Main–Danube Canal (opened in 1992) and on into the Rhine. From there it spread east via the Mittelland Canal to the Weser, Elbe and Oder/Odra rivers. The species reached Germany in 1994, the Netherlands (Amsterdam) in 1998 and Poland in 1999. It may also be about to invade British rivers.
Probable means of introduction	Probably shipping (in ballast water).
Habitat(s) in which species occurs	The species is highly adaptable to different conditions and habitats. It prefers a salinity of between 0 and 10 psu, but can tolerate salinities up to just over 20 psu (but not above 24 psu). It is to be found in lakes, rivers, estuaries and canals. The species can cope with a wide range of temperatures, but prefers a temperature of around +20°C. It lives on solid surfaces of all kinds, with a particular liking for mats of algae near or on the water surface. Since invading the Rhine,

	<i>Dikerogammarus villosus</i> has become the dominant species on stony substrata and has outcompeted the amphipod <i>Gammarus tigrinus</i> in this habitat. <i>D. villosus</i> is omnivorous, reaches sexual maturity early in life, and breeds very rapidly all year round.
Ecological effects	<p><i>Dikerogammarus villosus</i> is an extremely aggressive predator. It eats basically any small animals it comes across, including other amphipods. With its powerful mouthparts it bites, kills and shreds its prey. It can even fatally wound animals with shells. It does not eat everything it attacks; sometimes it seems to kill for the sake of killing, probably to quickly oust possible rivals for food and space. This aggressive pattern of effective and indiscriminate killing means that this amphipod quickly becomes dominant and displaces weaker native species. <i>D. villosus</i> has also been observed attacking small fish, which could imply that eggs, larvae and juveniles may be at risk.</p> <p>In addition, it is believed that the species could act as an intermediate host for spiny-headed worms (Acanthocephala), worm-like organisms that are parasites of fish and birds.</p>
Other effects	As well as "killer shrimp", the species has been referred to as "a freshwater 'jaws'".

FIND OUT MORE

- North European and Baltic Network on Invasive Alien Species: *Dikerogammarus villosus*
<http://www.nobanis.org/speciesInfo.asp?taxaID=2224>
- Baltic Sea Alien Species Database: *Dikerogammarus villosus*
http://www.ku.lt/nemo/directory_details.php?sp_name=Dikerogammarus+villosus
-  1 MB: University of Lodz: Invasive gammarids in Poland: Migration in progress
http://www.icaais.org/pdf/21Tuesday/B/tues_b_1_pm/Krzysztof_Jazdzewski.pdf
-  212 kB: US Army Corps of Engineers, Environmental Lab: *Dikerogammarus villosus*
http://el.erdc.usace.army.mil/ansrp/dikerogammarus_villosus.pdf
- Archiv für Hydrobiologie: Ecological traits of the amphipod invader *Dikerogammarus villosus* on a mesohabitat scale (Devin, Piscart, Beisel, Moreteau)
<http://www.ingentaconnect.com/content/schweiz/afh/2003/00000158/00000001/art00003>
- 924 kB: ICAIS lecture (Dirk Platvoet) If they can't meet you, they can't eat you
http://www.icaais.org/pdf/21Tuesday/B/tues_b_1_pm/Dirk_Platvoet.pdf
See also Platvoet *et al*:
Proceedings. Biological sciences: Invading predatory crustacean *Dikerogammarus villosus* eliminates both native and exotic species
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10874746&dopt=Abstract
Canadian Journal of Fisheries and Aquatic Sciences: Predatory impact of the freshwater invader *Dikerogammarus villosus* (Volume 59, Number 6, June 2002)
<http://www.ingentaconnect.com/content/nrc/cjfas/2002/00000059/00000006/art00015>
- Aquatic Invasions (2006): Recent invasions of alien macroinvertebrates and loss of native species in the upper Rhine River, Germany
<http://www.aquaticinvasions.ru/2006/index2.html>
-  329 kB: Biomonitoring der Amphipodenfauna in der Oberen, Mittleren und Unteren Elbe: Derzeitige Verbreitung von *Dikerogammarus villosus*
<http://www.arge-elbe.de/wge/Download/Texte/02Amph.pdf>
-  925 kB: University of Nijmegen: Trophic relations in the Lower Rhine food web, during invasion and after the establishment of *Dikerogammarus villosus*
<http://www.dbag.unifi.it/inwat/presentations/vanriel.pdf>
-  193 kB: Ein neuer Flohkrebs im Bodensee: *Dikerogammarus villosus*
<http://www.bodensee-ufer.de/Inhalt/ Archiv/ThdM-HYDRA-Dikerogammarus-031103.pdf>
- Centre national de la recherche scientifique: Rapid range extension of the Ponto-Caspian amphipod *Dikerogammarus villosus* in France: potential consequences
<http://cat.inist.fr/?aModele=afficheN&cpsidt=15731480>
- Marine and estuarine macroinvertebrates, macroalgae and fish introduced to the Netherlands: *Dikerogammarus villosus*
<http://home.hetnet.nl/%7Efaassema/Dikerogammarusvillosus.html>

- Wikipedia: Große Höckerflohkrebs
http://de.wikipedia.org/wiki/Großer_Höckerflohkrebs
- Patrick's Waterpage: Höckerflohkrebse im Zürichsee (good images!)
<http://psteinmann.net/dikerogammarus.html>
- Sea Grant National Aquatic Nuisance Species Clearinghouse: *Dikerogammarus villosus*
http://www.aquaticinvaders.org/nan_browse.cfm?level=4&key=300302000000
- Guardian (2001): Pink peril threatens native species in Britain's rivers
http://www.guardian.co.uk/uk_news/story/0,3604,417246,00.html

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<http://www.glerl.noaa.gov/pubs/photoqallery/Waterlife/pages/1030.html>

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<http://www.glerl.noaa.gov/pubs/photoqallery/Waterlife/pages/0354.html>

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