

# BULLETIN ZOOLOGISCH MUSEUM

 UNIVERSITEIT VAN AMSTERDAM

Vol. 10 No. 16 1985

## THE PRESENT POSITION OF THE ALIEN AMPHIPODS *GAMMARUS TIGRINUS* AND *CRANGONYX PSEUDOGRACILIS* IN THE NETHERLANDS (CRUSTACEA, AMPHIPODA).

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### ABSTRACT

Like in foregoing years, the dispersal of *G. tigrinus* was followed. It appeared that after an apparent standstill in the previous years *G. tigrinus* is explosively expanding its range again. For the first time it was found in the rivers Rhine and Meuse and its affluents. *Crangonyx pseudogracilis* has stabilized its position in the province of Groningen. Some remarks are made on the isopod *Proasellus coxalis*.

### INTRODUCTON

After its first appearance in the Netherlands in 1964, *Gammarus tigrinus* Sexton, 1939, successfully invaded its oligohaline waters (Pinkster et al., 1977). The winter of 1978/1979 caused a decline of the species (Pinkster et al., 1980) but in the following years when climatic conditions were favourable it rapidly consolidated its former position. *G. tigrinus* so far did not seem able to invade the fresh (and often running) waters in the eastern and southern parts of the country. In 1984 a new survey was made to follow the dispersal of this interesting species.

The dispersal of *Crangonyx pseudogracilis* Bousfield, 1958, known since 1979 from a restricted area in the province of Groningen, was likewise followed.

### THE SITUATION OF *GAMMARUS TIGRINUS*

AT THE END OF 1984.

During the year of 1984 local hydrobiologists reported *G. tigrinus* from the river Rhine near Arnhem, a locality far outside the known range of the species. A new survey was started immediately along the eastern and southern borders of its distribution area and along the rivers IJssel, Rhine, Waal and Meuse. The results were astonishing: *G. tigrinus* was found throughout the stream system of the river IJssel, and the rivers Rhine and Waal up to the German border. In the river Meuse the species has been found as far south as Roermond. It was also found in some canals connected with the Meuse (Fig. 1).

In spite of an intensive search *G. tigrinus* could not be traced along the eastern border of the country north of the river Rhine, so no

connection with the German populations in the drainage area of the river Ems has been found. In the Deltaic region *G. tigrinus* consolidated its position.

#### DISCUSSION

*Gammarus tigrinus* has been found for the first time in the major running waters of our country and in some fresh canals. So far, this was thought unlikely because of its poor capabilities to reproduce under freshwater conditions (Pinkster et al., 1977). However, the high ion content of the river Rhine and its affluents, caused by various industries and mining, has apparently created a suitable biotope for *G. tigrinus*. This situation is comparable to the situation in Germany where *G. tigrinus* successfully thrives in larger rivers like the Fulda, Weser, Elbe, Werra and Ems (Herhaus, 1978). Moreover, a succession of very mild winters since 1978/1979 certainly worked in favour of *G. tigrinus*.

Further range extensions are to be expected in the areas between the large rivers and in the provinces of Noord-Brabant, Gelderland and Overijssel. It will be interesting to see what will happen with the local species like *Echinogammarus berilloni* (Catta, 1878) and *Gammarus roeseli* Gervais, 1835. Like *G. tigrinus*, these species also expanded their distribution area in the last few decades, probably favoured by the increasing effect of pollution (Pinkster, 1973; Karaman & Pinkster, 1977). So far, no data are available about the reproductive capacities and tolerances of these species in situations comparable to those found in the southern part of the Netherlands, so no predictions about the outcome of this interesting confrontation can be made.

When the present survey was finished, Berndt, 1984 reported *G. tigrinus* from the Lower Rhine, between Rees and Emmerich, in Germany. Most probably these populations also descend from the Dutch populations, as can be concluded from earlier studies in the river Rhine. Schmidt, 1981, did not find any trace of *G. tigrinus* in any locality between km 150 and km 1030, so a spreading from upstream does not

seem likely. However, it will be interesting to know from where the populations in the Rhine originate: from the known German populations or from the Dutch ones. Electrophoretic research, as carried out by Bulnheim, 1985, can possibly provide an answer to these questions.

#### THE SITUATION OF *CRANGONYX PSEUDOGRACILIS* AT THE END OF 1984.

In early autumn 1984 all known localities in which *C. pseudogracilis* was previously found have been revisited as well as all waters in adjacent areas in a radius of about 15 km around the known distribution area (Pinkster & Platvoet, 1983). Although the species was abundantly present in all formerly known localities, it was never found outside this area.

#### DISCUSSION

In 1983 Pinkster & Platvoet discussed the possibilities of this species for further range extensions and tentatively predicted a future spreading in southern and southeastern direction, an area in which *Gammarus p. pulex* is the only gammarid species. So far, this prediction did not come true, although *C. pseudogracilis* certainly consolidated its position within its known distribution area. We still believe in a future dispersal of this species because of the greater reproductive capacity of this species as compared to *Gammarus p. pulex*.

#### REMARKS ON *PROASELLUS COXALIS* DOLFUSS, 1892.

During the 1984 *Crangonyx*-survey, *Proasellus coxalis*, a new faunal element for the north of the country was found. Only one male specimen was caught. The locality (Oude Vaart near Surhuizum, province of Groningen) in which this species was found, is an isolated one and widely separated from the known distribution area of the species. So far, it has not been found north of the line Amsterdam - Overijsselse Vecht (Beijer & Gardeniers, in press). Artificial spreading (by means of shipping) seems likely.

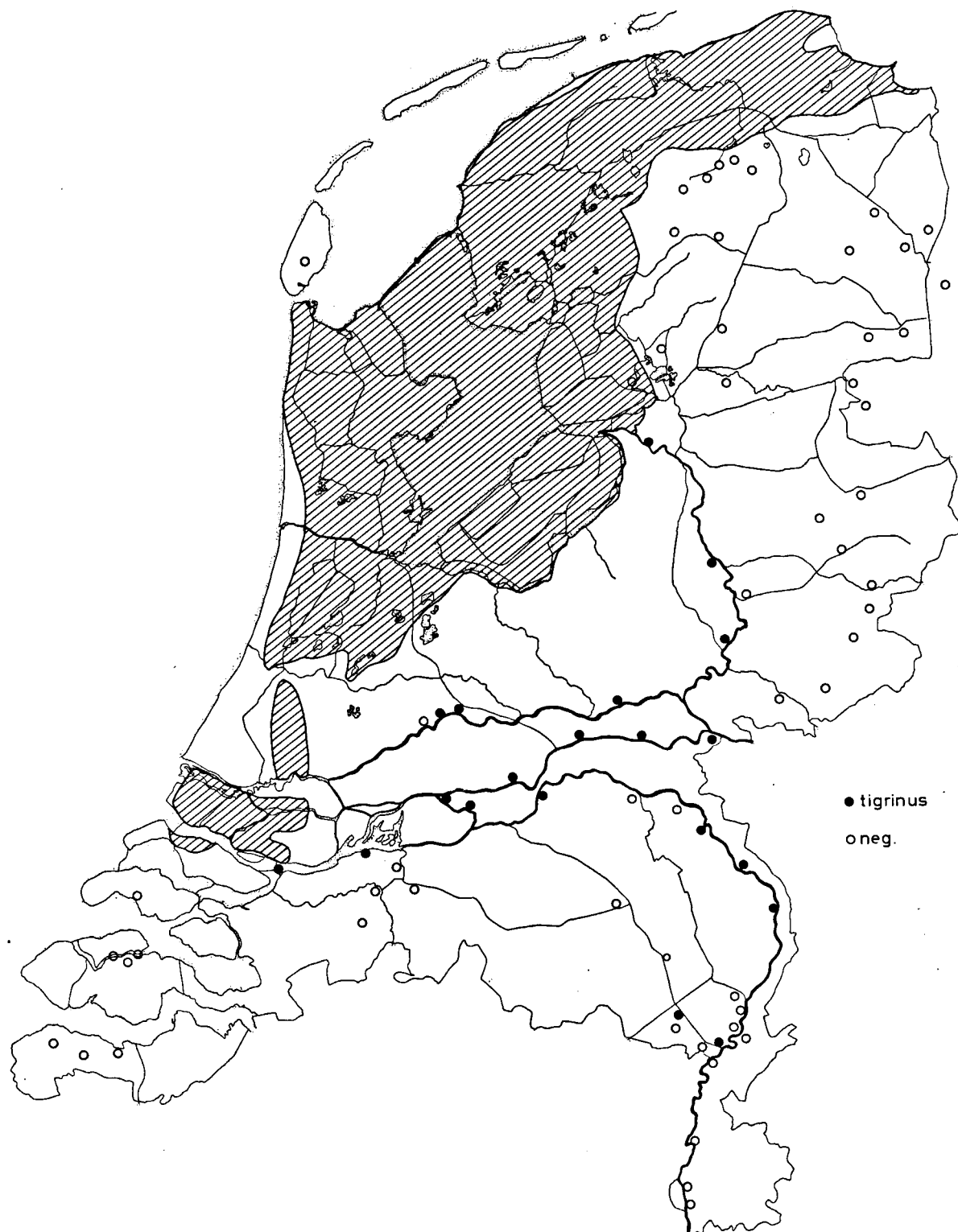


Fig. 1. Distribution of *Gammarus tigrinus* in the Netherlands at the end of 1984. ● new localities with *G. tigrinus*; ○ negative sample. The minimal area occupied by the species at the end of 1982 is hatched.

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Received: 21.II.1985  
Distributed: 27.IX.1985

This periodical is regularly published by the Institute of Taxonomic Zoology (Zoölogisch Museum), of the University of Amsterdam. Requests for exchange or sale of this publication may be addressed to the Administration.

This periodical may be quoted in abbreviation as Bull. zool. Mus. Univ. Amsterdam  
ISSN 0165 - 9464