

Press release

When do alien species pose a threat?

June 7, 2018

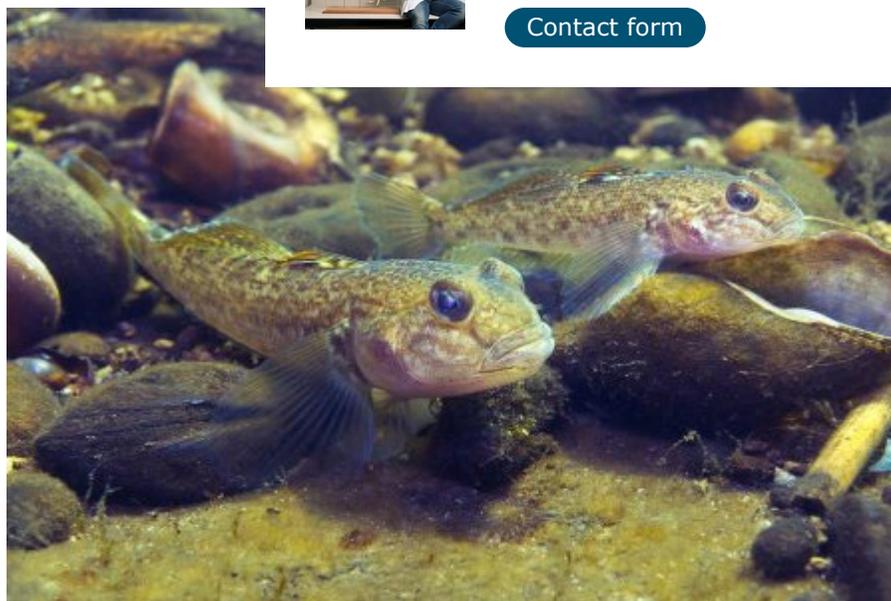
Is it possible to predict whether newly-arriving alien species, such as fishes from the Black Sea, will establish in Western Europe and displace native species? Researchers of Wageningen University & Research and Radboud University Nijmegen present a novel method, based on functional traits, such as mouth shape, to predict which alien fish species pose a threat to native fish. Their work is published in PLOS ONE of this week.

Many alien plant and animal species settle well in new environments. Some thrive to such an extent that they displace native species, such as American crayfish, or even develop into pests, such as Japanese knotweed in Europe. What makes some alien animal and plant species successful, while others are not? A difficult, but relevant question, since it is to be expected that many more alien species will reach the Netherlands and Western Europe.

There are several pathways for alien animal and plant species to reach new environments, such as deliberate introductions, escapes, or releases into nature by unsuspecting citizens. In that way red-eared terrapins, Egyptian geese, and sunfishes have reached the Netherlands. There are also species that 'hitchhike' with traded products, such as Asian tiger mosquitos with second-hand car tyres, or that expand their range by making use of new man-made introduction corridors. A group



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of freshwater fishes from the Black and Caspian Sea area belong to the latter group.

Fishes from the Black and Caspian Sea area

New canals connecting the large rivers of Europe, such as the Danube and Rhine River, have enabled at least five alien fish species to reach the Netherlands since 2000. One of these, the round goby is considered a pest and it is shown that it can displace native and protected fish species. Other species, such as the whitefin gudgeon, appear to have far fewer negative effects on native species, or even seem to disappear again.

Predicting from shape differences

To predict whether alien fish species compete for food with each other and with native species, the researchers performed precise measurements of fish characteristics involved with feeding. They measured characters such as mouth size, jaw shape, and gut length, in five alien and four native species. If these functional traits are more similar in different species, the more likely they will compete for food. The results of the study show that some alien species indeed can compete for food with natives, because of similar shapes. For instance, Kessler's goby competes with the protected brook and river bullheads. Other species, such as round goby, appear to be successful by filling up spaces in the food web that were not yet taken by native species, rather than competing with them. Invasive species therefore apply different strategies to become successful.

Risk assessment

Therefore, there is not one explanation why alien species can be successful: both strong competition with native species, and the filling up of vacant niches in ecosystems might work. Both phenomena can be derived from studying functional traits, which makes it a good method for risk assessment of new alien species.

Publication in *PLOS ONE*

[Nagelkerke, L.A.J., van Onselen, E., van Kessel, N., Leuven, R.S.E.W. \(2018\) Functional feeding traits as predictors of invasive success of alien freshwater fish species using a food-fish model. PLOS ONE. DOI: 10.1371/journal.pone.0197636](#)

Read more about exotic species in the

Read the publication:

- 'Functional feeding traits as predictors of invasive success of alien freshwater fish species using a food-fish model' (2018)

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Round goby



Northern whitefin gudgeon



Monkey goby

dossier



Exotic species in the Netherlands

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