

FROM BAD TO WORSE

UPDATE ON THE NON-NATIVE FRESHWATER FISHES IN FLANDERS (BELGIUM)

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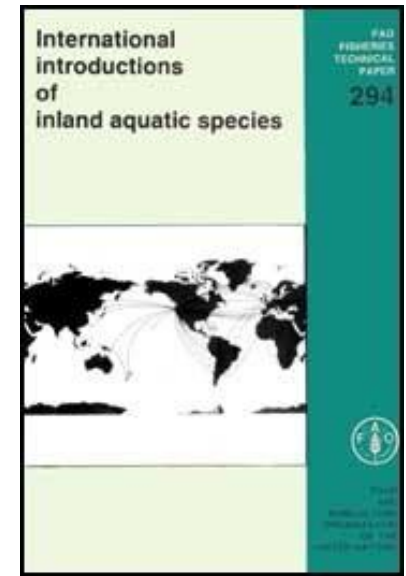
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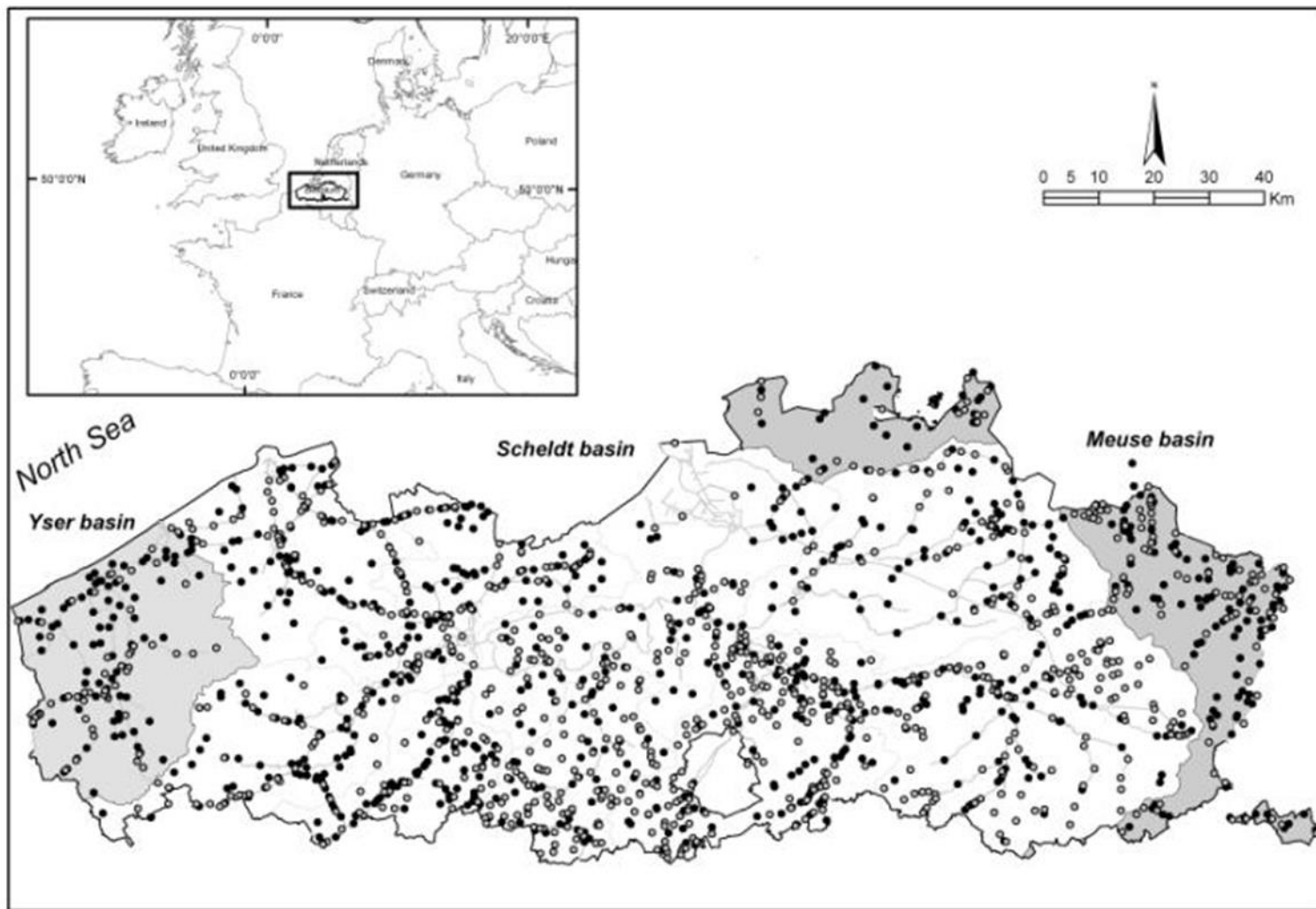


Introduction

- ▶ Many freshwater fish species have been introduced to non-native areas (e.g. Welcomme, 1988) => **not always clear** which species are **still present** and have formed sustainable, naturally reproducing populations
- ▶ Hanel *et al.* (2012) found at least **109 non-native** freshwater fish species (29 families) were introduced to Europe of which **38 species** are **successful**
- ▶ **Updates of regional and national lists** are important to keep track of the currently occurring species
- ▶ Reporting on the non-native species' presence, spread and also pathways is an important part of **new EU regulation**.
- ▶ **Aim:** update of currently established and acclimatized species in Flanders (North Belgium)



Study area



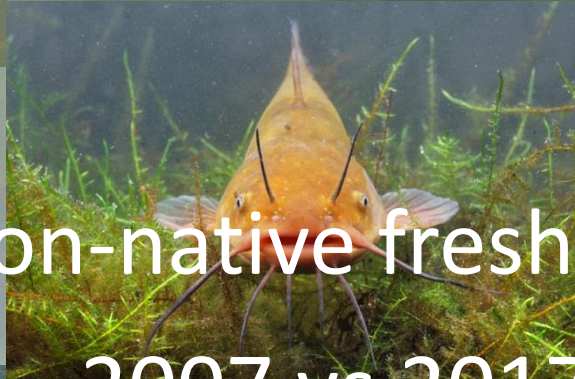
Methods





Update non-native freshwater fishes

2007 vs 2017



Non-native fish species in Flanders

2007 = 14 sp

| Latin name | Common name | Origin | Date of introduction | Suspected pathway/vector | Status |
|-----------------------------|-------------------|--------|----------------------|--------------------------|--------|
| Ameiurus nebulosus | Brown bullhead | NA | 1871 | AQ, OR | N |
| Aspius aspius | Asp | EE | 1984 | AN | N |
| Carassius auratus | Goldfish | AS | 17th c. | OR | A |
| Carassius gibelio | Golden orfe | AS, EE | 13th c. | UN | N |
| Ctenopharyngodon idella | Wuchang bream | AS | 19th c. | BC | A |
| Cyprinus carpio | Common carp | EE | 13th c. | AQ | N |
| Hypophthalmichthys molitrix | Silver carp | AS | 1975 | BC | A |
| Lepomis gibbosus | Pumpkinseed | NA | 1885 | OR | N |
| Oncorhynchus mykiss | Rainbow trout | NA | 1884 | AQ, AN | A |
| Oreochromis niloticus | Nile tilapia | AFR | 1990 | AQ | A* |
| Pimephales promelas | Fathead minnow | NA | 1984 | AN | N |
| Pseudorasbora parva | Topmouth gudgeon | AS | 1992 | UN, AN | N |
| Sander lucioperca | Pikeperch | EE | 1890 | AN | N |
| Umbra pygmaea | Eastern mudminnow | NA | 1920 | OR, AQ | N |

2007: 9 species established/naturalized

Origin: AS = Asia, EE = Eastern Europe, AFR = Africa, NA = North America

Pathway: AQ = aquaculture, OR = ornamental, AN = angling/bait fish, BC = biological control, UN = unintentional

Status: A = Acclimatized, N = Naturalized; A* = acclimatized in restricted areas



Flanders
State of the Art

Non-native fish species in Flanders

First non-native record?



2017: at least 12 species established/naturalized

| Latin name | Common name | Origin | Introduction | Pathway(s) | Status |
|------------------------------------|-------------------|----------|--------------|------------|--------|
| <i>Acipenser baerii</i> | Siberian sturgeon | AS | 2001 | AQ, OR | A |
| <i>Acipenser gueldenstaedtii</i> | Russian sturgeon | EE | 2005 | AQ, OR | A |
| <i>Acipenser ruthenus</i> | Sterlet | EE | 20xx | AQ, OR | A |
| <i>Ameiurus nebulosus</i> | Brown bullhead | NA | 1871 | AQ, OR | N |
| <i>Aspius aspius</i> | Asp | EE | 1984 | AN | N |
| <i>Ballerus ballerus</i> | Blue bream | EE | 2016 | AN? | N? |
| <i>Carassius auratus</i> | Goldfish | AS | 17th c. | OR | A |
| <i>Carassius gibelio</i> | Gibel carp | AS or EE | 17th c. | UN | N |
| <i>Clarias gariepinus</i> | African catfish | AFR | 1980s | AQ | A* |
| <i>Ctenopharyngodon idella</i> | Grass carp | AS | 1973 | BC | A |
| <i>Cyprinus carpio</i> | Common carp | AS | 17th c. | OR | A |
| <i>Hypophthalmichthys molitrix</i> | Silver carp | AS | 1975 | BC | A |
| <i>Hypophthalmichthys nobilis</i> | Bighead carp | AS | 1975 | BC | A |
| <i>Ictalurus punctatus</i> | Channel catfish | NA | 1884 | AQ | A |
| <i>Lepomis gibbosus</i> | Pumpkinseed | NA | 1885 | OR | N |
| <i>Neogobius fluviatilis</i> | Monkey goby | EE | 2015 | AM | N? |
| <i>Neogobius melanostomus</i> | Round goby | EE | 2010 | BW, AM | N |
| <i>Oncorhynchus mykiss</i> | Rainbow trout | NA | 1884 | AQ, AN | A |
| <i>Oreochromis niloticus</i> | Nile tilapia | AFR | 1990 | AQ | A* |
| <i>Pimephales promelas</i> | Fathead minnow | NA | 1984 | AN | N |
| <i>Ponticola kessleri</i> | Bighead goby | EE | 2012 | BW, AM | N |
| <i>Proterorhinus semilunaris</i> | Tubenose goby | EE | 2010 | AM | N |
| <i>Pseudorasbora parva</i> | Topmouth gudgeon | AS | 1992 | UN, AN | N |
| <i>Sander lucioperca</i> | Pikeperch | EE | 1890 | AN | N |
| <i>Umbra pygmaea</i> | Eastern mudminnow | NA | 1920 | OR, AQ | N |

4 Ponto-Caspian gobies since 2010

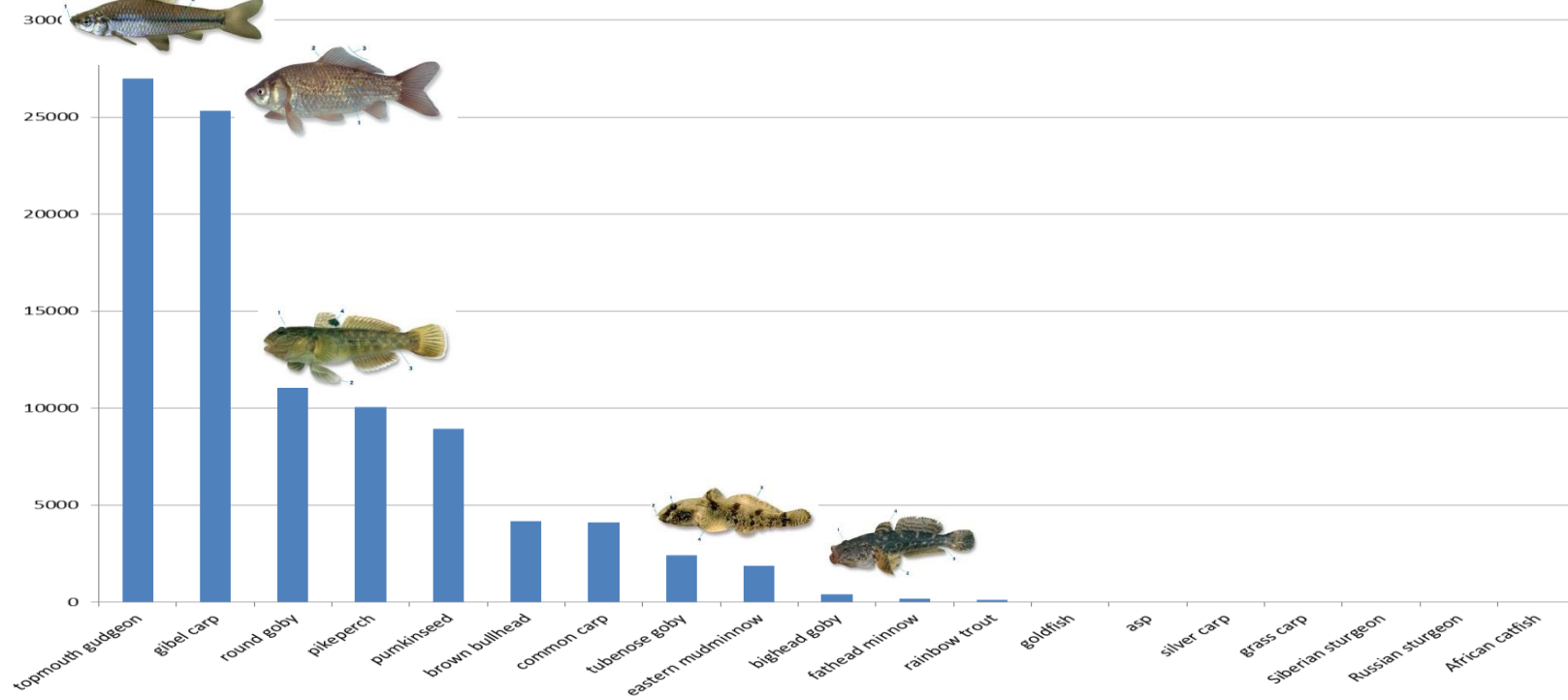
Distribution and number of records

| Distribution | No. of species |
|----------------------|----------------|
| Widespread | 4 |
| Regional | 6 |
| Scattered | 3 |
| Too few observations | 12 |

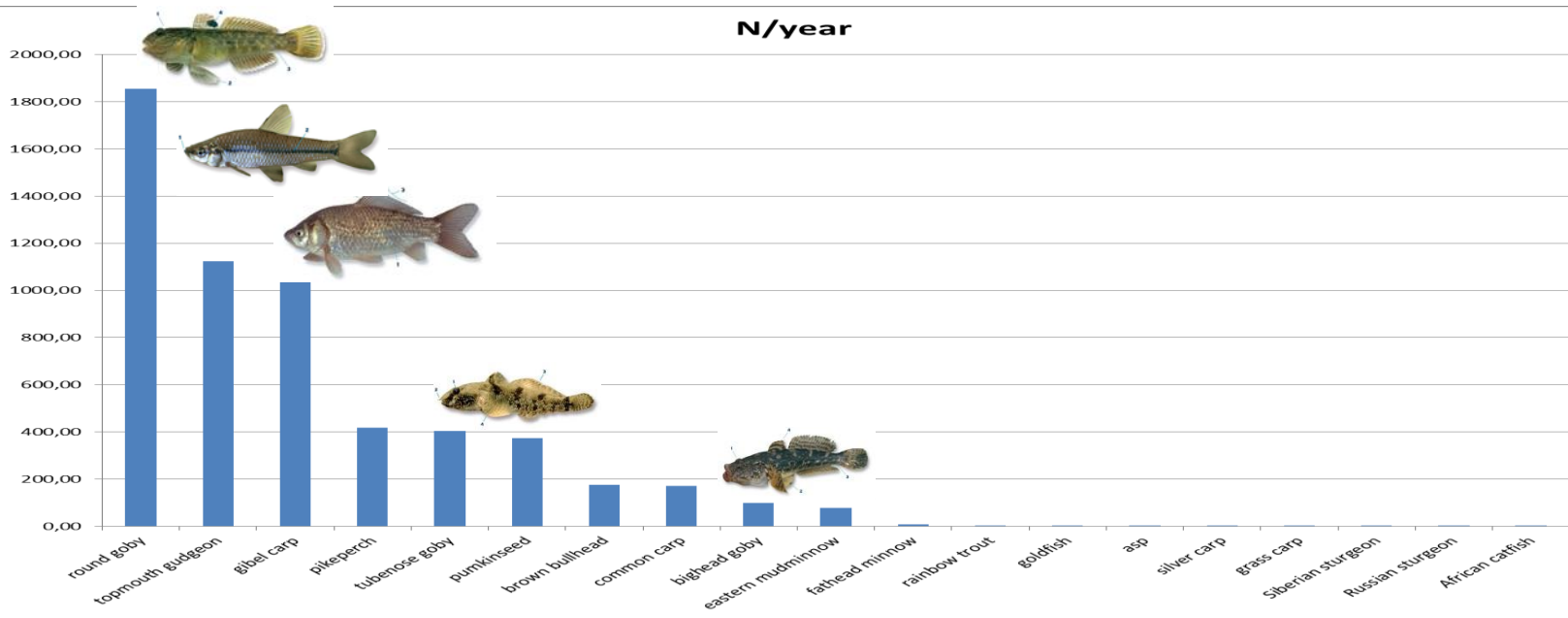
| | No. of species | Records |
|----------------|----------------|-------------------|
| Very common | 4 | > 10000 |
| Common | 5 | 1001- 10000 |
| Rare | 3 | 101 – 1000 |
| Very rare | 4 | 10 - 100 |
| Extremely rare | 9 | < 10 observations |



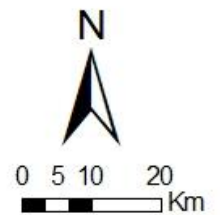
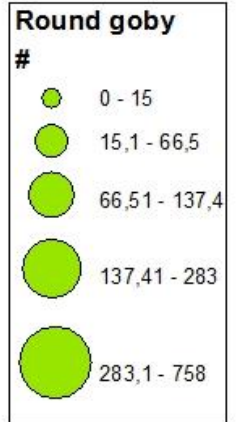
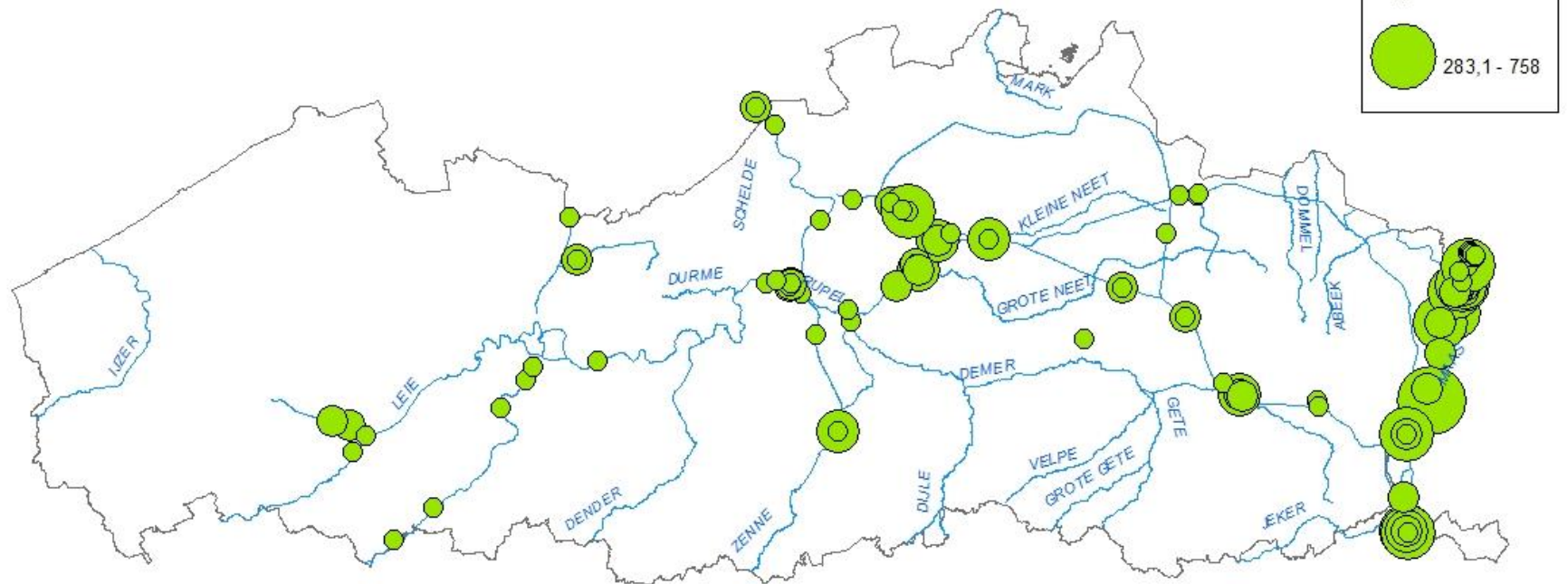
Total



N/year



2016



Round goby

2010 - 2016



Flanders
State of the Art

Pathways

| Main pathway* | | No. of fish species |
|--------------------|----|---------------------|
| Aquaculture | AQ | 6 |
| Ornamental | OR | 6 |
| Angling/bait fish | AN | 4 |
| Biological control | BC | 3 |
| Ballast water | BW | 3 |
| Unintentional | UN | 2 |
| Active migration | AM | 1 |

*Some species have multiple pathways

Trend over time and origin

| | < 1800 | 1851 - 1900 | 1901 – 1950 | 1951 - 2000 | 2001 – 2017 |
|---------------|----------|-------------|-------------|-------------|----------------|
| N.-America | - | 4 | 1 | 1 | - |
| Asia | 2 | - | - | 4 | 1 (+2?) |
| Africa | - | - | - | 2 | - |
| East Europe | 1 | 1 | - | 1 | 7 (+4?) |
| Totaal | 3 | 5 | 1 | 8 | 8 (+6?) |
| Cum. Tot. | 3 | 8 | 9 | 17 | 25 (31?) |

- Number of species/time period is still increasing
- Increasing number of species from East Europe

*Species to be expected in near future between brackets

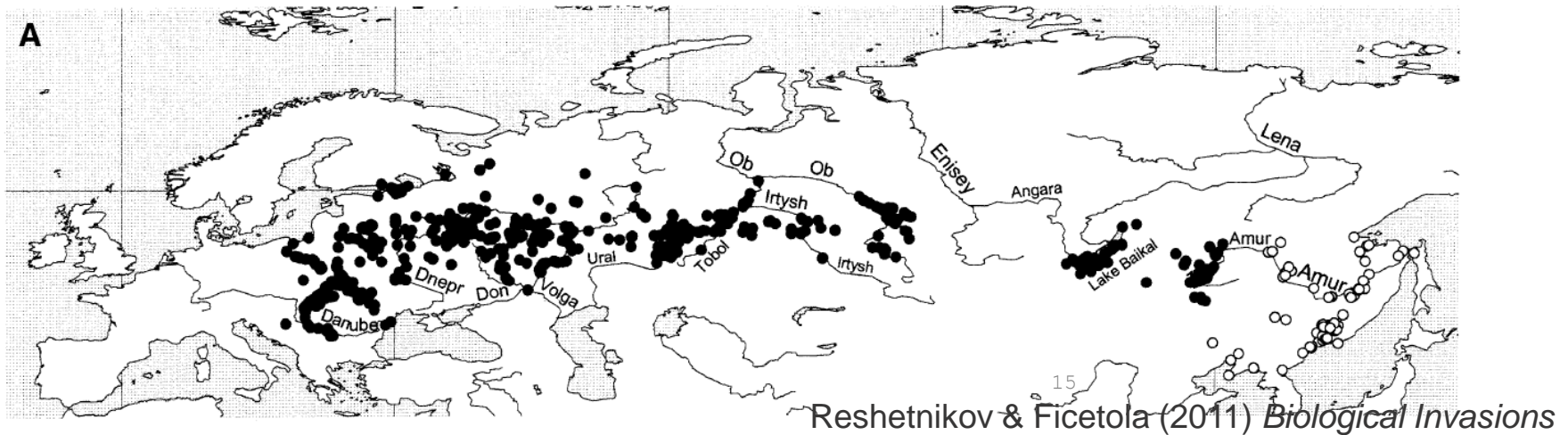
Future: species to be expected

- White-finned gudgeon *Romanogobio belingi* => The Netherlands
- Vimba *Vimba vimba* => The Netherlands
- White-eye bream *Ballerus sapa* => The Netherlands
- Oriental wheaterfish *Misgurnus anguillicaudatus* => The Netherlands
- Racer goby *Neogobius (Babka) gymnotrachelus* => Germany?
- Amur sleeper *Perccottus glenii* => Germany

Reshetnikov AN, Schliewen UK (2013) First record of the invasive alien fish rotan *Perccottus glenii* Dybowski, 1877 (Odontobutidae) in the Upper Danube drainage (Bavaria, Germany). *Journal of Applied Ichthyology*



Future: Amur sleeper



Conclusions

- ▶ Number of non-native freshwater fish species is increasing fast
- ▶ Shift from intentional to unintentional introductions
- ▶ Important to report new occurrences and the establishment status of species
 - EU regulation on IAS



Thank you – Questions?

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