

Supporting Information for “*InsectChange: Comment*”. Laurence Gaume, Marion Desquilbet.

Appendix S2.

Freshwater studies of the InsectChange database including noninsect taxa

The "insects" considered in the InsectChange database (van Klink et al. 2021) are actually intended to be insects, arachnids and entognaths. Therefore, for the sake of brevity, insects, arachnids and entognaths are hereafter referred to as insects.

Table S1. This table specifies the freshwater studies of InsectChange included in Figure 3 (i.e. studies involving non-insects) and shows their distribution according to their degree of information on insect share. Out of the 62 freshwater studies of InsectChange, 28 considered noninsects, among which 24 considered the whole invertebrate assemblage. The study identifiers are those used by Van Klink et al. 2021 and the associated references can also be found in *Problems.xlsx*.

Table S2. This table synthesises the qualitative information available on the noninsects, i.e. the different taxa included in the freshwater studies that considered either the whole invertebrate assemblage or a subset of this assemblage. It shows that these studies most frequently include worms, crustaceans and molluscs, especially taxa that are often signs of poor water quality.

Table S3. This table credits the photographs used in Figure 3 of the comment to their authors. It specifies the type of noninsect shown in the photograph, the name of the species shown, the name of the author to whom the photograph should be credited, the way the source was used, the copyright license, the date of the photo, additional details and the link where all this can be found.

Figure S1. This figure shows the insect share (mean % per plot) and its variation over time (standard deviation per plot) in the time series that have considered the entire invertebrate assemblages instead of only insects and where it was possible to extract the percentage of insects for all or for some records of the time series. Insect shares were often low with high standard deviations over time, meaning that the insect trend cannot be inferred from the trend of the whole invertebrate assemblage

Table S1 - Distribution of freshwater studies in InsectChange according to their information on the insect share in the invertebrate assemblage

Invertebrate assemblage considered	Study identifier	# studies
Whole invertebrate assemblage considered, where insects were not dissociable in any metric or site	1395, 1423, 1427, 1432, 1437, 1498, 1500, 1503, 1504	9
Whole assemblage considered, where insects were reported to be in a minority in the assemblages of all sites	1454, 1466	2
Whole invertebrate assemblage considered, where insects were dissociable in some records in at least one metric or site	1425, 1452*, 1456*, 1506, 1507, 1509, 1511	7
Whole invertebrate assemblage considered, where insects were dissociable over the whole period in at least one metric or site	1421, 1428, 1435, 1455, 1473, 1513	6
Subset of the whole invertebrate assemblage considered, where insects were not dissociable in any site or metric (abundance/biomass) but inferred to be dominant because chironomids represented more than 50% of the quantity of invertebrates.	1448, 1449, 1451, 1457	4
Only insects considered	63, 478, 1347, 1351, 1376, 1381, 1388, 1408, 1412, 1414, 1415, 1417, 1418, 1422, 1426, 1429, 1430, 1431, 1433, 1439, 1440, 1441, 1444, 1453, 1488, 1491, 1499, 1510, 1517, 1519, 1520, 1525, 1526, 1527	34

Note: Studies with only abundance data are in black, studies with only biomass data are in blue, studies with both abundance and biomass data are in green. *: Studies for which some plots considered the whole assemblage of invertebrates whereas the other plots considered a subset of the assemblage with an unknown insect share.

Table S2 - Information on non-insect taxa in the freshwater invertebrate assemblages in InsectChange (entirely or partially available in 26 of the 28 studies including non-insects)

Invertebrates				Molluscs		Crustaceans		Worms			Tardigrade	Hydrozoans
Study	Metric	Considered assemblage	Information on non-insects	Bivalves	Snails	Amphipods	Others*	Annelids (Oligochaeta /Polychaeta/ Hirudinea)	Flat worms (Turbellaria and others)	Round worms (Nematodes)		
1421	A	whole	complete	X	X	XX	XX	X	XX	-	-	X
1423	A	whole	partial	NA	NA	NA	NA	X	NA	NA	NA	NA
1425	AB	whole	complete for some records	XX(invasive)	XX	-	X	X	X	X	-	X
1427	AB	whole	complete	X	X	X	X	X	-	X	-	X
1432	B	whole	partial	X	NA	NA	X	X	NA	X	NA	NA
1435	A	whole	complete	X	XX	XX	XX	XX	X	-	-	-
1437	B	whole	partial	NA	NA	NA	NA	X	NA	X	NA	NA
1448	AB	subset	complete	NA	NA	NA	NA	X	NA	NA	NA	X
1449	AB	subset	complete	NA	NA	NA	X	X	NA	X	X	X
1451	B	subset	partial	NA	NA	NA	X(invasive)	NA	NA	NA	NA	NA
1452	B	whole 2 plots subset 6 plots	complete for some records	XX(invasive)	X	X	X	X	-	-	-	-
1454	B	whole	reported as a majority	NA	NA	NA	X	X	NA	XX	NA	NA
1455	AB	whole	complete	XX	-	X	XX	XX	X	X	X	X
1456	AB	whole 3 plots subset 1 plot	complete for mean 3 plots	X(invasive)	XX(invasive)	X (invasive)	X	X(invasive)	-	X	-	-
1457	AB	subset	partial	NA	NA	NA	NA	NA	NA	X	NA	X
1466	AB	whole	reported as a majority	XX(invasive)	NA	X	X	X	NA	NA	NA	NA
1473	AB	whole	complete	X	X	X	X	X	X	X	-	-
1498	A	whole	partial	NA	X	X	X	X	NA	NA	NA	NA
1500	A	whole	partial	NA	NA	NA	NA	X	X	NA	NA	NA

Table S2 - continued

Invertebrates				Molluscs		Crustaceans		Worms			Tardigrade	Hydrozoans
Study	Metric	Considered assemblage	Information on non-insects	Bivalves	Snails	Amphipods	Others*	Annelids (Oligochaeta / Polychaeta / Hirudinea)	Flat worms (Turbellaria and others)	Round worms (Nematodes)		
1503	A	whole	partial	NA	X	X	X	X	X	X	NA	X
1504	A	whole	partial	NA	X	NA	X	X	X	NA	NA	NA
1506	AB	whole	partial, overall % known	NA	NA	NA	X	X	NA	X	NA	NA
1507	AB	whole	complete for some records	-	X	XX	-	X	X	X	-	-
1509	AB	whole	partial	X	X	XX	X	XX	NA	NA	NA	NA
1511	B	whole	complete for some records	X	X	-	X	X	-	-	-	-
1513	A	whole	complete	-	-	-	XX	XX	X	XX	-	-
1395	A	whole	none	NA	NA	NA	NA	NA	NA	NA	NA	NA
1428	AB	whole	none	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total number of studies			28									
# studies with information			26	12	13	12	20	24	10	14	2	8
% Studies including the subgroup				46.2%	50%	46.2%	76.9%	92.3%	38.5%	53.8%	7.7%	30.8%
# studies with information			26	16		20		24			2	8
% Studies including the group				61.5%		76.9%		92.3%			7.7%	30.8%

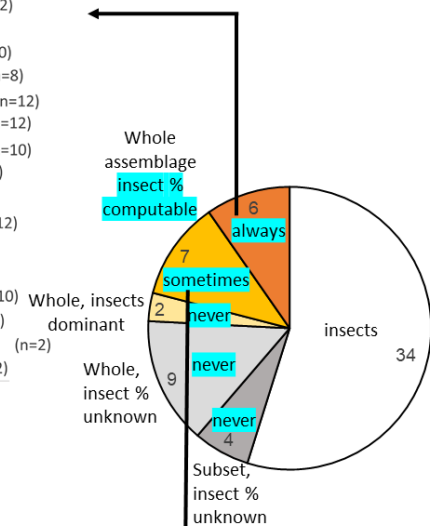
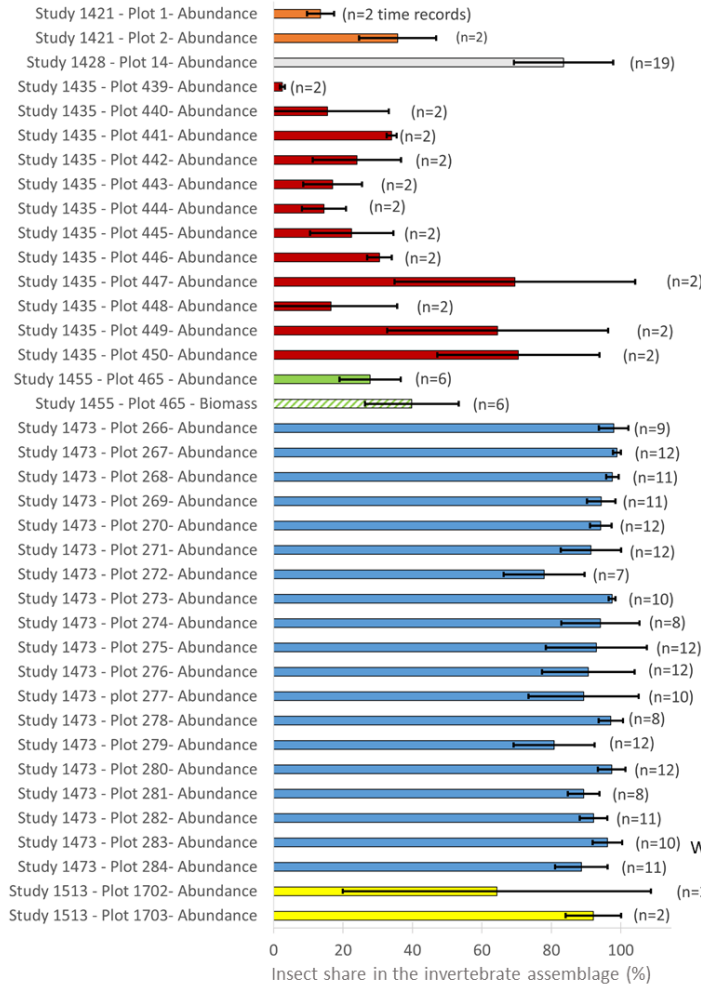
Note: The references of the studies are available in *Problems.xlsx*. A: study with abundance data, B: study with biomass data, AB: study with abundance and biomass data, X: invertebrate group reported to be present in the assemblage, XX: invertebrate group observed to be particularly abundant in the assemblage, -: invertebrate group absent or not mentioned, Others*: other crustacean types among shrimp, crayfishes, crabs, isopods, copepods, cyclopods, ostracods, cladocerans... NA: no available information. Information on noninsect taxa involved was extracted from the studies themselves except for study 1427 where information on noninsects was available in Baxter and Minshall (2016). When in a study some plots considered the whole invertebrate assemblage whereas other plots considered a subset of this assemblage involving noninsects, we show the noninsects that were present in the whole assemblage.

Table S3 - Credits for the photographs used in Figure 3 and information on their sources

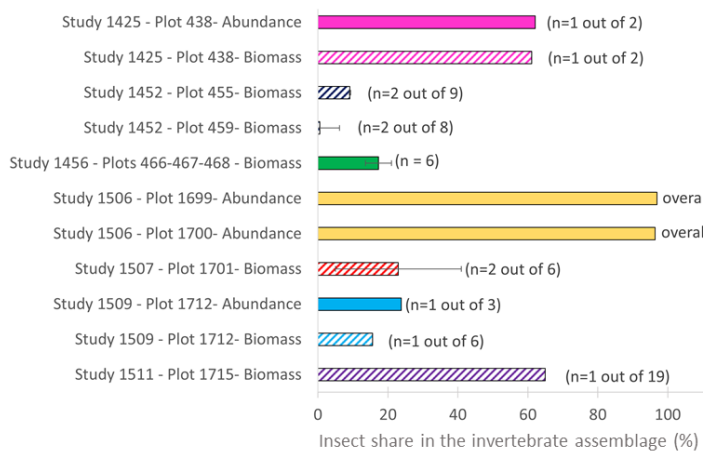
Non-insect type (Figure 3)	Invertebrate species name	Source (Author of the photo)	Use of the source	Copyright license	Date	Details / Link
Mussels	<i>Dreissena polymorpha</i> - Moule zébrée (zebra mussels)	F. Lamiot	Modified (focus on some mussels only)	CC BY-SA 1.0	Oct.2006	Zebra mussel, an invasive freshwater species, photographed in the canalised deule at Lambersart, near Lille (Northern France, Europe), in 2006. https://commons.wikimedia.org/w/index.php?curid=1316814
Snails	<i>Planorbis planorbis</i> (Linnæus, 1758)	H. Zell	Modified (focus on the bottom left specimen)	CC BY-SA 1.0	Oct.2019	Diameter 1.0 cm; Originating from Rappenwörth, Karlsruhe, Germany; Shell of own collection, therefore not geocoded. https://commons.wikimedia.org/w/index.php?curid=1316814
Crayfishes	<i>Austropotamobius pallipes</i> (white-clawed crayfish)	D. Geke	Not modified	CC BY-SA 3.0	Dec.2007	https://fr.wikipedia.org/wiki/%C3%89crevisse_%C3%A0_pattes_blanches#/media/Fichier:Austropotamobius_pallipes.jpg
Shrimps	<i>Nototropis swammerdamei</i> (Milne-Edwards, 1830) - Amphipoda	H. Hillewaert	Not modified	CC BY-SA 3.0	Oct.1999	Belgian Continental Shelf. Camera mounted on a Zeiss Stemi C-2000 binocular microscope. Length: ~4 mm. Geo-location not applicable as the picture was taken in the lab. Note the typically deeply pleated coxal gills. https://commons.wikimedia.org/wiki/File:Nototropis_swammerdamei.jpg
Leeches	<i>Erpobdella octoculata</i> (Hirudinea)	W. Walas	Not modified	CC BY-SA 3.0	Jul.2012	https://commons.wikimedia.org/w/index.php?curid=20294374
Worms	<i>Tubifex tubifex</i> (Sludge worm)	J.Reischig	Not modified	CC BY-SA 3.0	Mar.2014	Total preparation. Optical microscopy technique: Negative phase contrast. Magnification: 120x (for picture width 26 cm ~ A4 format). https://commons.wikimedia.org/wiki/File:Sludge_worm_(265_31)_Total_preparation.jpg

Figure S1 - Insect share (mean percentage) in time series included in InsectChange relating to whole invertebrate assemblages and where it was possible to calculate the insect share and its variation over time (standard deviation), (A) for all time records for 37 plots from 6 studies or (B) for some available time records for 11 plots from 7 studies.

(A) Data available for each time record (6 studies, 37 plots)



(B) Data available for some time record (7 studies, 11 plots)



Note: One colour per study. Solid bars: abundance data; hatched bars: biomass data. The pie chart is that shown in Figure 3 of the comment. For study 1506, only the mean insect share over time was available.

References.

- Baxter, C.V. and G.W. Minshall. 2016. Invertebrate abundance and biomass data from Big Creek tributaries (1988-2012). Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2016-0027>
- van Klink, R., D. E. Bowler, O. Comay, M. M. Driessen, S. K. M. Ernest, A. Gentile, F. Gilbert, et al. 2021. InsectChange: a global database of temporal changes in insect and arachnid assemblages. *Ecology* **102**:e03354.