Characteristic riverine insects, the caddisflies *Hydropsyche angustipennis* and *Cyrnus trimaculatus* and the mayfly *Ephoron virgo* exposed to copper and diazinon

H.G. van der Geest
G.D. Greve
A. Kroon
S. Kuijl
M.H.S. Kraak

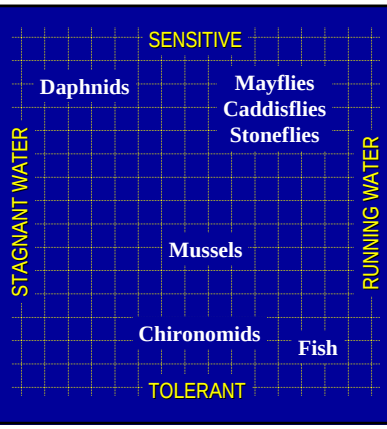
Department of Aquatic Ecology and Ecotoxicology

ARISE
University of Amsterdam, Netherlands

Introduction

- Biodiversity of large European rivers has been strongly reduced during the last century due to habitat deterioration and water pollution.
- Ecological rehabilitation of these systems is nowadays a major concern of environmental management.

To support environmental rehabilitation programmes, test organisms are needed that indicate the progress of ecological recovery



- Aquatic insects can play a key role in indicating ecological recovery
- However, there is a lack of ecological and ecotoxicological data
- This limits the interpretation of data on the distribution of aquatic insects

This study aims to provide basic knowledge on the sensitivity of three characteristic riverine insects. To this purpose, laboratory cultures and standardised ecotoxicity tests are developed and validated using different model toxicants.

Hydropsyche angustipennis	*Cyrnus trimaculatus*	*Ephoron virgo*
Trichoptera: Hydropsychidae	Trichoptera: Polycentropodidae	Ephemeroptera: Polymitarcidae

Representative for undisturbed large river ecosystems
- common < 1900
- disappeared during the last century
- recently returned to recovering ecosystems

Important ecological role
- filter feeders of organic material / predators
- food source for e.g. fish and birds

Insects can be maintained in the laboratory
- continuous culture (Greve et al., 1998)
- field collected eggs in diapause (Greve et al., in press)

Model toxicants

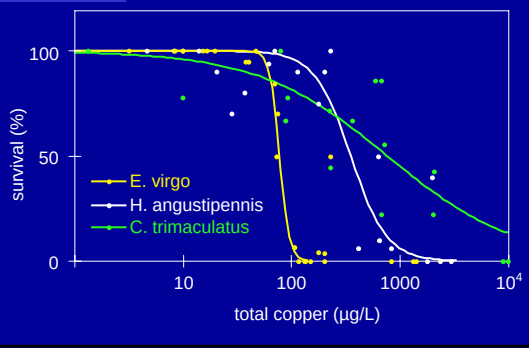
Copper
- metal
- in the field, continuously present in low concentrations

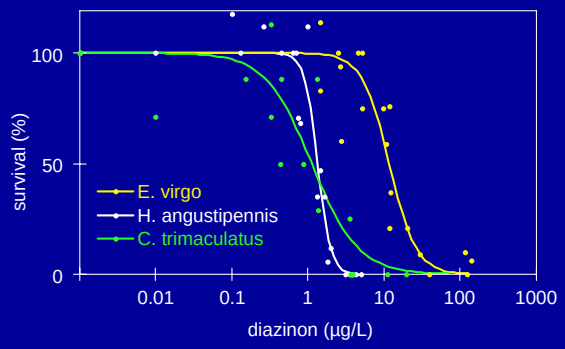
Diazinon
- organophosphorus insecticide
- in the field, high peak concentrations caused by frequent incidents
- adverse biological effects at low concentrations

Materials and methods

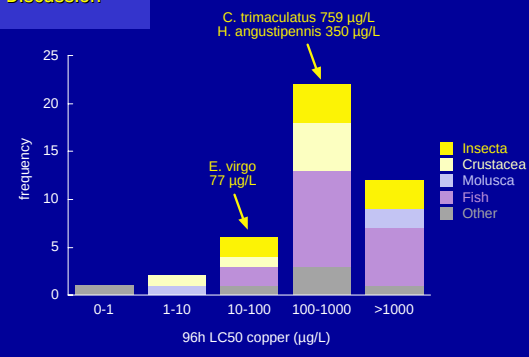
test units:	glass jars (180 mL), 100 mL DSW
larvae:	*H. angustipennis:* 20 1st instars (lab culture)
	E.virgo: 20 1-2 days old larvae (field collected eggs)
	C. trimaculatus: 10 2nd instars (lab culture)
conditions:	20° C, 16:8 light:dark
food:	*H. angustipennis, E.virgo:* Urtica
	C. trimaculatus: Urtica + fish food + algae
toxicants:	copper, AAS
	diazinon, GC
exposure time:	96 hours
endpoint:	survival (LC50)

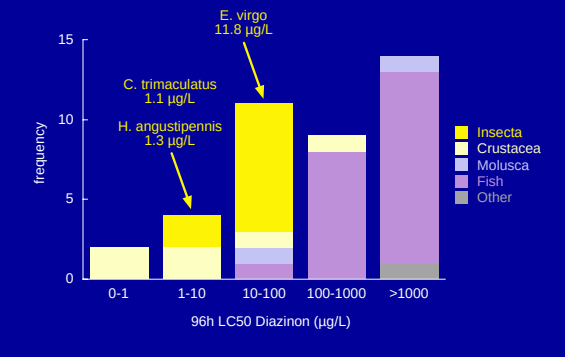
Results





Discussion





Copper

- No general classification of sensitive and tolerant taxa can be made.
- The three insect species selected in the present project are among the most sensitive insects and in the middle range of all 96h copper toxicity data.

Diazinon

- In general, insects and crustaceans are the most sensitive taxa and fish and moluscs the least sensitive taxa to diazinon.
- The three insect species selected in the present project are among the most sensitive species to diazinon.
- The 96 h LC50 for *C. trimaculatus* and *H. angustipennis* are even lower than for any other insect species known from literature.

Conclusions

The low short term LC50 values for both environmental relevant model compounds are in agreement with the field observed sensitivity of the three species and their absence from contaminated rivers.

The results of this study stress the importance of using indigenous species in assesing the risk of environmental contaminants in rivers and in defining conditions for ecological recovery.