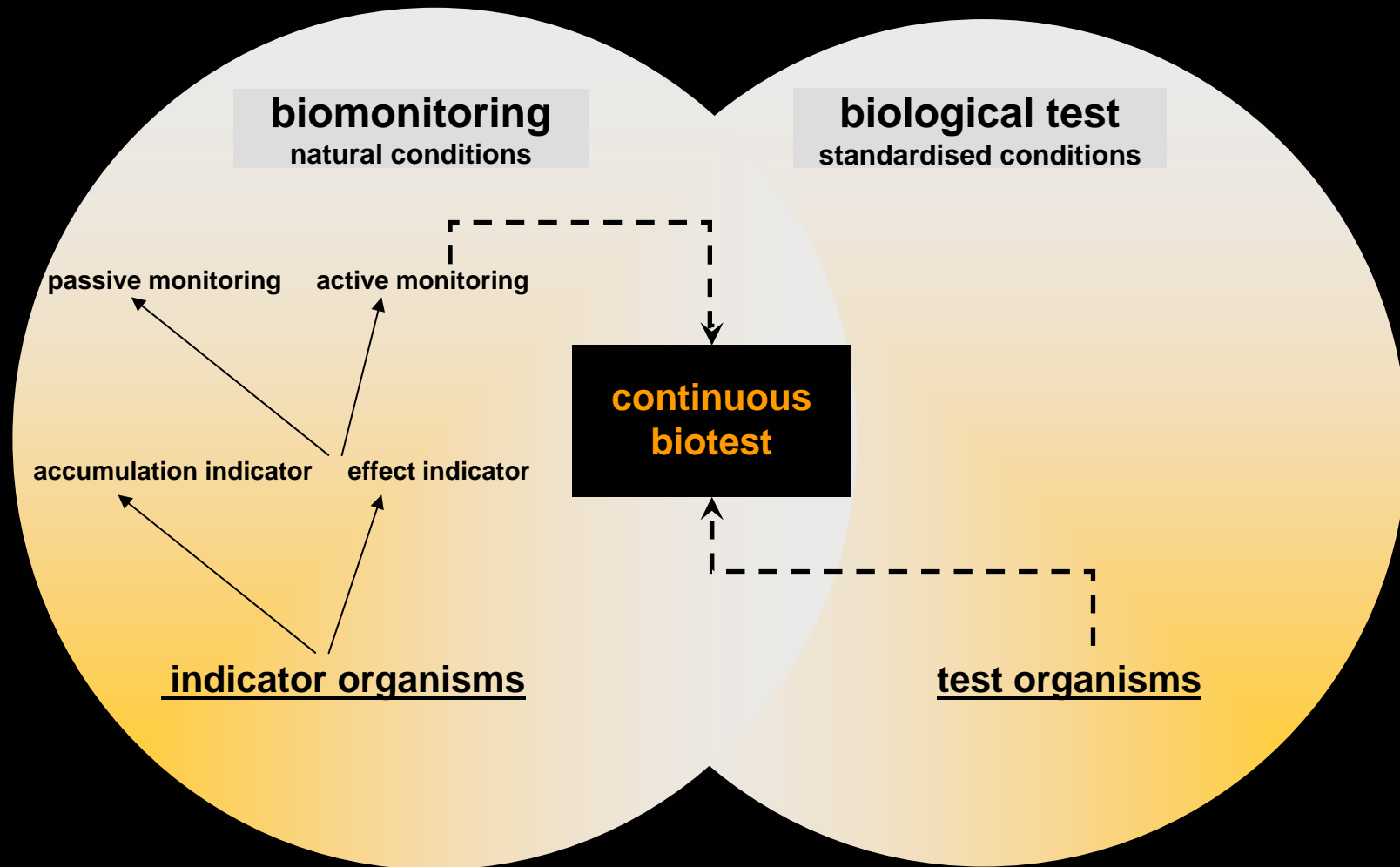


New suitable test organisms for real-time biomonitoring



Current use of continuous biotests



- Leuchtbakterientest (2)
- Dynamischer Daphnientest (10)
- Dreissena Monitor (11)
- DF-Algentest (4)
- bbe Algentoximeter (7)
- bbe Daphnientoximeter (10)
- bbe Verhaltensfischtest (1)
- () = Einsatz im Routinebetrieb wird derzeit getestet

SUMME: 45



Selection of the test species

- constant pattern of behaviour
- expressive stress-reaction
- availability all year round
- technology to record behavioural changes

bbe Daphnia Toximeter



Drift-Toximeter



Daphnia magna



Eudiaptomus vulgaris

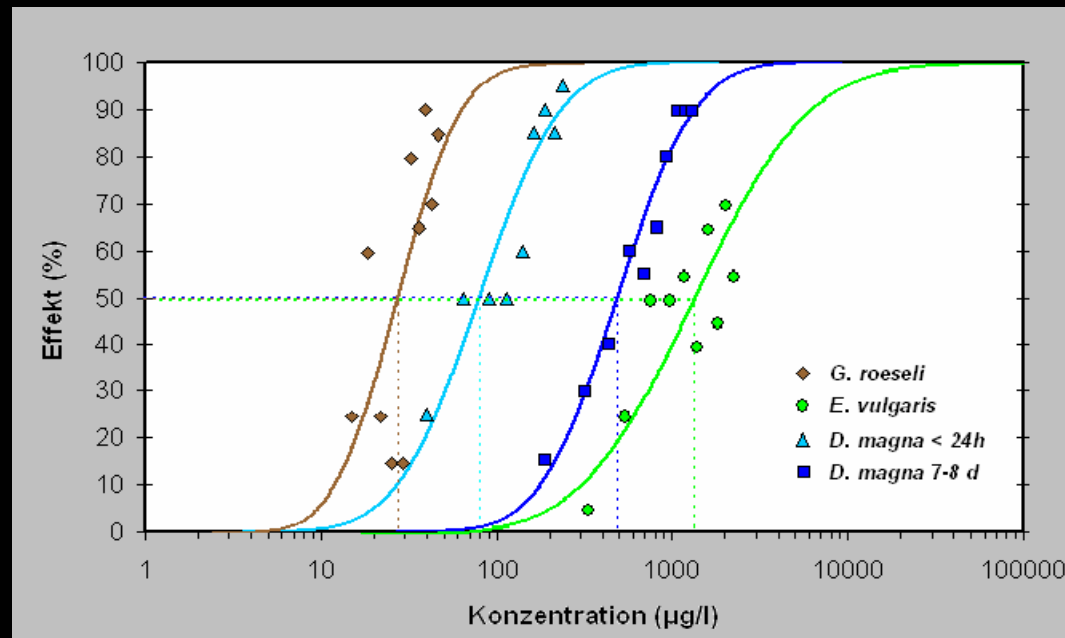
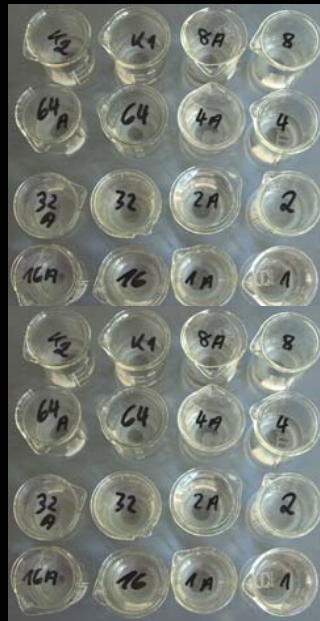


Gammarus roeseli

Conception for the toxicological studies

substances: Lindane, Dimethoate, Carbofuran, Carbaryl, Cypermethrin

static tests / EN-ISO 5667-16: Immobile (24h-EC₅₀-values)

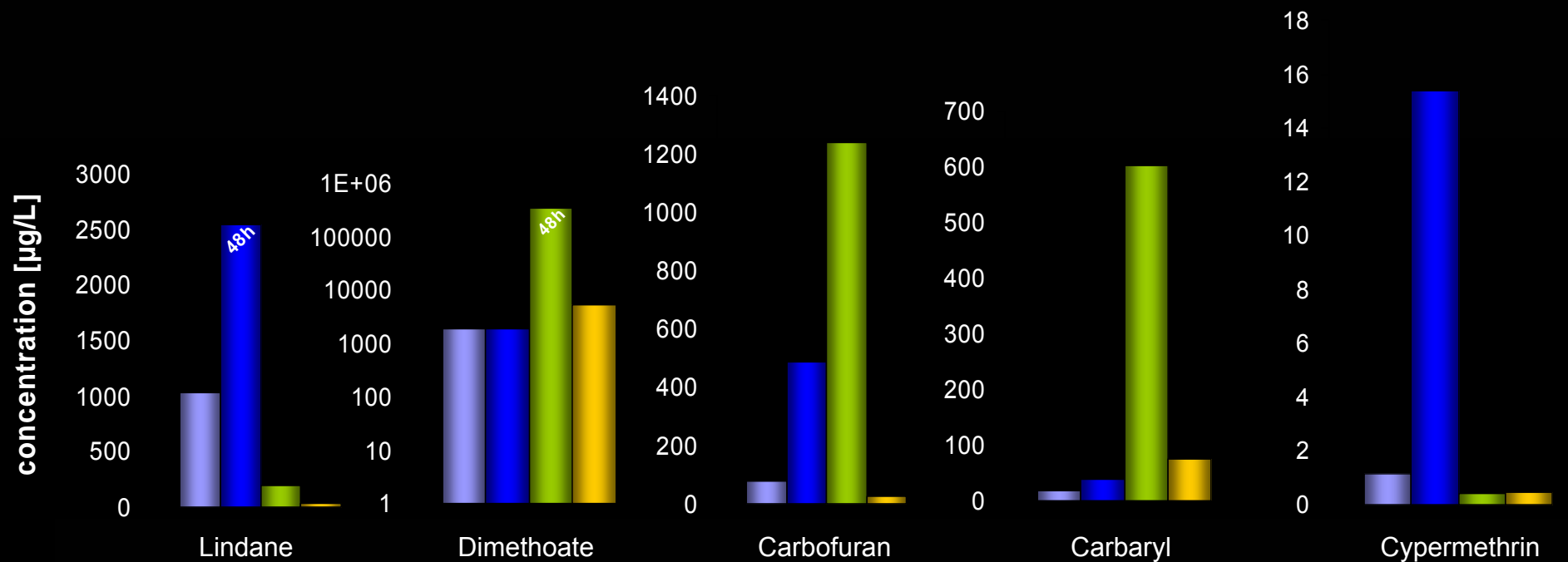


continuous tests: behavioural changes / exposure time 4,5 hours
bbe Daphnia Toximeter

Drift-Toximeter



Results from static tests (immobile / 24h-EC₅₀-values)



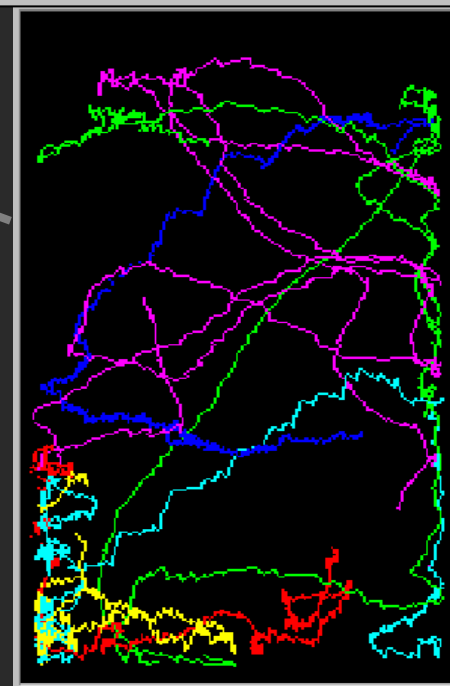
■ *Daphnia magna* (< 24 h) ■ *Daphnia magna* (7-8 d) ■ *Eudiaptomus vulgaris* (adult) ■ *Gammarus roeseli* (adult)



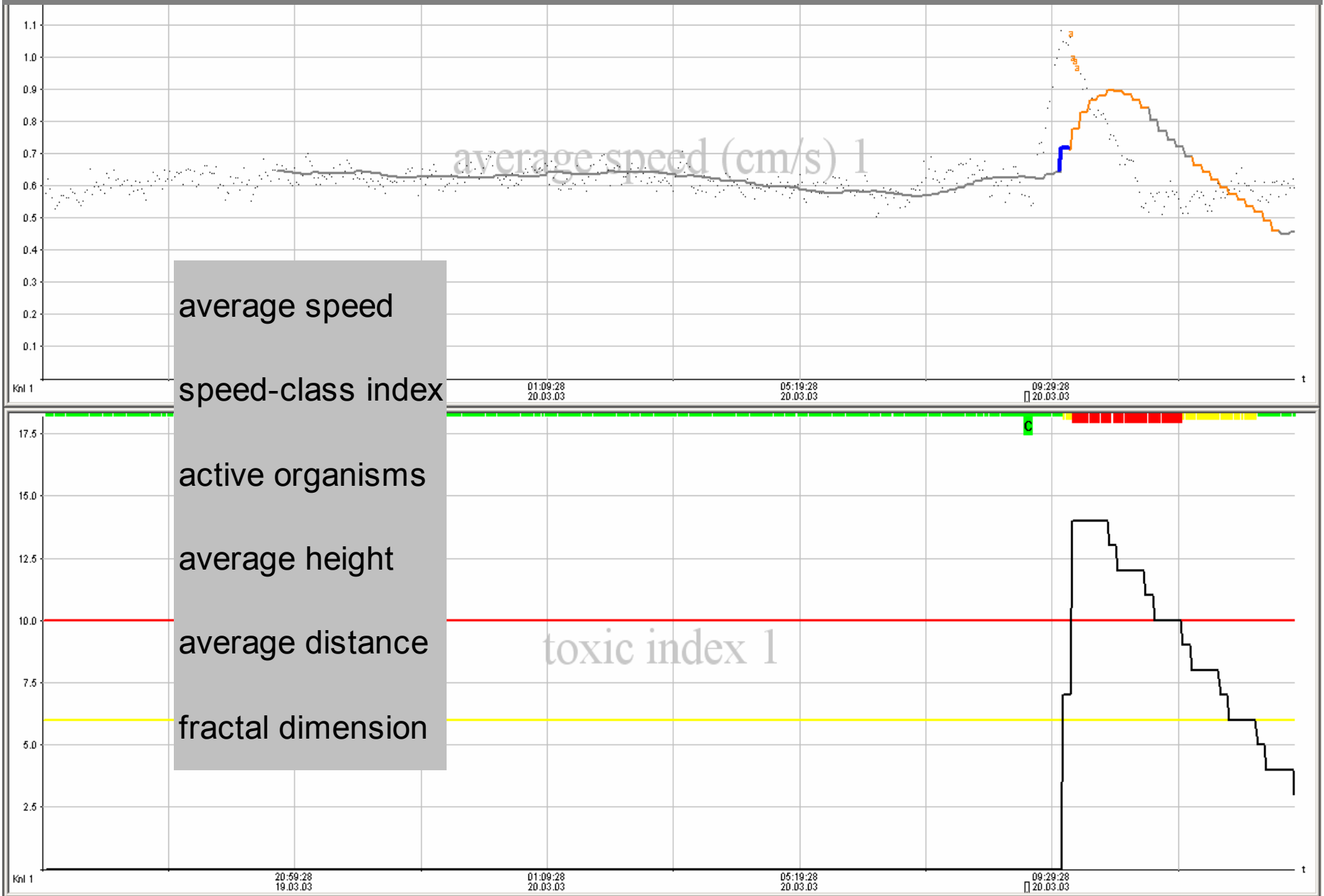
The bbe Daphnia Toximeter a highly developed continuous biotest



swimming curves



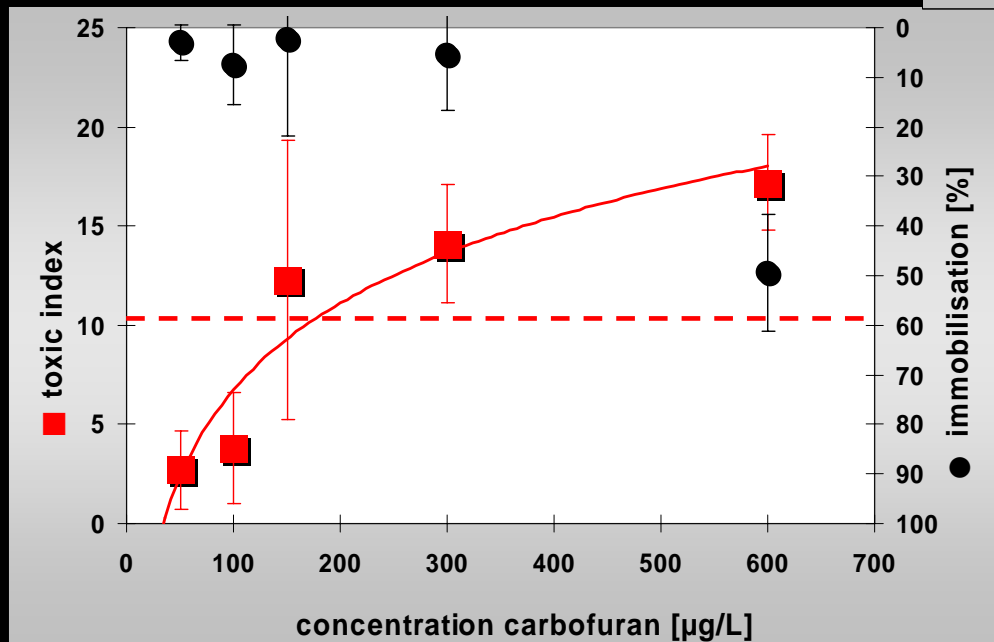
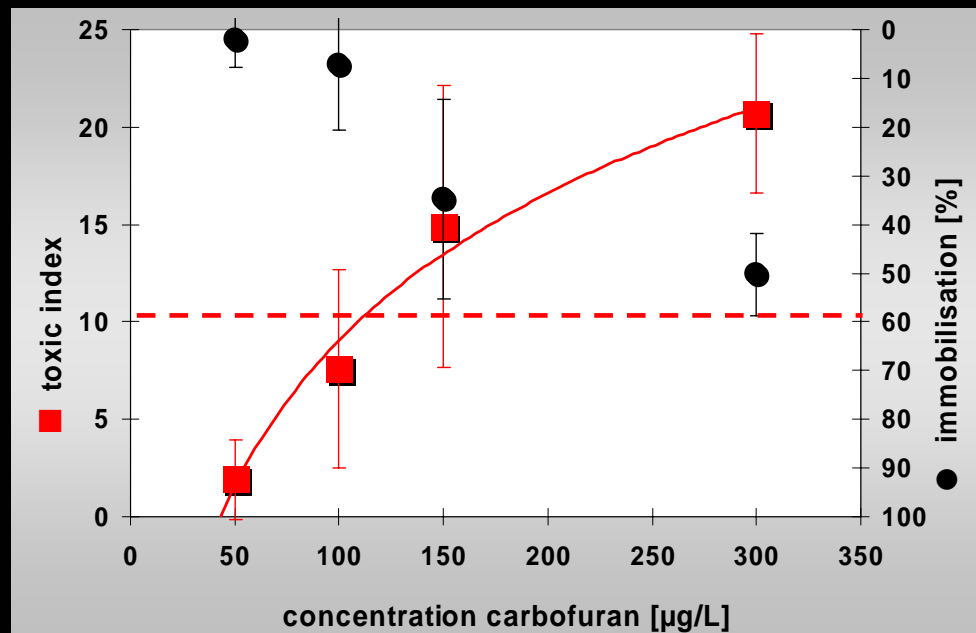
The bbe Daphnia Toximeter (data analyses)



Results from continuous tests (bbe Daphnia Toximeter)



Daphnia magna



Eudiaptomus vulgaris

Results from continuous tests (bbe Daphnia Toximeter)

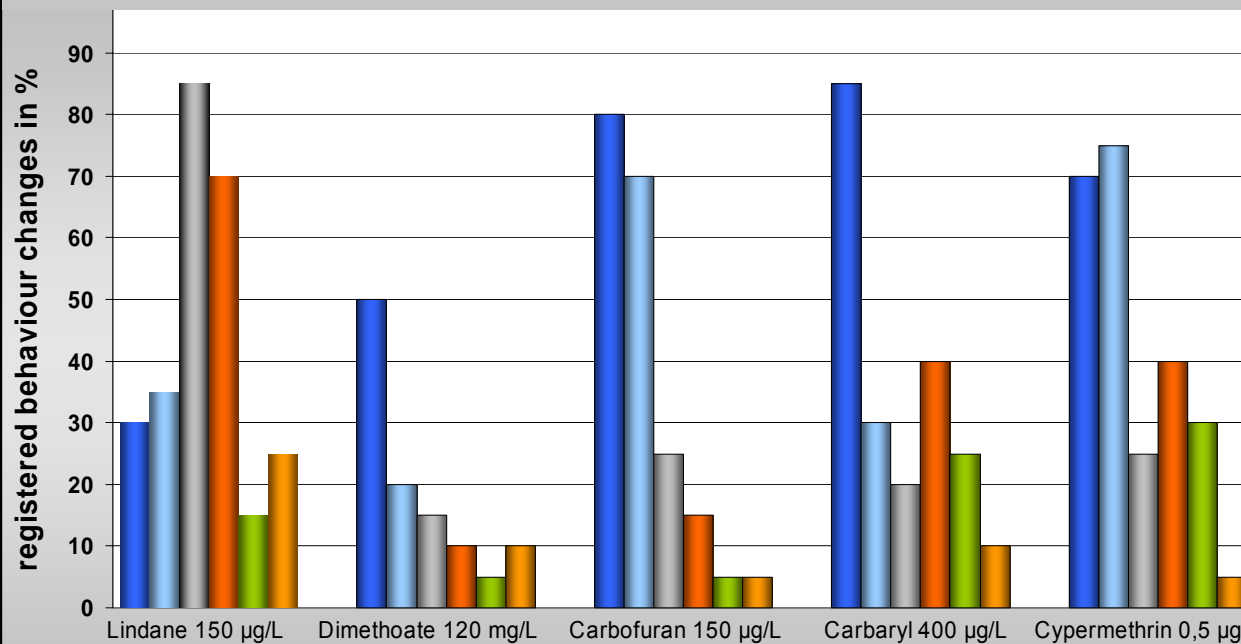
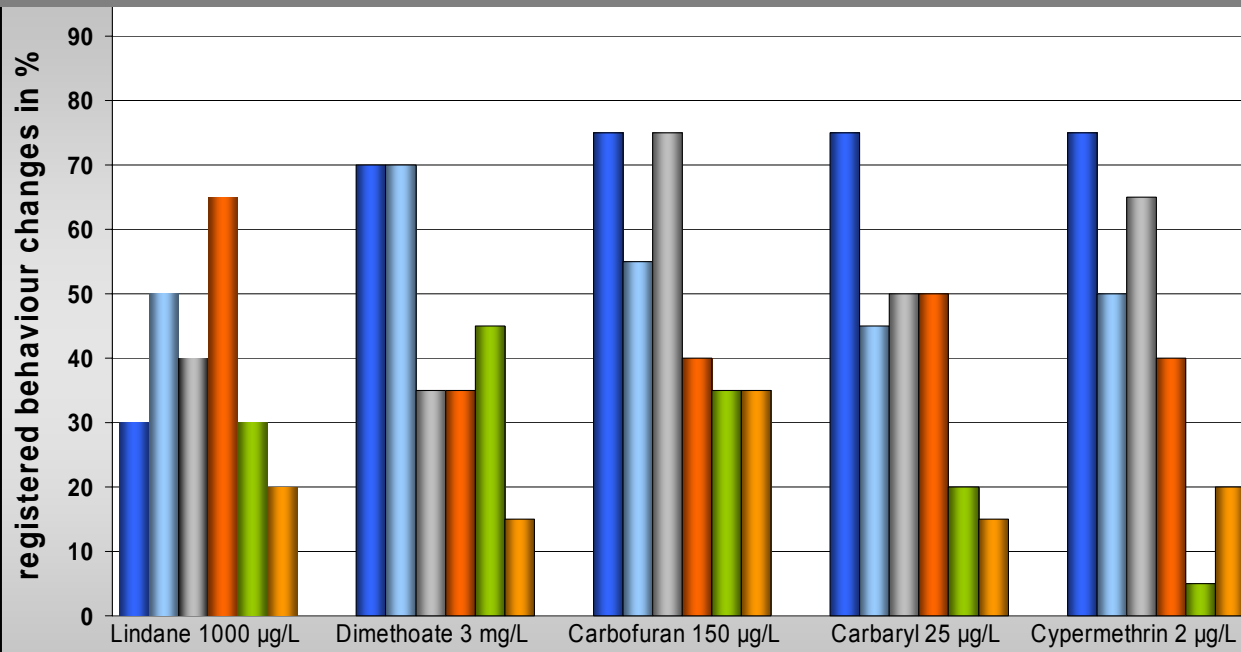


Daphnia magna

- average speed
- speed-class index
- active organisms
- average height
- average distance
- fractal dimension



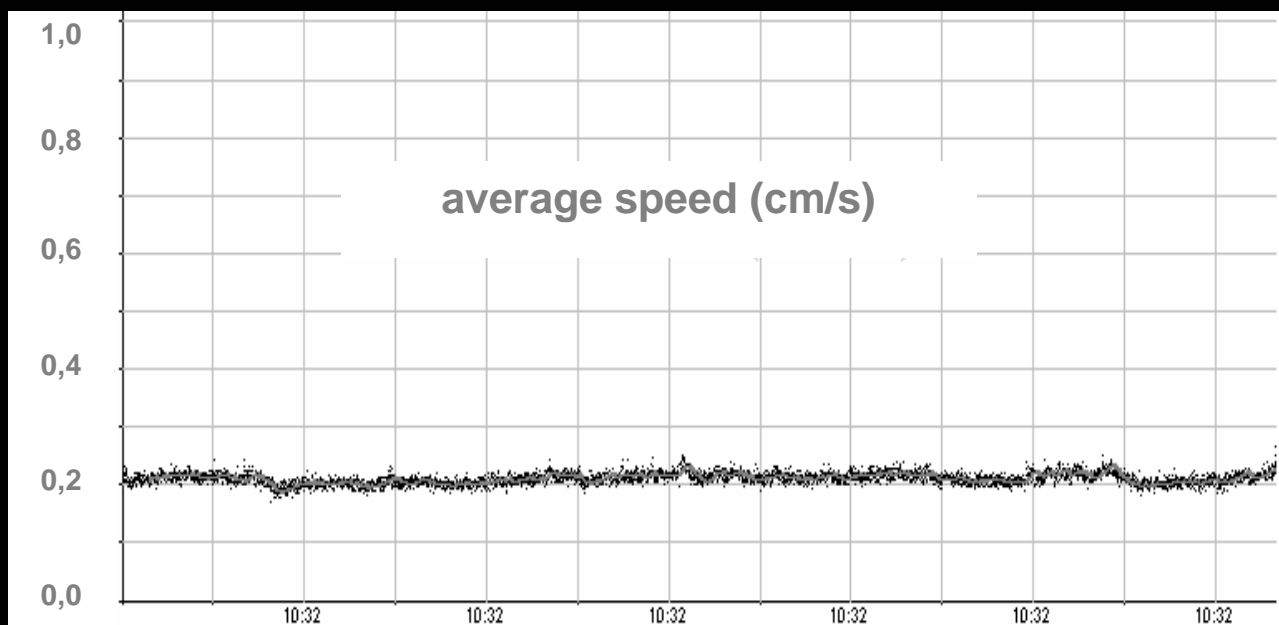
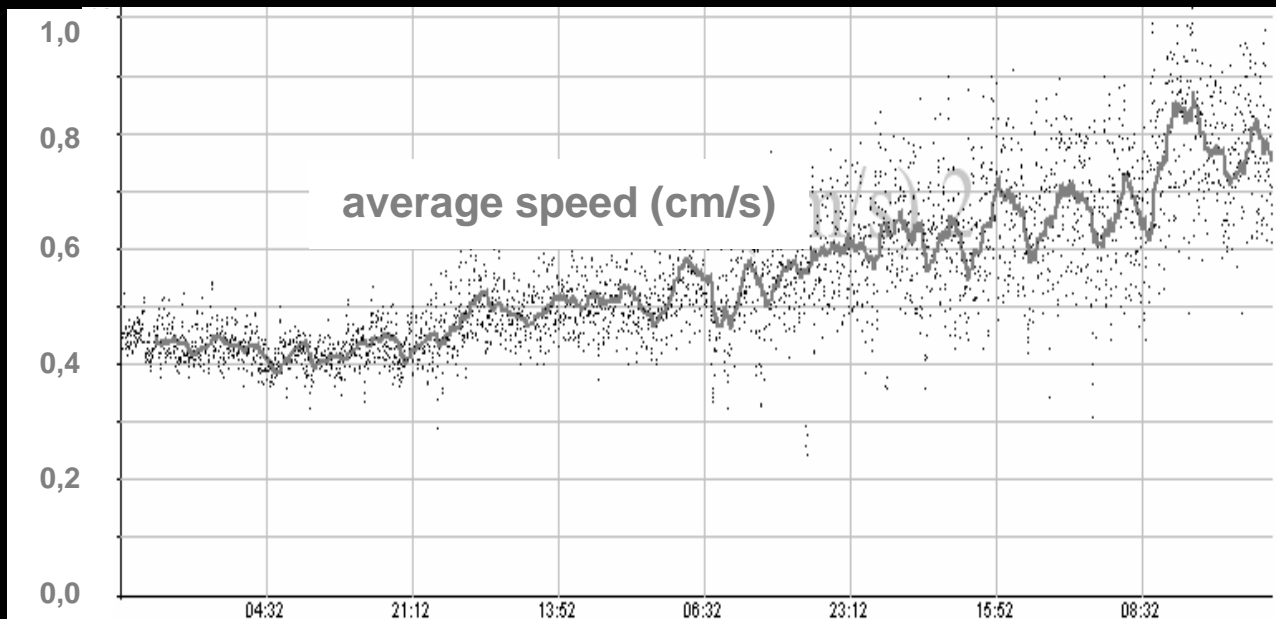
Eudiaptomus vulgaris



Results from continuous tests (bbe Daphnia Toximeter)

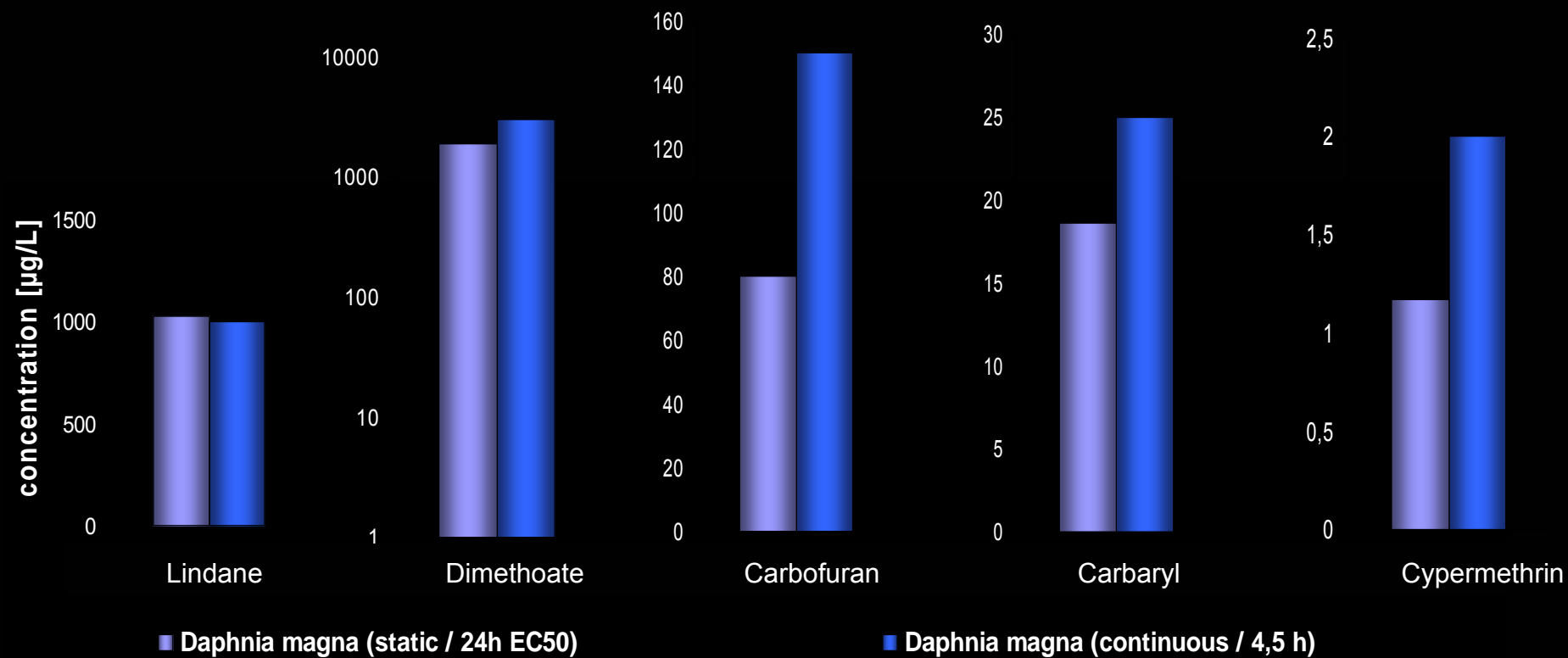


Daphnia magna

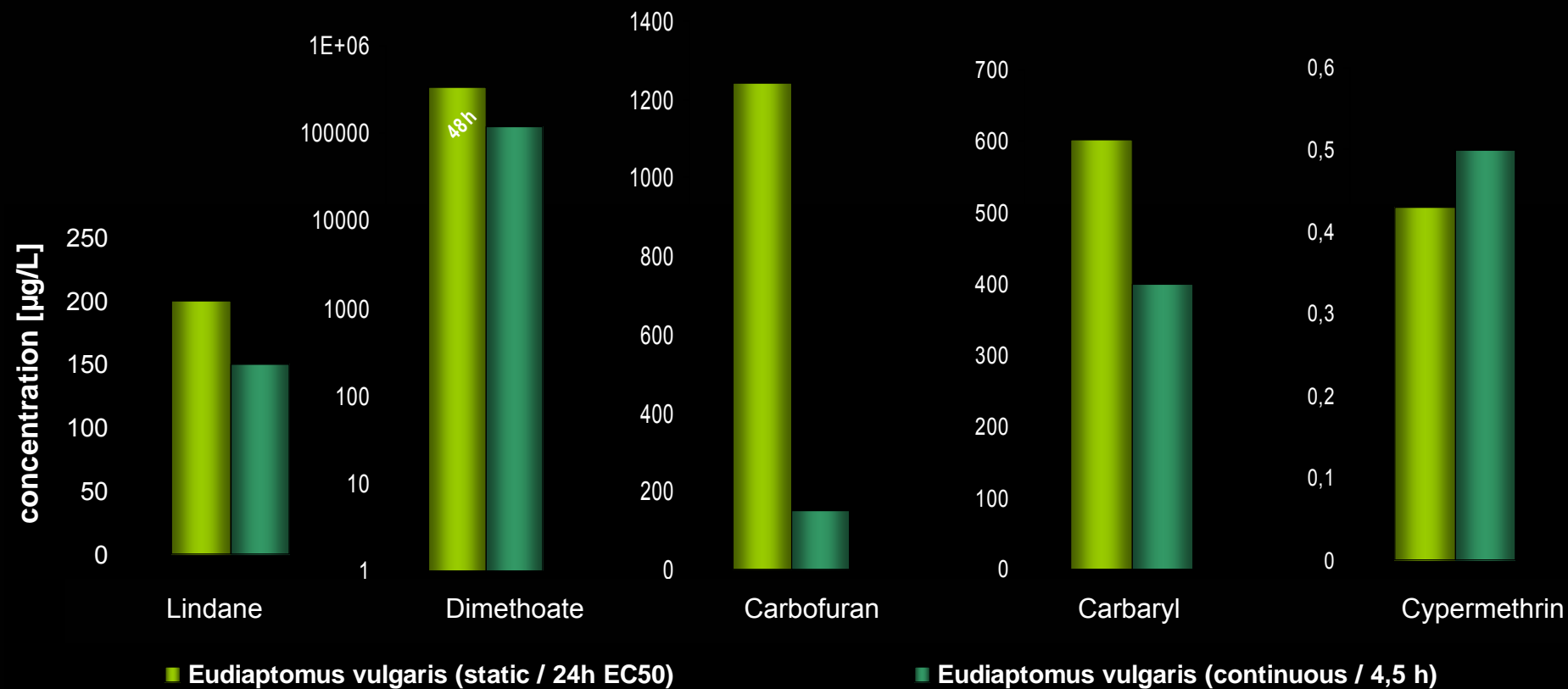


Eudiaptomus vulgaris

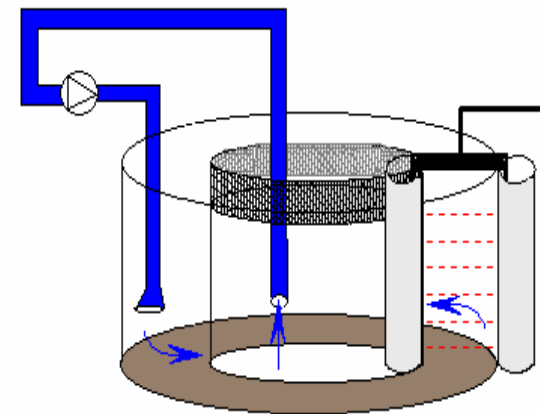
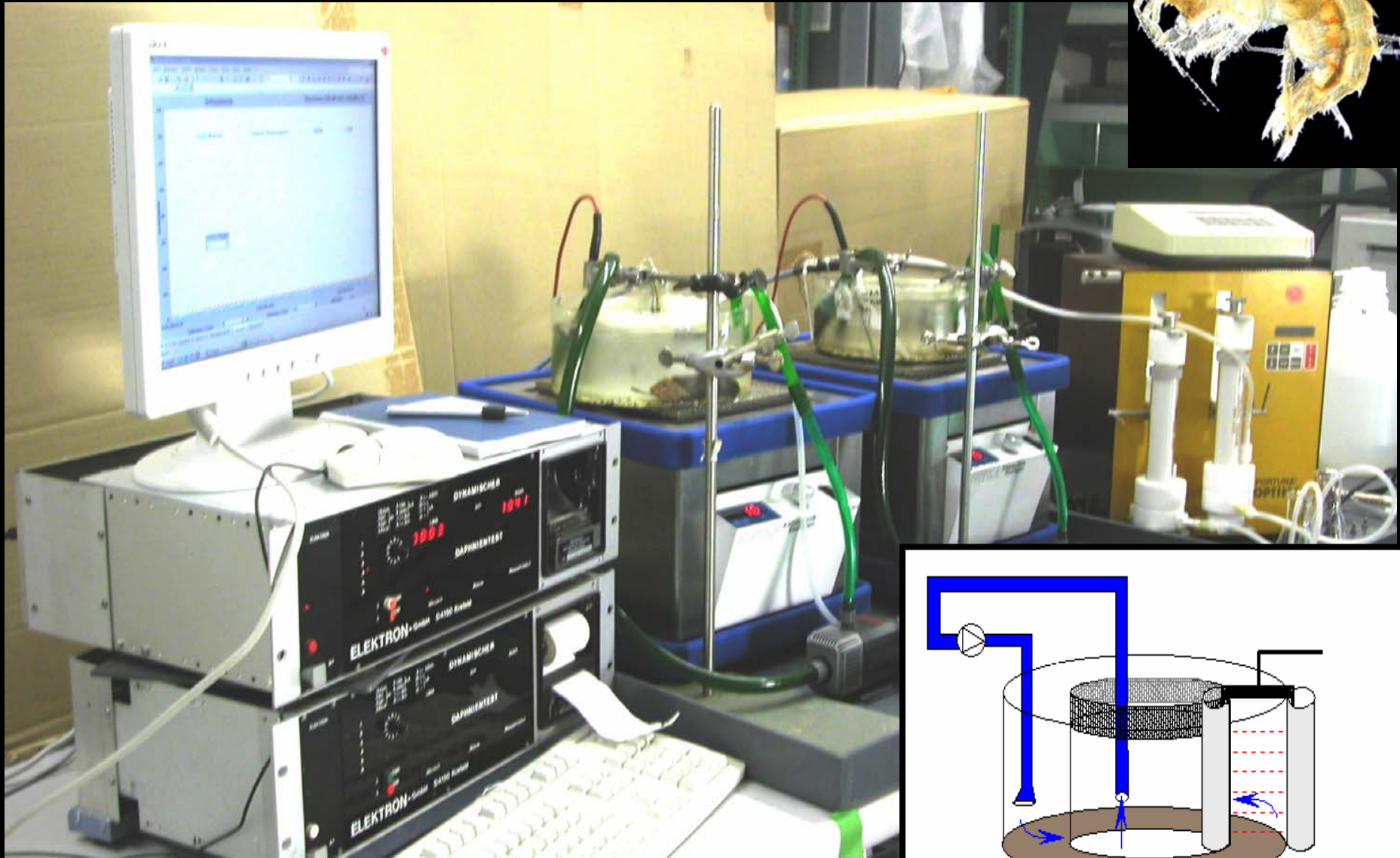
Static tests compared with changes in behaviour



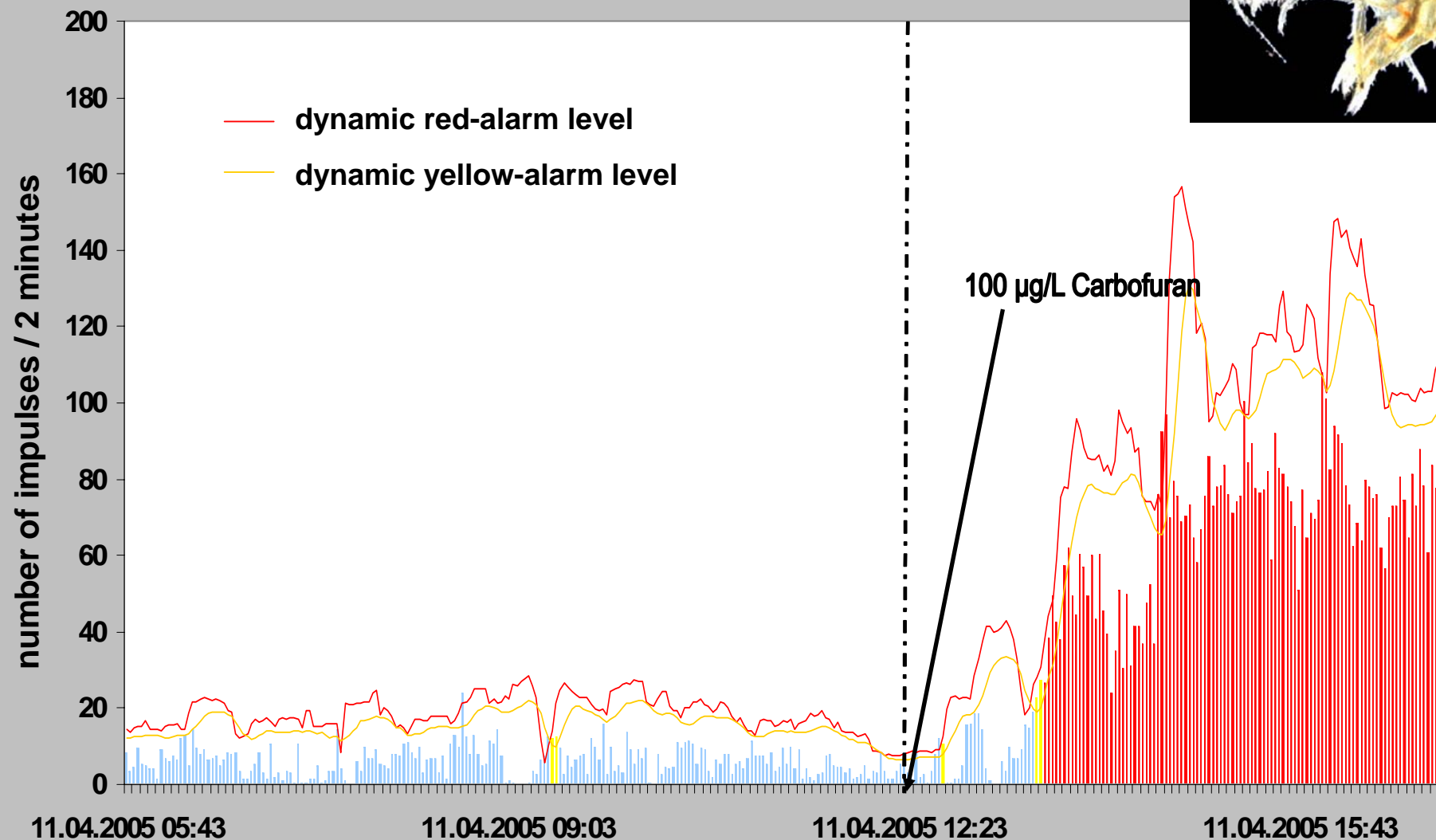
Static tests compared with changes in behaviour



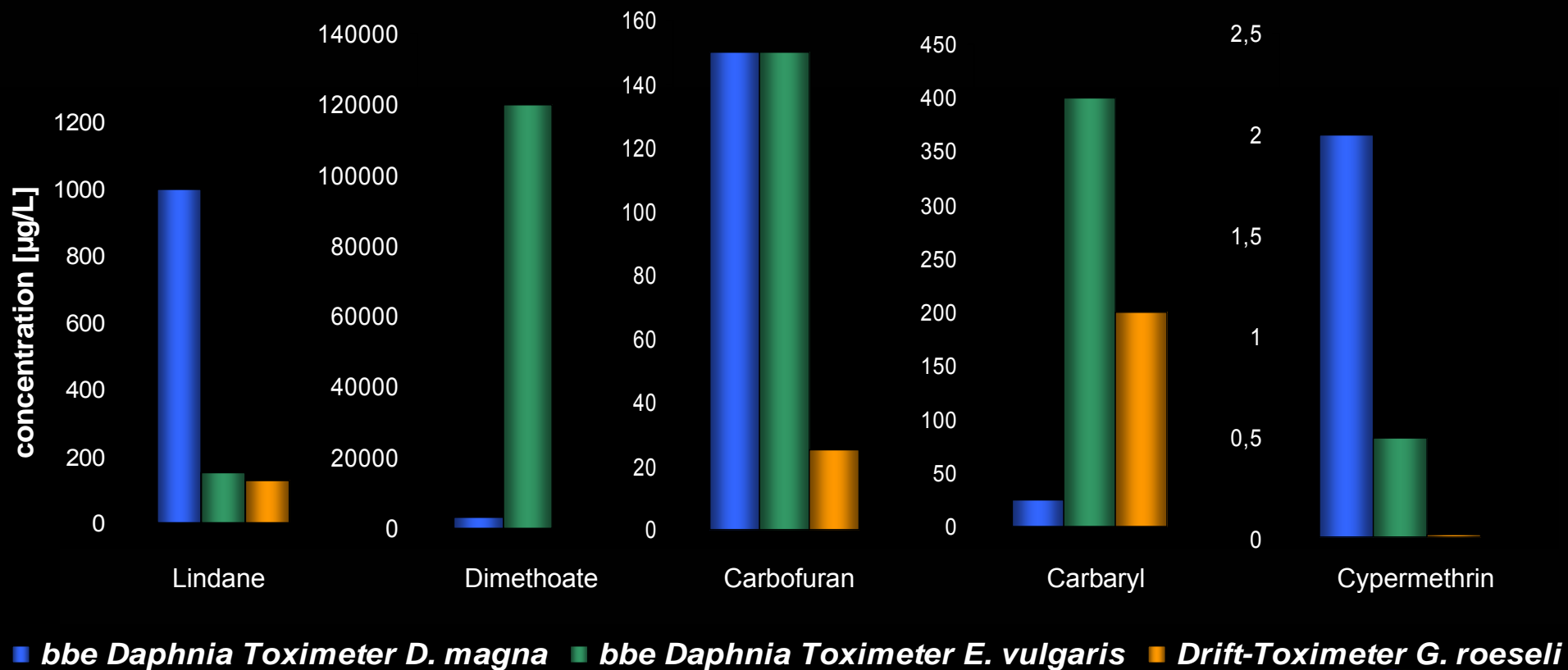
The Drift-Toximeter - a new test system



The Drift-Toximeter (data analyses)

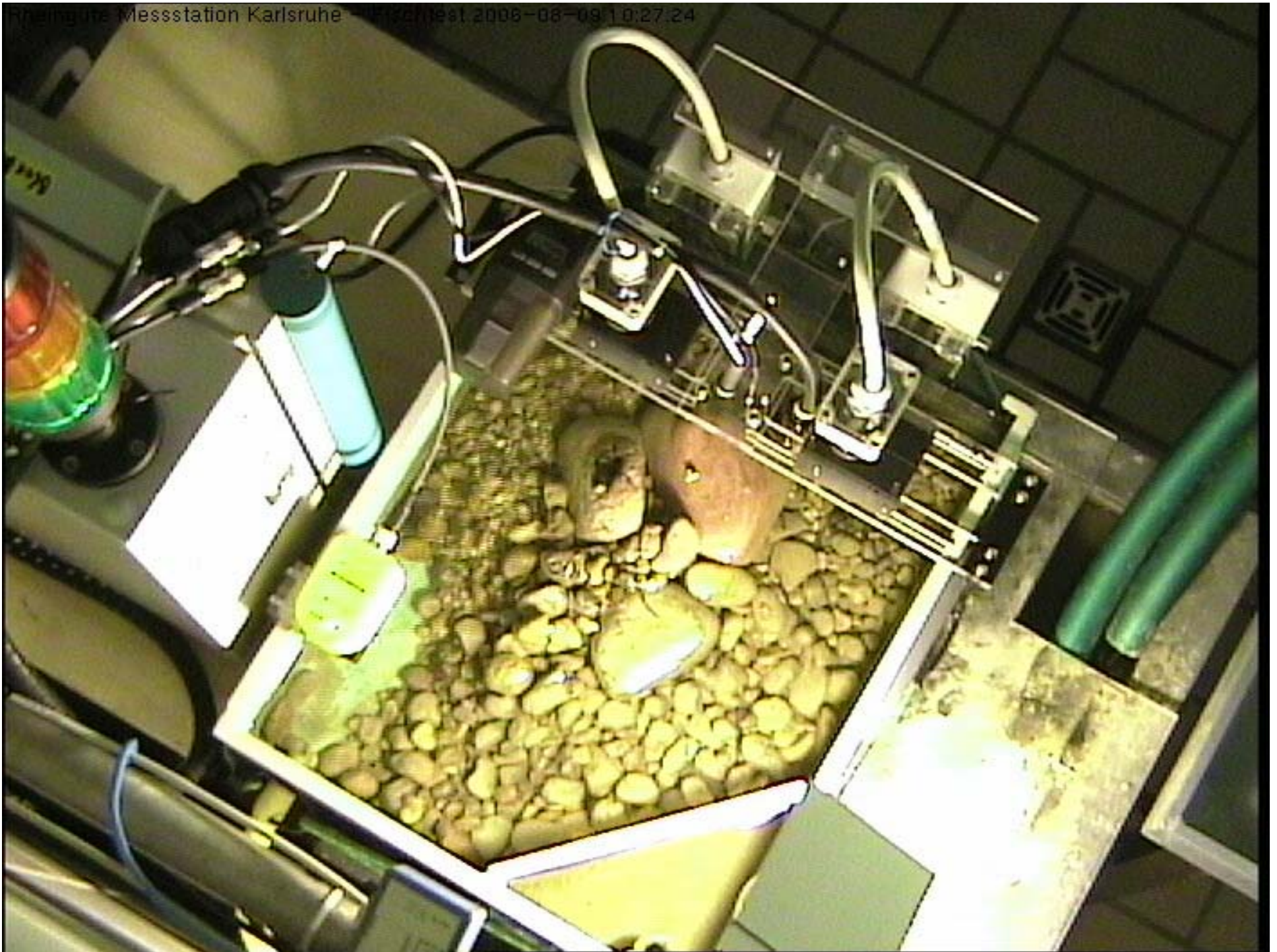


Results from continuous tests (behavioural changes / 4.5 h exposure)



Conclusion

- **Constant measuring conditions by using grown-up organisms**
- **Multi-species system for higher sensitivity**
- **The Drift-Toximeter – a new sensitive test system**



Rhine Control Station at Karlsruhe



Thanks for your attention!