

OECD 218/219

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Sediment-water *Chironomid* toxicity test – using spiked sediment/ spiked water (OECD 218/219)

<http://www.oecd-ilibrary.org/content/book/9789264070288-en>

- “ investigate the effects of chemical exposure to the sediment-dwelling larvae of freshwater species (*Chironomus* sp.; *C. riparius* - preferovaný, *C. tentans* . možné také použít, ale delší doba líhnutí, *C. yoshimatsui*)
- “ Exposure scenario; sediment/ water spiking (process of adding test substance into test sediment/ water)

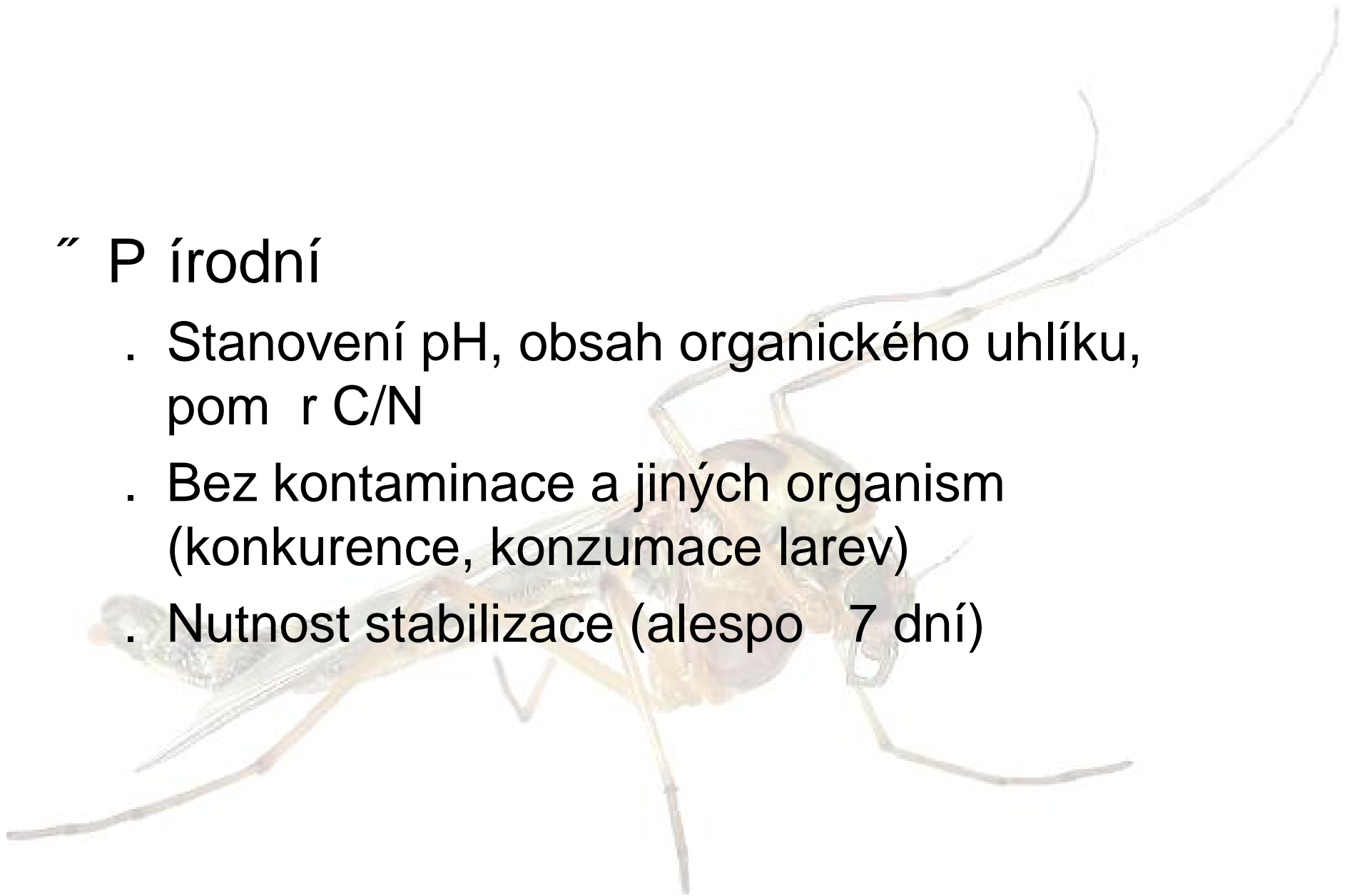
Sediment

“ Artificial sediment (uncontaminated, clean, standard matrix, no seasonal variability, no other organisms, no pre-treat)

- . 4 . 5 % vysušená razelina (velikost částic m_1 mm)
- . 20 % kaolinový jíl s obsahem kaolinitu min. 30 %
- . 75 - 76 % k emenný písek (min. 50 % zrn 0,05 . 0,2 mm)
- . CaCO_3 se přidá, aby výsledné pH bylo $7,0 \pm 0,5$

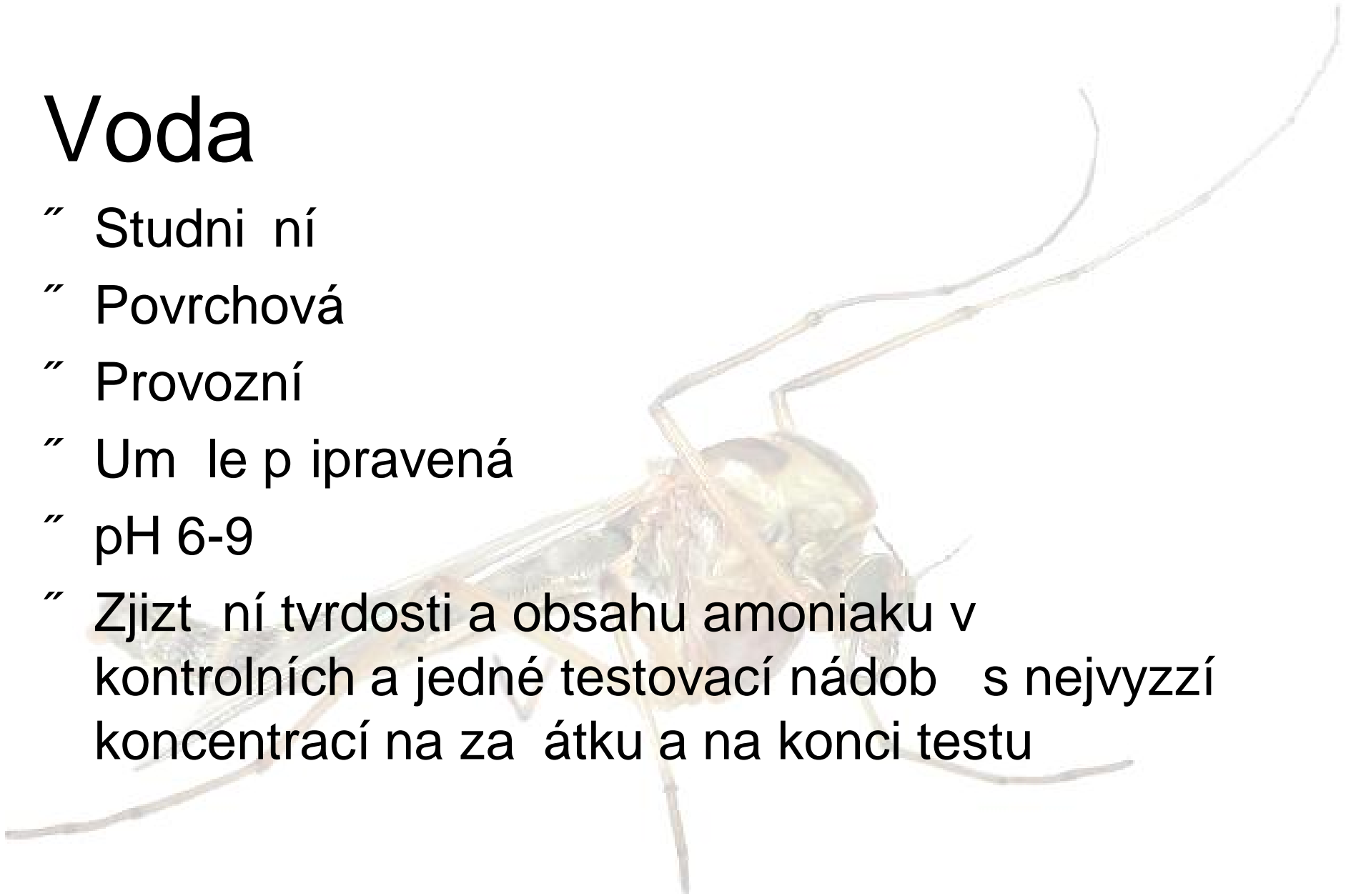
” Přírodní

- . Stanovení pH, obsah organického uhlíku, poměr C/N
- . Bez kontaminace a jiných organismů (konkurence, konzumace larev)
- . Nutnost stabilizace (alespoň 7 dní)



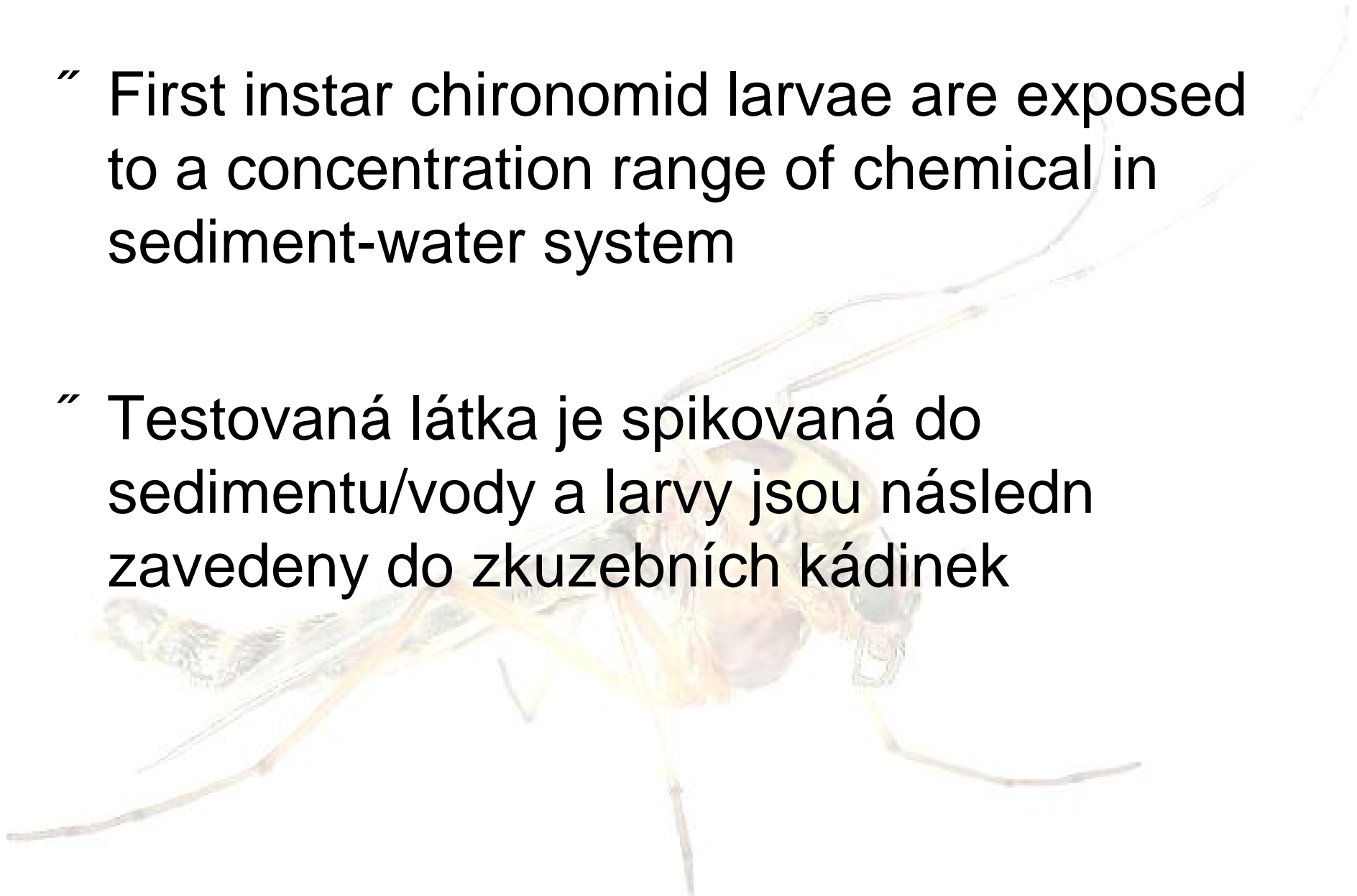
Voda

- ” Studni ní
- ” Povrchová
- ” Provozní
- ” Um ěle p ěpravená
- ” pH 6-9
- ” Zjist ění tvrdosti a obsahu amoniaku v kontrolních a jedné testovací nádob ě s nejvyšší koncentrací na začátek a na konci testu



“ First instar chironomid larvae are exposed to a concentration range of chemical in sediment-water system

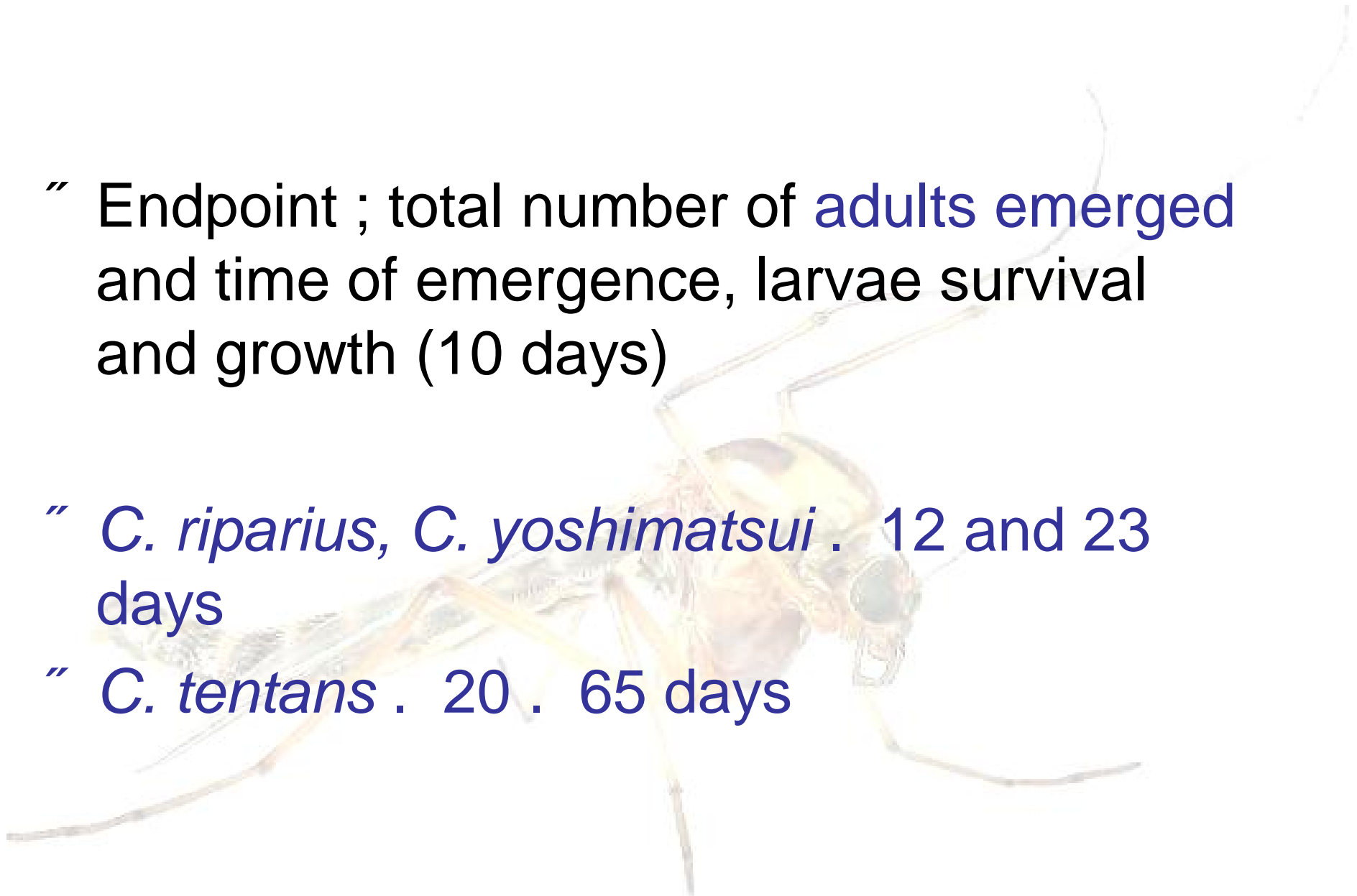
“ Testovaná látka je spikovaná do sedimentu/vody a larvy jsou následně zavedeny do zkuzebních kádinek



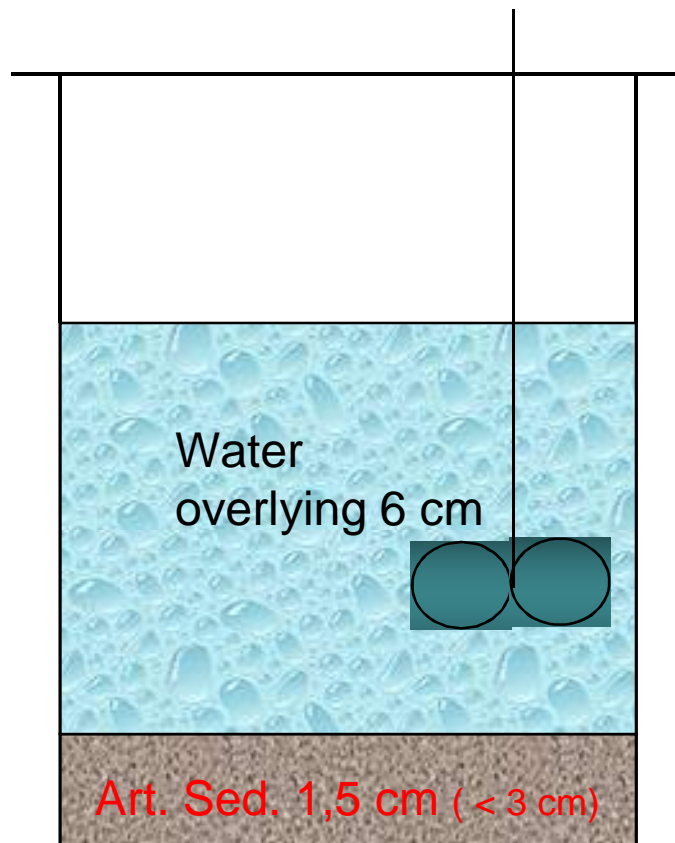
“ Endpoint ; total number of **adults emerged** and time of emergence, larvae survival and growth (10 days)

“ *C. riparius*, *C. yoshimatsui* . 12 and 23 days

“ *C. tentans* . 20 . 65 days



“ At least 5 concentrations and 4 replicates
(EC_x, larvae survival and growth
estimation test)



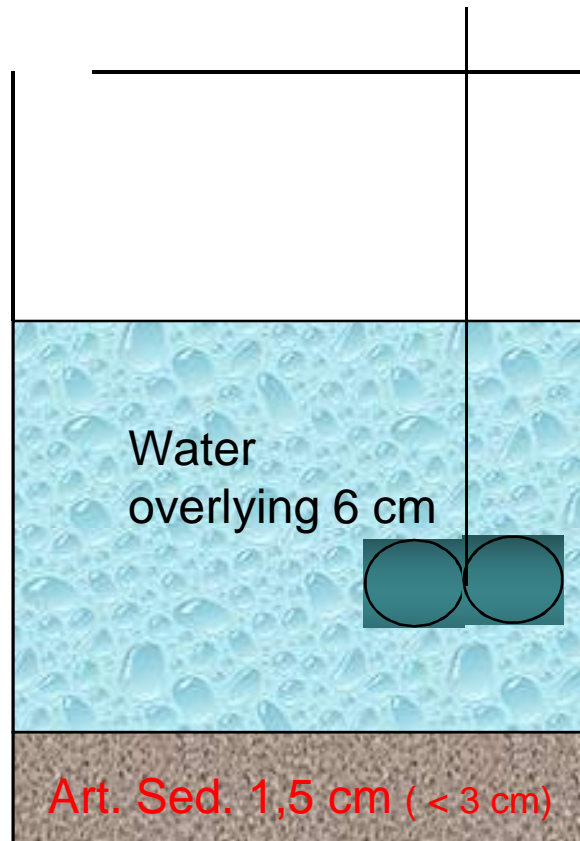
Aeration; 7 days

2nd . 3rd day . take egg
masses place in new
culture medium

First instar begin to hatch
couple days later

Add 20 of first instar larvae
(stop aeration)

Then, continues aeration



24 hours later, spike the test
substance into the overlying water

Then, continues aeration

Food; daily or 3 times/week

Finely ground fish food

Temp . 20

Light . 16 hours (500 . 1000 lux)

“ Exposure duration

-- *C. riparius*, *C. yoshimatsui* . 20 - 28 days

-- *C. tentans* . 28 - 65 days

“ Observation

number of female and male, development
time, abnormal behaviour

number of pupae

compare with control (̄ 70%)

Plumose antennae



Source: www.williamfisherphotography.com



www.MzePhotos.com

- Blind mosquito

- Important food source of fish and predatory aquatic insects



Adult male

Adult female

Source:

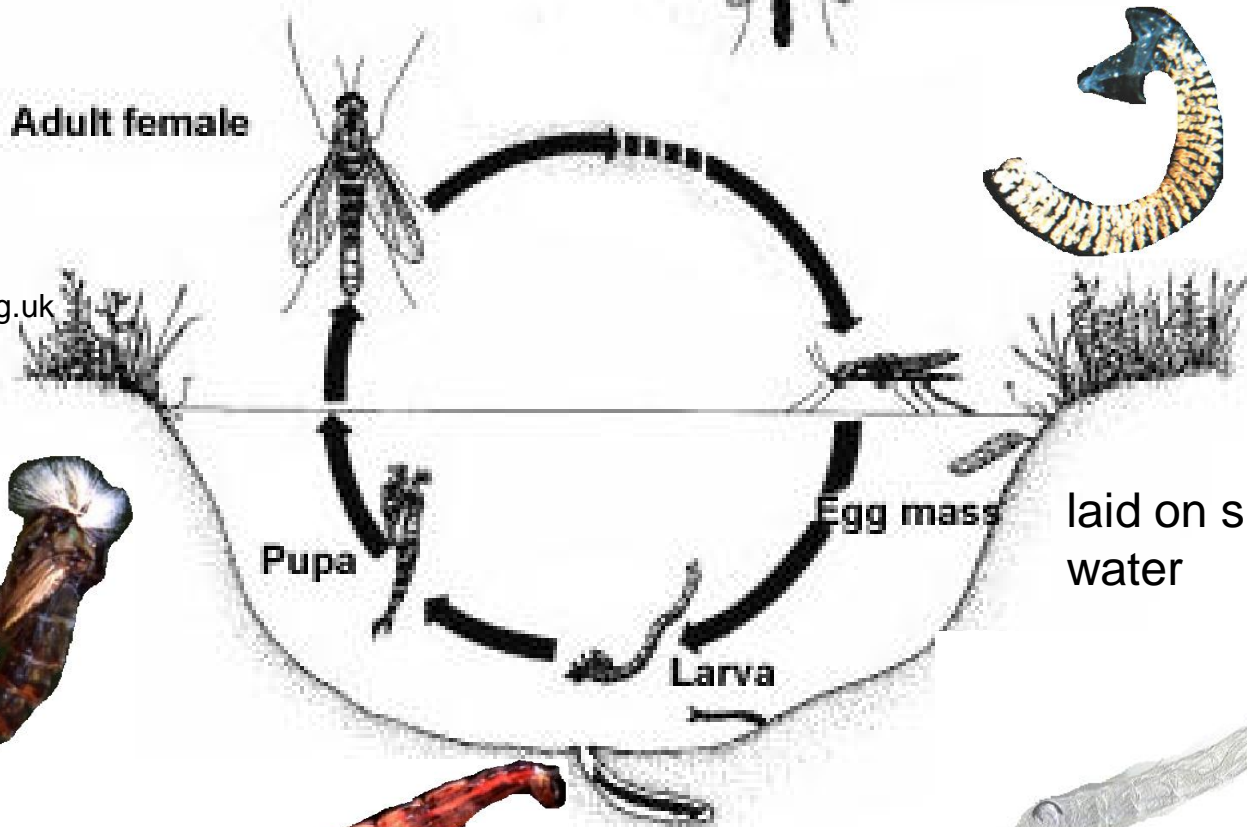
<http://www.ces.ncsu.edu>

<http://www.mzephotos.com>

<http://www.morgellonsuk.org.uk>

<http://flyfishingreporter.com>

<http://www.nature.com/>



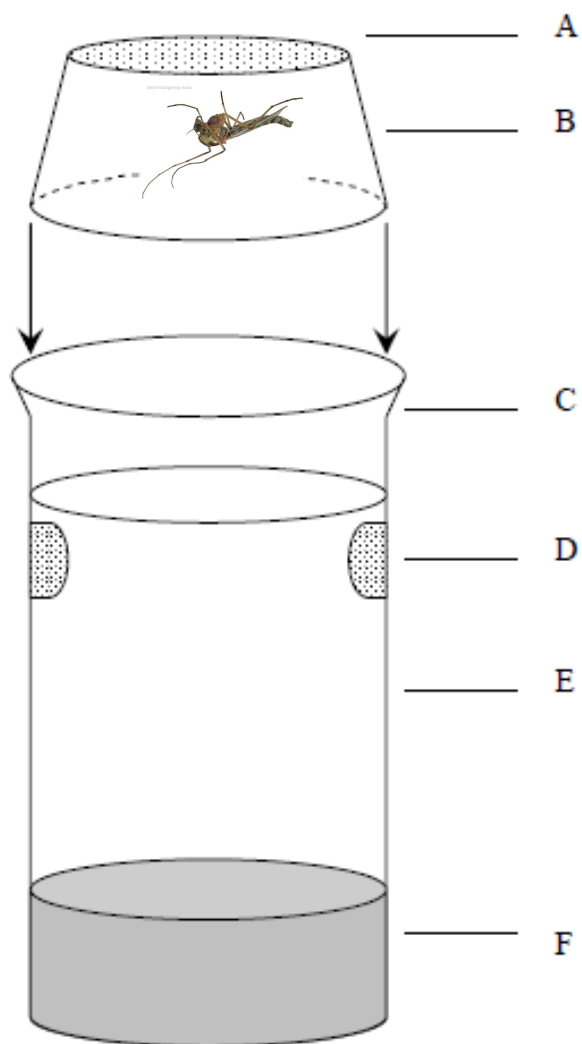
Egg mass

laid on surface water

Pupa

Larva





A: the nylon screen

B: the inverted plastic cups

C: the lipless exposure beaker

D: the water exchange screen ports

E: water

F: sediment

Poměr líhnutí

$$ER = \frac{n_e}{n_a}$$

n_e : pakomá i vylíhnutí v nádob

n_a : larvy vložené do nádoby

Validace: ER kontrola > 0,7

Average development rate = time span of introduction of larvae and emergence of the experimental of midges

$$\bar{X} = \sum_{i=1}^m \frac{f_i X_i}{n_e}$$

\bar{X} = Avg. development rate per vessel

i = index of inspection interval

m = maximum number of inspection intervals

f_i = number of midges emerged in the inspection interval i

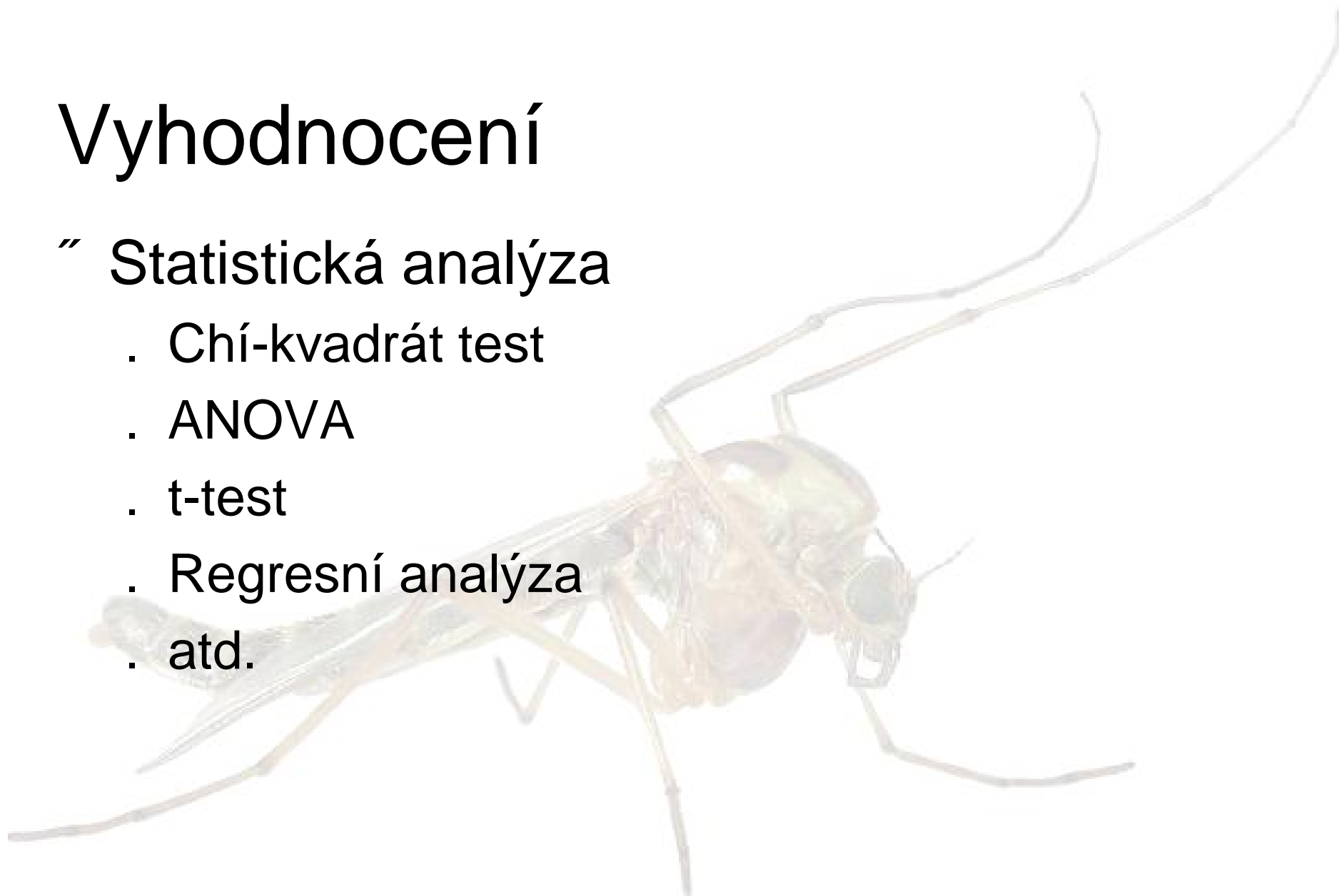
n_e = total number of midges emerged at the end of experiment ($= \sum f_i$)

X_i = development rate of the midges emerged in interval i

Vyhodnocení

” Statistická analýza

- . Chí-kvadrát test
- . ANOVA
- . t-test
- . Regresní analýza
- . atd.





“ D kujeme za pozornost!