

Water deficit: One of the limiting factors of the embryogenesis in *Javesella pellucida* (F.) and *Macrosteles sexnotatus* (Fall.) (Homoptera: Auchenorrhyncha)

Schopke, H. & W. Witsack

Martin-Luther-Universität Halle-Wittenberg, Institut für Zoologie Krollwitzer Str. 44, D-06120 Halle (Saale), Germany

Embryogenesis is a very sensitive period of insect ontogenesis and mainly responsible for ecological valency. To answer the questions of population vulnerability analysis it is important to understand the aspects of host-plant selection, habitat- and condition preference during all stages of ontogenesis. Doing a step in this way, we dealt with the influence of the environmental water balance on planthopper and leafhopper embryogenesis. The results of our investigations are demonstrated for two Auchenorrhynch species.

Starting from the assumption that the effect of plant water stress on leafhopper and planthopper eggs is osmotically produced, we reared eggs of *Javesella pellucida* (F.) (Auchenorrhyncha: Delphacidae) and *Macrosteles sexnotatus* (Fall.) (Auchenorrhyncha: Cicadellidae) in sucrose solutions with different osmotical pressures under laboratory conditions.

Potential osmotic pressures of the sucrose solutions ranged between 0.0 MP (water) and 3.5 MP (sucrose concentration 1.0 mol/l). Temperature in the climatic chamber was kept constant at 20.0 ± 0.5°C. The range of relative humidity was between 40 and 55 %. Photoperiod was 18:6 and light intensity was at 120 lx.

The eggs were dissected from plants and transferred into a small cup with sucrose solution within one day after female oviposition. Every five days the solution was changed and the embryonic development was checked.

The visible embryonic stages of the two species during normal development were determined. Then the anatrepsis-, catatrepsis- and hatching-rates in relation to different osmotic pressures were examined under the submitted temperature and light conditions.

Javesella pellucida embryos showed a rapidly increasing mortality-rate with increasing osmotic pressure during a period of 30 days. The mortality rate of *Macrosteles* embryos in same time increased far less (Fig.1).

There was a desiccation quiescence in the *Macrosteles* embryos starting to be effective between a potential osmotic pressure of 1.5 and 1.8 MP. After rehydration the normal development resumed. Eggs of *Macrosteles* are able to survive water stress in a state of quiescence for about 60 days, whereas only 6 days of water stress are sufficient to increase the mortality of *Javesella* to 100 %.

The results of our investigations demonstrate the importance of the osmotic conditions in the egg environment to embryonic development and by this to the population dynamics of the two species.

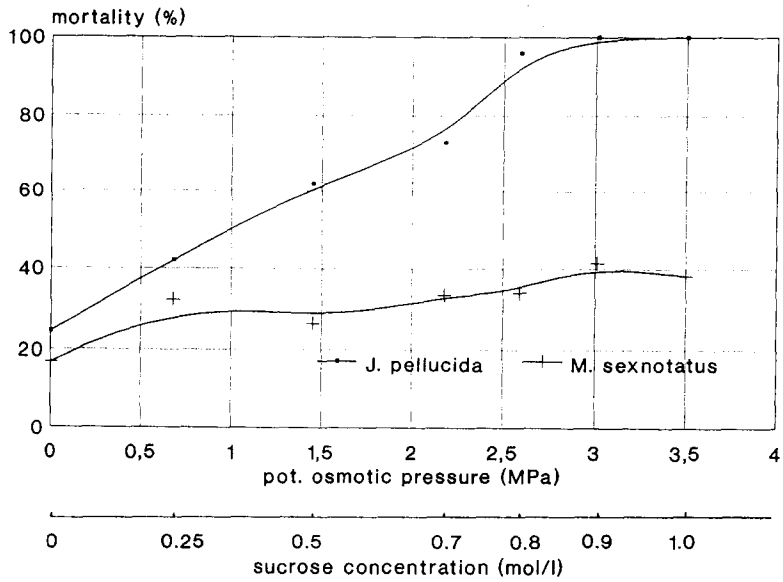


Fig.1 Mortality-rates of *J.pellucida* and *M.sexnotatus* after an 30 days stay in sucrose solutions with different poten osmotic pressure.

To answer questions on host-plant selection or aestivation and hibernation, great attention should be paid on the impact of plant osmotic conditions on egg development.