

EFFECT OF ATMOSPHERIC HUMIDITY ON THE EGGS OF A PHASMID
CARAUISIUS (DIXIPPUS) MOROSUS BR.

By Jean LECLERCQ, F.R.E.S.

(Université de Liège.)

IN these experiments, 175 eggs were used. They were laid between 11th September and 10th November, 1943, by three females from the same culture and fed on leaves of *Hedera helix* L. Immediately after laying, the eggs were placed in incubator tubes. The relative humidity in these tubes was controlled by a series of supersaturated solutions of different salts. Seven humidities were chosen: 100%, 95%, 87%, 78%, 50%, 25%, and 7%. The conditioned tubes were kept in a room at a temperature between 15 and 21° C.

EFFECT ON VITALITY.

The eggs of *Carausius morosus* survive and produce nymphs at all the tested humidities. But under 30% R.H. an average of 20–25% of the young nymphs cannot survive after hatching and often die without escaping completely from the eggshell (fig. 1). This is an effect of dryness on the emerging young only, because all embryos develop up to the first stage. It seems, therefore, that these deaths are the result of dehydration of the newly formed first nymphs. Similar results have been recorded by H. H. P. Séverin and H. C. Séverin (1910) for another Phasmid, *Diapheromera femorata* Say. In this case, the percentage checked and dying during hatching was higher, *i.e.*, 94%.

EFFECT ON DURATION OF INCUBATION PERIOD.

The first hatchings occurred on 24th December, 1943, the last on 13th March, 1944. The development is quicker at the higher humidities. In saturated air, hatching requires an average of 104 days and it is in this condition that I have recorded the minimum incubation time of 96 days. At 7% R.H., hatching requires an average of 120 days and here I have recorded the maximum incubation time of 162 days. Table 1 gives details of these results:—

TABLE 1.

Effect of relative humidity on duration of incubation period of the eggs of *Carausius morosus* (temperature between 15 and 21° C.).

| Relative Humidity | Average duration of incubation period | Standard error |
|-------------------|---------------------------------------|----------------|
| 100% | 104 days | ±2.5 days |
| 95% | 109 " | ±3 " |
| 87% | 110 " | ±3 " |
| 78% | 112 " | ±2 " |
| 50% | 114 " | ±2.5 " |
| 25% | 116 " | ±2 " |
| 7% | 120 " | ±3 " |

CONCLUSIONS.

Under the condition of temperature used in my experiments (*i.e.*, 15–21° C.), eggs of *Carausius morosus* appear to be able to survive and produce nymphs at all humidities between 7 and 100%. High humidities, particularly those approaching saturation, however, accelerate incubation and favour the survival of the hatched nymphs.

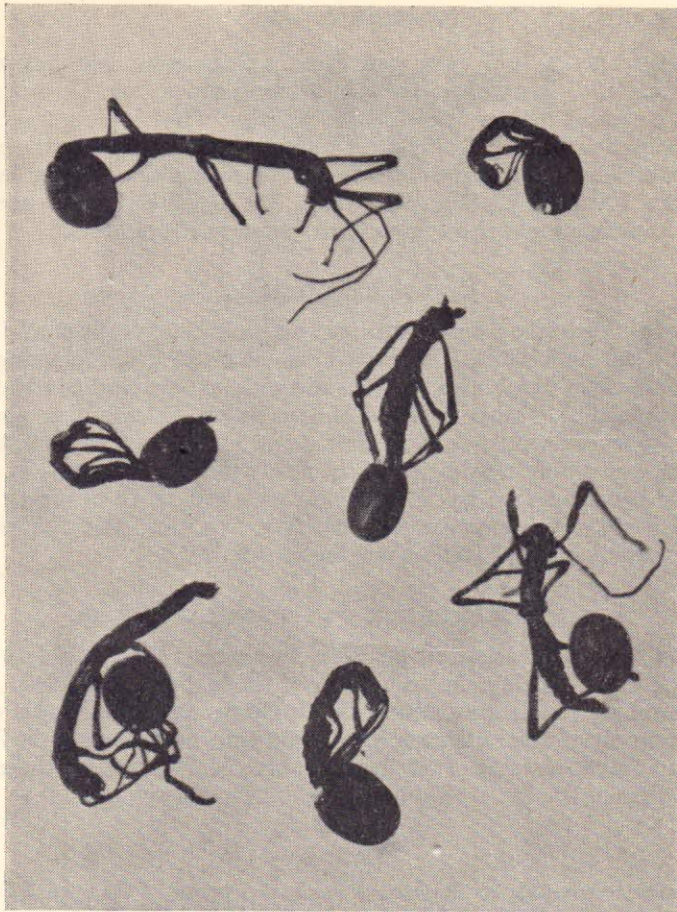


FIG. 1.—First nymphs of *Carausius morosus* dead during hatching after incubation in dry conditions (Phot. L. Max).

Eggs of Orthoptera are known to be able to develop over a wide range of humidities, but not so wide as the eggs of *Carausius*. For example, eggs of *Schistocerca gregaria* (Bodenheimer, 1929), of *Melanoplus mexicanus* and *Camnula pellucida* (Parker, 1930) fail to develop under 40% R.H. at optimal temperatures and the threshold became still higher at temperatures above the optimum.

ACKNOWLEDGEMENTS.

I wish to thank Prof. Z. M. Bacq and Prof. D. Damas, in whose Departments at the University of Liège this work was carried out. I am indebted to Dr. K. Mellanby of the London School of Hygiene and Tropical Medicine for kind help and advice in the writing of this paper.

REFERENCES.

- BODENHEIMER, F. S., 1929, Studien zur Epidemiologie, Ökologie und Physiologie des afrikanischen Wanderheuschrecke (*Schistocerca gregaria* Forsk.). *Z. angew. Ent.* 15 : 435.
- PARKER, J. R., 1930, Some effects of temperature and moisture upon *Melanoplus mexicanus* Saussure and *Cammula pellucida* Scudder. *Bull. Univ. Montana agric. Exper. Sta.* 223.
- SÉVERIN, H. H. P., and SÉVERIN, H. C., 1910, The effect of moisture and dryness on the emergence from the egg of the walking-stick, *Diapheromera femorata* Say. *J. econ. Ent.* 3 : 479.
-