

- 1901 *Pterodesmus hova*; De Saussure & Zehntner, l.c. : 436.
 1902 *Polydesmus (Tubercularium) hova*; De Saussure & Zehntner, in : GRANDIDIER, Hist. phys., nat. polit. Madagascar 27 : 91.
 1940 *Tubercularium hova*; Attems, l.c. : 435, fig. 619—620.

Dalodesmus odontopezus (Attems)

- 1898 *Tubercularium odontopezum* Attems, l.c. : 360, pl. 7, fig. 158—161.
 1940 *Tubercularium odontopezum*; Attems, l.c. : 434, fig. 618.

Dalodesmus sakalava (De Saussure & Zehntner)

- 1901 *Pterodesmus sakalava* De Saussure & Zehntner, l.c. : 437, pl. 39, fig. 8—10.
 1902 *Polydesmus (Tubercularium) sakalava*; De Saussure & Zehntner, l.c. : 93, pl. 14, fig. 20—20b.
 1940 *Tubercularium sakalava*; Attems, l.c. : 436, fig. 621.

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On klinotaxis in the caterpillars of *Bupalus piniarius* L. (Lep.)

by

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In an earlier paper in Dutch (1957, *Ent. Ber.* 17 : 108—113) I mentioned the ability of caterpillars of the pinelooper, *Bupalus piniarius* L., to counteract their displacement by external forces, e.g. after falling to the ground. When the caterpillar, which lives on the pine needles, falls to the ground, it tends to move toward vertical objects, such as tree trunks, poles and human beings. That movement is independent of the direction of the rays of the sun, so that the phenomenon falls under the term of skototaxis, rather than negative phototaxis (c.f. KLEIN 1934, experiments with *Julus*).

HUNDERTMARK (1937) gave a description of the various dummies to which caterpillars (e.g. larvae of *Lymantria monacha*) react, when presented simultaneously. Compare the WEBER-FECHNER quantitative law of sense excitation. The caterpillar, when taking samples of the surroundings (c.f. *Buccinum undatum* L.), makes weaving movements with its head and front part of the body. It is clear that this is the most simple form of orientation, namely klinotaxis (Greek: klinein = slope). The fluctuation in intensity of the stimuli, received at short intervals by the sense organs, determines the direction. The classic example of this type of

orientation is provided by the maggot of *Callifora erythrocephala*, which tends to move away from the light during the last few days before pupation. When crawling, it turns the head alternately from left to right (FRAENKEL & GUNN 1940). Vision in caterpillars possessing simple eyes is effectuated by the capacities of all units operating jointly. The twelve ocelli of lepidopterous larvae project twelve points of light on the receptive surfaces of the retinulae, thus forming an exceedingly coarse mosaik of light intensities. The weaving movements enable the advancing larvae to obtain a wider field of vision than would otherwise be possible with that number of photic points. This gives rise to a primitive type of form perception (DETHIER 1943). That author stated that the rhabdom or "Sehelement" in itself is not capable of form perception, but the behaviour of the larva makes this type of orientation possible. Both the ocelli and ommatidia of the compound eyes are built according to the same plan, but the first are more widely scattered over the head capsule. They are not rudimentary organs without function, as stated by PLATEAU. They do not have a simple kinetic, non-orientating function, such as KÜHN's topo-taxis, observed in *Paramaecium*, or the stimulating function of the sense organs, serving to raise the nervous tonus, as described by WIGGLESWORTH. The latter author pointed out that honeybees walked much slower when the ocelli were blinded, but he did not study their behaviour in the field.

Summary

Caterpillars of *Bupalus piniarius* L. move towards tree trunks after they have fallen to the ground and make weaving movements whilst doing so (KLEINHOUT 1957). From studies by DETHIER (1943) it is obvious that these movements should be interpreted in terms of klinotactic orientation. The ocelli do not have a simple kinetic, non-orientating function.

Literature

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Deventer, Sinthenstraat 44.

Cidaria fulvata Forster (Lep., Geometr.). Op 14 juli 1964 ving ik van deze soort een exemplaar in mijn lichtval in het Amsterdamse Bos. De soort was, voor zover mij bekend, nog niet daaruit vermeld. Wel uit Amsterdam door B. J. LEMPKE en L. VÁRI, die in 1941 over deze soort in „Amsterdam Natuurhistorisch gezien” opmerkten: „Zwerfer, zeer zeldzaam, o.a. in 1939 en '40.” Als voedselplanten worden genoemd *Rosa rubiginosa* en *R. canina*. *Rosa* spec. komen inderdaad in de omgeving van de val voor.

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