On the last instar larvae of two allied Palaearctic species, *Lygaeus equestris* and *L. simulans* (Heteroptera: Lygaeidae)

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Abstract: Studies on the coloration of the larvae of two allied Palaearctic species, *Lygaeus equestris* and *L. simulans,* are presented. Characters enabling separation of the last instars of both species are included.

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Introduction

Lygaeus simulans was described by Deckert (1985) and separated from *L. equestris* (Linnaeus) on the basis of characters concerning only the adult stages; unfortunately, differences between larvae of these two species were not considered.

Almost all previous papers on larvae of *L. equestris* (Solbreck & Kugelberg, 1972; Kugelberg, 1973a, 1973b, 1974, 1977a, 1977b) considered the problem of food preferences, but since both species feed on the same host plants, the identity of their material is not clear. The same applies to the material studied by Solbreck et al. (1989). The last larval stage of *L. equestris* was described and figured by Putshkov (1969), but from the present study it can be concluded that both the description and the figure refer to *L. simulans*.

Recently, Melber et al. (1991) described the last instars of both species and presented colour photographs. The descriptions suggested that only two types of larvae existed: those with creamy-white bodies bearing three red longitudinal bands on the dorsum represented *L. simulans*, and entirely red larvae pertained to *L. equestris*.

Nevertheless, beside larvae of the two types recognised by Melber et al. (1991) I have collected during my field studies (Lis, 1994) many specimens with intermediate body coloration. Therefore, the aim of this paper is to present the results of rearing experiments with larvae of both species under laboratory conditions. Additionally, I have tried to find the best characters enabling correct separation of the last instars of these two sibling Palaearctic species.

Material and methods

Larvae of *Lygaeus equestris* and *L. simulans* (different stages) were collected in the "Kamienna Góra" Mt. reserve in Upper Silesia (Poland) in 1995, where both species live and feed on *Vincetoxicum officinale* (L.) (Lis, 1994).

Collected larvae were put into rearing jars after division into the three following groups: larvae with abdomen entirely red (group I, figs 3-4); larvae with creamy-white abdomen bearing three distinct red bands (group II, fig. 1); larvae with intermediate coloration (group III, fig. 2). The larvae were fed with *Vincetoxicum officinale*; hatched adults were collected and determined to species. Furthermore, small numbers of larvae of different stages have been preserved in ethylene alcohol.

Results and discussion

As a result of the rearing 26 adult specimens were obtained; 16 adults represented *Lygaeus*

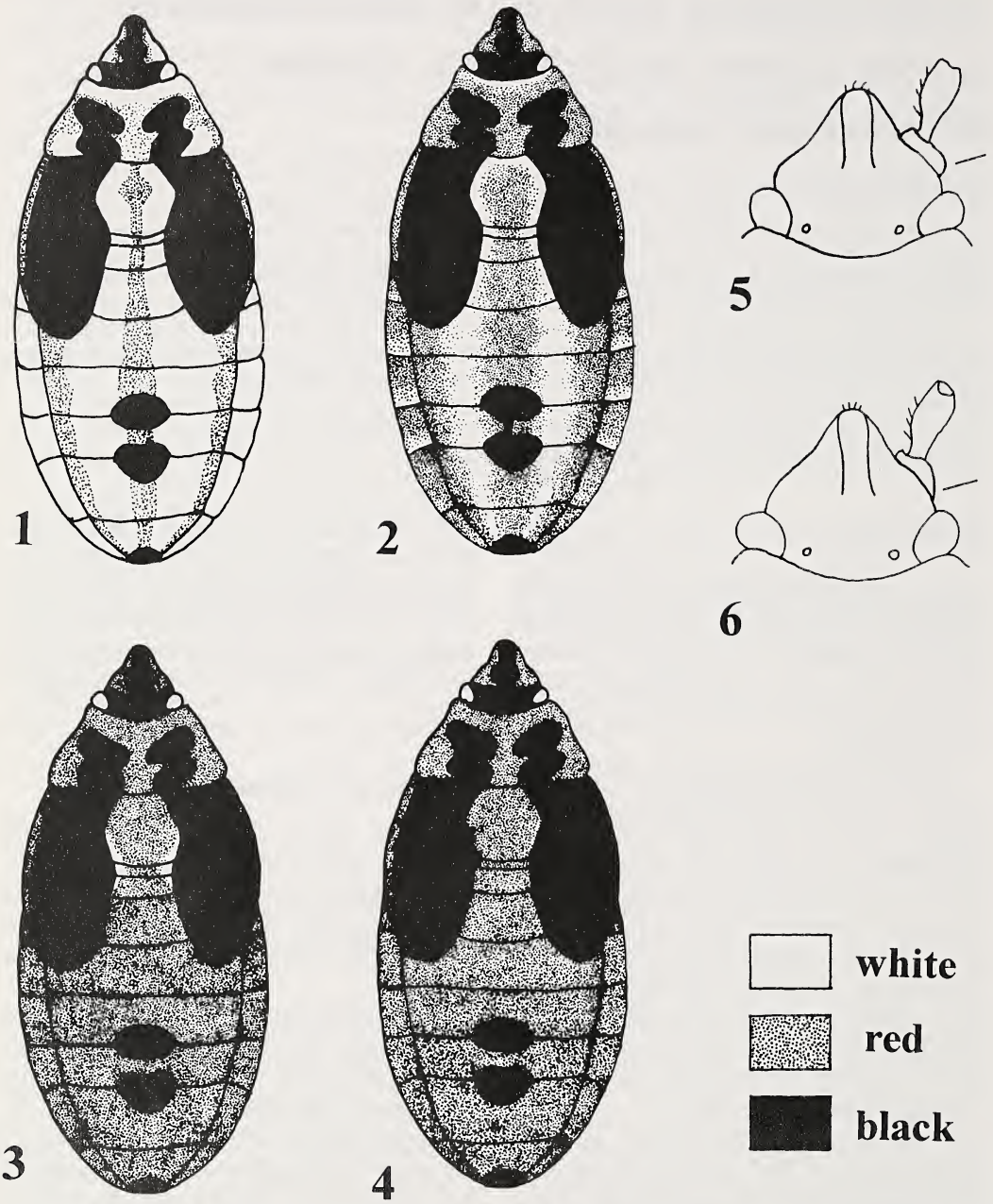

Fig. 1-6. Fifth instar larvae of *Lygaeus simulans* and *L. equestris*. 1-4, body colour pattern. 1-3, *L. simulans*; 4, L. equestris. 5-6, head outline. 5, *L. simulans*; 6, L. equestris

simulans, and 10 specimens belonged to *L. equestris*. They hatched from the groups of larvae, as follows. Group I (abdomen entirely red): ten adults of *L. equestris* and two adults of *L. simulans*; group II (abdomen creamy-white with red bands): eight adults of *L. simulans*; group III (intermediate larvae): six adults of *L. simulans*.

As one can see from these results, correct identification of larvae based exclusively on the colour of the abdomen is quite impossible. Moreover, it is not possible to divide the lar-

vae of *L. simulans* and *L. equestris* only into two typical groups as it was done by Melber et al. (1991), simply because intermediate colour morphs can be found among larvae of both species. I have also observed, that in some cases the body colour of larvae changed during development.

It seems very likely that the body colour of *L. simulans* larvae depends on the amount of sunlight during their development (in Poland the species prefers rather warm and sunny areas). A similar effect of sunlight was recorded in adults of *Adalia bipunctata* Linnaeus (Coleoptera), where the percentage of dark coloured adults inversely increased proportionally to the number of sunny hours during a year (Binney, 1977).

Since the abdominal coloration appeared to be an unreliable character for separating larvae of *L. simulans* and *L. equestris*, I have tried to find other features more useful in distinguishing the last instars of both species.

Examination of the material preserved in alcohol showed that the creamy-white larvae (4th and 5th instars) with three red bands (fig. 1) had a swollen base of the antennae (fig. 5). This character occurs only in adults of *L. simulans*, and it seems likely that larvae with this type of body coloration belong to this species. Moreover, the larvae with intermediate body coloration and a few of the entirely red larvae also showed swollen antennal bases. Examination of the larvae classified as group III (body entirely red) showed that a few of them possessed a narrow creamy-white band along the margins of the scutellum (fig. 3). Altogether this explains why adults of *L. simulans* hatched in each group of larvae. Larvae with the body entirely red (without any creamy-white band or white patches along the scutellum) showed normally developed antennal bases as in the adults of *L. equestris*; those were classified as representing the latter species.

Finally, it is concluded that the best characters to separate last (4th and 5th) instar larvae of *L. simulans* from those of *L. equestris* are the colour of the scutellum, which is entirely red in *L. equestris* (fig. 4) and shows at least narrow creamy-white bands along its lateral margins in *L. simulans* (fig. 1-3), and the shape of the antennal base, which is normally developed in *L. equestris* (fig. 6) and distinctly swollen in *L. simulans* (fig. 5).

References

Binney, R. (ed.), 1977. *The natural world*: 1-260. Mitchell Beazley, London.

Deckert, J., 1985. Über Lygaeus simulans spec. nov. und L. equestris (L.), zwei nahe verwandte paläarktische Lygaeinae (Heteroptera, Lygaeidae). – *Mitt. zool. Mus. Berlin* 61: 273-278.

Kugelberg, O., 1973a. Laboratory studies on the effects of different natural foods on the reproductive biology of Lygaeus equestris (L.) (Het. Lygaeidae). – *Ent. scand.* 4: 181-190.

Kugelberg, O., 1973b. Larval development of Lygaeus equestris (Heteroptera, Lygaeidae) on different natural foods. – *Entomologia exp. appl.* 16: 165-177.

Kugelberg, O., 1974. Laboratory studies on the feeding preference and feeding behaviour in Lygaeus equestris (L.) (Het. Lygaeidae). – *Ent. scand.* 5: 49-55.

Kugelberg, O., 1977a. Distribution, feeding habits and dispersal of Lygaeus equestris (Heteroptera) larvae in relation to food supply. – *Oikos* 29: 398-406.

Kugelberg, O., 1977b. *Food relations of a seed feeding insect, Lygaeus equestris (L.) (Heteroptera, Lygaeidae)*: 1-14. Department of Zoology, University of Stockholm.

Lis, B., 1994. Land-bugs (Heteroptera) of the "Kamienna Góra" Mt. in Ligota Dolna (Upper Silesia). – *Acta ent. siles.* 2: 25-30.

Melber, A., H. Günther & Chr. Rieger, 1991. Die Wanzenfauna des österreichischen Neusiedlerseegebietes (Insecta, Heteroptera). – *Wiss. Arb. Burgenld.* 89: 63-192.

Putshkov, V. G., 1969. Lygaeidae. – *Fauna Ukr.* 21 (3): 55-58.

Solbreck, C. & O. Kugelberg, 1972. Field observations on the seasonal occurrence of Lygaeus equestris (L.) (Het., Lygaeidae) with special reference to food plant phenology. – *Ent. scand.* 3: 189-210.

Solbreck, C., R. Olsson, D. B. Anderson & J. Forare, 1989. Size, life history and responses to food shortage in two geographical strains of a seed bug Lygaeus equestris. – *Oikos* 55: 387-396.

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