

## Unusual malformations in males of a North American *Leptothorax* species (Hymenoptera, Formicidae)

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Teratologies of various kinds are quite common in ants, probably due to care for and survival of otherwise not viable individuals in the colonies (Buschinger & Stoewesand 1971). Gynandromorphism may be induced by heat shock (Berndt & Kremer 1982), or have cytological origin. Young workers and sexuals often have crippled appendages which do not completely unfold during hatching of the pupae, perhaps due to low temperature. Other malformations, lack or duplication of segments, fusion of antennomeres, or split sclerites may be caused by injuries of larval instars during the handling of brood by workers.

In a colony of an as yet not identified species belonging to the North American *Leptothorax muscorum* complex a peculiar malformation of males and male pupae (figs. 1-5) was observed in laboratory culture. The colony belongs to *Leptothorax* "sp. B" (Heinze & Buschinger 1988; = *L. cf. canadensis*, Heinze 1994), a comparatively large, dark brown, facultatively polygynous member of this complex which ranges from SW-Canada and NW-USA through the Rocky Mountains. The colony had been collected on 30 July 1993 in Jasper National Park, Alberta, near Sunwapta Falls, in a dry branch at the forest floor. It comprised a few worker and ordinary male pupae.

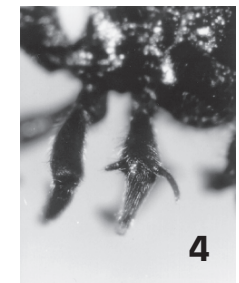
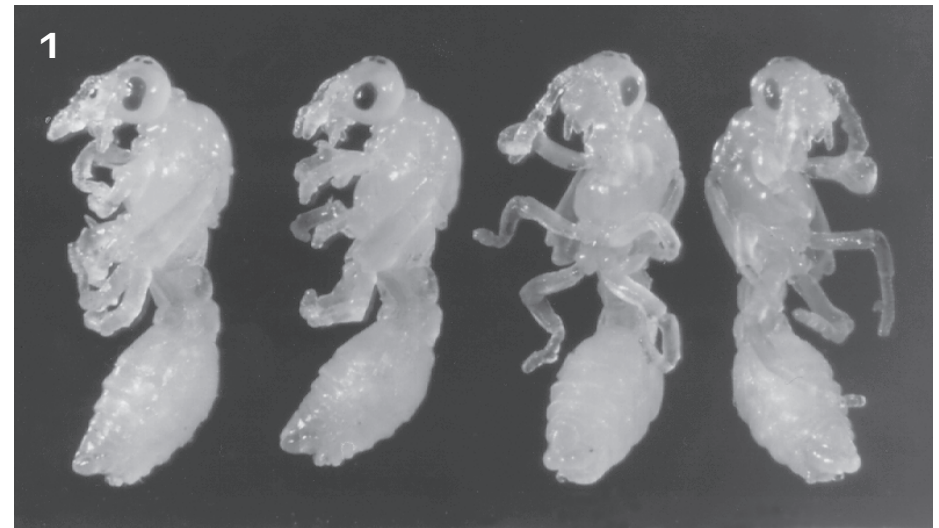
The colony was routinely reared as

Fig. 1-4

- 1 *Leptothorax* cf. *canadensis*, ♂ pupae with malformations of the appendages. Length ca. 4 mm.
- 2 Normal ♂ of *Leptothorax* cf. *canadensis*.
- 3 Teratological males of *Leptothorax* cf. *canadensis*.
- 4 Teratological ♂ of *Leptothorax* cf. *canadensis*, closeup of right middle leg with protrusions at the end of the femur, and fused articulation with tibia.

described by Buschinger 1974 over a total of six artificially shortened "annual" cycles until summer 1996. It was apparently monogynous since only one physogastric queen was observed in all "summer" periods, though several other dealate females were living in the colony. Normal, healthy males were produced in the first laboratory "summer", together with workers and alate females. In the following three cycles only female progeny was reared, but in the fifth and sixth cycles aberrant male pupae, alongside with normal ones, appeared in the nest. The male pupae were conspicuous because their appendages, instead of being appressed to the ventral side, were irregularly splayed out (fig. 1).

The teratological pupae were normally cared for, as were healthy pupae, by the workers. Pigmentation of both kinds of pupae occurred simultaneously, and the abnormal pupae



began to move their appendages and bend the body prior to eclosion in the ordinary manner. Workers then tore apart some of the abnormal pupae in the fifth cycle, but in the sixth cycle most of them hatched to maturity. Except for the normal males of the first cycle, and a few teratological pupae which may have been destroyed before they were detected, a total of 20 such specimens and 19 normal males were recorded and preserved.

Closer examination of abnormal pupae and adults revealed that the numbers of antennomeres were strongly reduced, from normally 12 to 5–6 or even 3, the antennae were short and stout. The legs were sometimes bent in unusual angles, and the articulations between the joints were fused (fig. 3–4). The numbers of tarsal segments were reduced. In addition the legs in some instances had single or paired thorn-like protrusions, mainly at the distal end of the femur. One out of 20 affected specimens had a malformation of the compound eyes which were kidney-shaped instead of regularly oval. The wing buds in pupae appeared shorter than usual, and the wings did not completely unfold after hatching. The genital apparatus seems not affected by any malformation.

The teratology here reported is as yet unique. Over the past 30 years the author has reared several thousand formicoxenine (formerly leptothoracine) colonies in the laboratory, among them about 800 belonging to the North American *Leptothorax muscorum* complex, and nearly 100 of *Leptothorax* sp. B. More than 500 teratological specimens of various kind have been detected

in this material, of which 97 were described by Buschinger & Stoewesand (1971), but none of the type as described above was ever found, and also Balazuc (1958) in his comprehensive review on teratologies in the Hymenoptera does not report on similar malformations.

The abnormalities quite probably have a genetic origin, which is suggested by the fact that just about one half of the male production (20 out of 39) is affected. Perhaps the queen was heterozygous for a recessive allele which in the hemizygous condition of the haploid males caused the defects, while heterozygous workers and females were normal.

#### Literature

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## Taxonomie

### Anmerkungen zur *Andrena-pilipes*-Gruppe (= *carbonaria* auct.)

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#### Summary

The group of *Andrena carbonaria* auct. contains an important systematic problem. Many species of the group had been described, but, at last, all of them had been synonymised with *A. carbonaria*. Since 1987, some authors proposed that the taxon should be divided into two species, but they were not able to find stable names. We propose now to take *Andrena pilipes* Fabricius, 1781 and *Andrena nigrospina* Thomson, 1872 as the most stable names from a systematical point of view. We are also able to specify further taxa beside the two taxa proposed by Baker (1994) and Dylewska (1987). One of them is *iliensis* Alfken, 1938, the second is an intermediate form between *pilipes* and *nigrospina*. The article has the intention to be the first step to a deeper study of *Plastandrena* Warncke, 1968.

#### Resumé

Le groupe d'*Andrena carbonaria* auct. pose un problème systématique important. Plusieurs espèces ont été décrites mais durant longtemps tous les taxons ont été considérés comme synonymes d'*Andrena carbonaria*. Depuis 1987, plusieurs auteurs proposent sporadique la division du taxon en deux espèces pour lesquelles le choix d'un nom est un travail ardu. Les auteurs proposent les noms *Andrena pilipes* Fabricius, 1781 et *Andrena nigrospina* Thomson, 1872 comme étant les plus valables d'un point de vue systématique. En plus de ces deux taxons dont la reconnaissance est déjà suggérée par Baker (1994) et Dylewska (1987), les auteurs ont remarqué l'existence de deux variantes particulières qu'ils décrivent momentanément, comme une sous-espèce de *pilipes*, appelée *iliensis* Alfken, 1938 et une forme intermédiaire entre *pilipes* et *nigrospina*. Cet article se pose comme l'amorce d'un travail plus important de révision des *Plastandrena* Warncke, 1968.

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Zeitschrift/Journal: [Bembix - Zeitschrift für Hymenopterologie](#)

Jahr/Year: 1997

Band/Volume: [8](#)

Autor(en)/Author(s): Buschinger Alfred

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