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A description of the pupae of *Philonthus albipes* (GRAVENHORST, 1802) and *Ph. varians* (PAYKULL, 1789) (Coleoptera: Staphylinidae: Staphylininae)

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ABSTRACT**.** The pupae of *Philonthus albipes* (GRAV.) and *Ph. varians* (PAYK.) are described and illustrated for the first time. A modification of a key to known pupae of Polish Staphylininae is proposed.

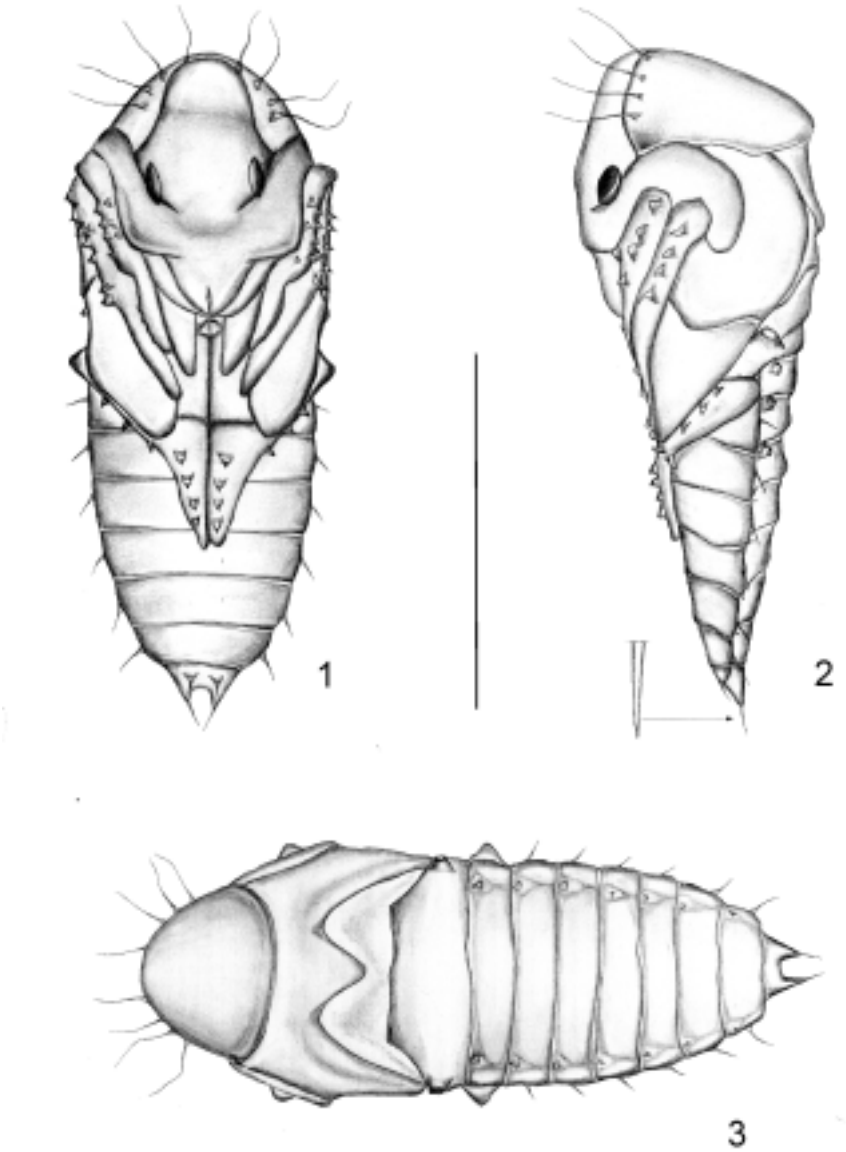
Key words: entomology, morphology, pupa, Coleoptera, Staphylinidae, Staphylininae, *Philonthus*.

INTRODUCTION

Within the genus *Philonthus* CURTIS only a few pupae were described (VERHOEFF 1918, MANK 1923, SZUJECKI 1965, EGHTEDAR 1970, TAWFIK et al. 1976a, b, c, PRINS 1984, BYRNE 1993, STANIEC 1999, 2001). However, their descriptions in most cases are superficial and poorly illustrated. The authors usually consider the total length, width, number of setiform projections on pronotum and abdomen as their diagnostic characters. However, the above features may be inadequate in the case of pupae of very closely related species, e. g. those belonging to the same subgenus. In that case also some following morphological details should be considered: structure of spiracles, length of antennae, length of hind legs and measurements other parts of the body. An identification key to the all known pupae of the Polish Staphylininae (including the genus *Philonthus*) provided STANIEC (2001).

Philonthus albipes and *Ph. varians* are the widely distributed Palaearctic species. The second taxon is also recorded from eastern India and North America. In Poland *Ph. albipes* is rather rare taxa, known from a dozen or so localities,

defined as an eurytopic and phytodetriticolous species. *Ph. varians* is common species on whole its area distribution, listed as an ubiquistic stercoricolous and phytodetriticolous species. Both inhabit rotten plant remains, compost heaps and mammal excrements in fields and gardens. They also occur in leaf-litter, moss and rotten fungi in forests (BURAKOWSKI et al. 1980, KOCH 1989). The pupae both of the above mentioned species have not been described up to date.



1-3. Pupa of *Philonthus albipes*. 1 - ventral aspect; 2 - lateral aspect; 3 - dorsal aspect. Scale bar = 2 mm

MATERIAL EXAMINED

Philonthus albipes: 2 pupae (females), *Ph. varians*: 3 pupae (2 female). Both pupae were obtained by sifting a compost heap. They were collected in Milejów (SE Poland, Wyżyna Lubleska Upland) on 10 July 2001. They were kept alive until emergence (16-20 July) of adults. Imagines of both species were determined by the author. Total drawing of a live pupae were made. For more detailed studies, fragments of exuvia of pupae were used.

DESCRIPTION

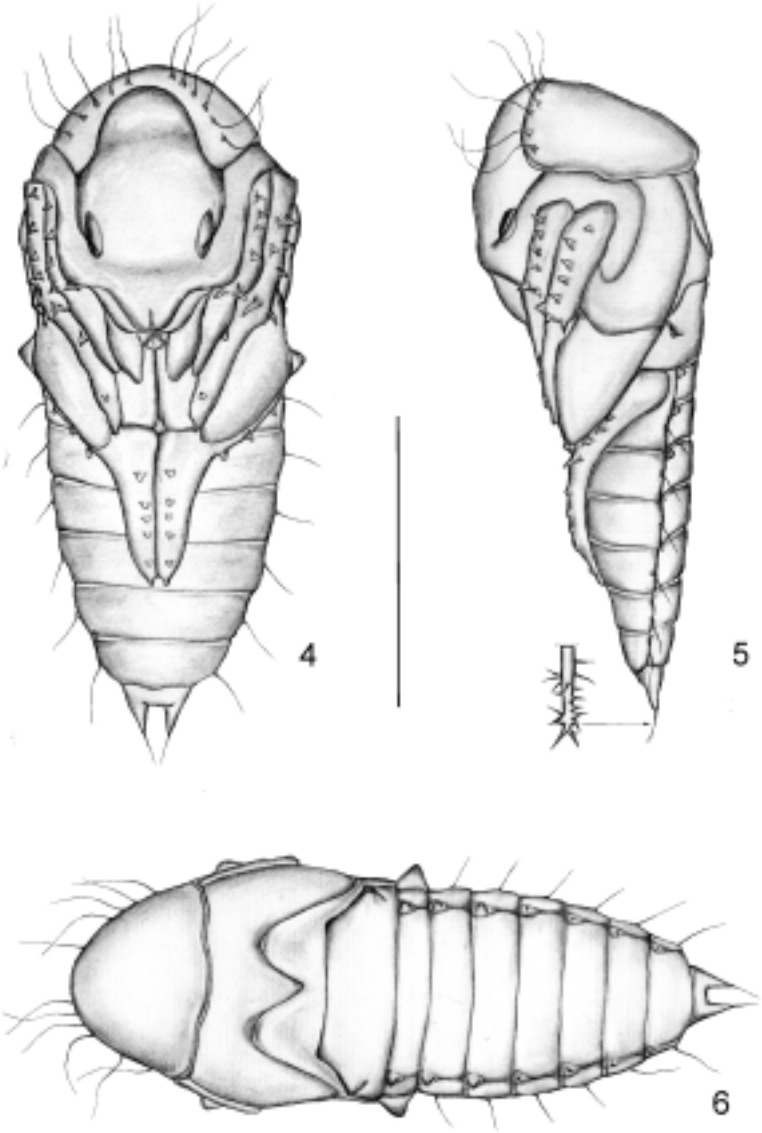
Philonthus albipes (GRAVENHORST, 1802)

Body length 3.4-3.5 mm, width in widest place (between of hind knees) 1.50-1.55 mm. Epicranium width (between of eyes) 0.7 mm, pronotum width 0.90-0.94 mm. Pupa of obtect type (Figs 1-3), colour from dark yellow just after pupation to yellowish brown with darker edges, becoming almost black, except for lighter wings just before emergence of imago. Head directed ventrally towards thorax. Antennae curved, and slightly protrude beyond half of length of the shortened elytra (Fig. 2). Pronotum 1.1 x as long as broad at the base with 8 setiform long projections at the anterior margin located on protuberances (Figs 1-3). Wings extending to ventral side, slightly protrude beyond the posterior margin of the first visible abdominal sternite; hind margin of shortened elytra well visible at lateral view only (Fig. 2). Tibiae and tarsi directed obliquely to middle of body. Tibiae of all legs each with a few well visible outlines of protuberances. Tarsi of hind legs with 4 protuberances; almost reaching half of length of 4th abdominal sternite (Fig. 1). Abdomen dorso-ventrally flattened; with 9 tergites and 7 sternites visible; narrowed below segment IV (Fig. 3). Abdominal tergite I nearly twice longer than the second and distinctly longer than others. Segments III-VIII each bearing a pair of setiform projections (all VI pairs) situated at middle of lateral margin. Setiform projections of abdominal segments III-VII short and stocky (Fig. 7), setiform projections of abdominal segment VIII somewhat longer and slim (Fig. 9). Abdominal segments III-VI over twice longer than projections. All setiform projections with numerous sharp cuticular spines. Terminal abdominal prolongation of segment IX smooth, without cuticular spines (Fig. 2). Abdominal tergites I-IV with tuberculate, functional spiracles, first pair situated more laterally than rest; tergites V-VIII with externally visible, but apparently atrophied spiracles (Figs 11, 12).

Philonthus varians (PAYKULL, 1789)

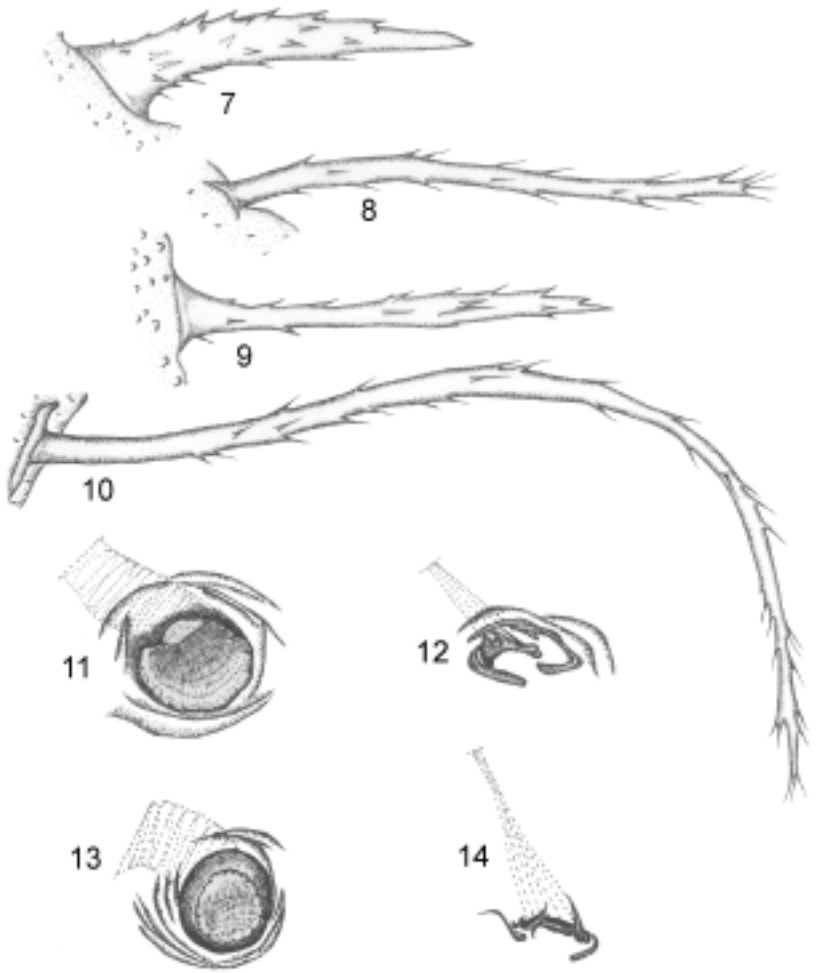
Body length 4.30-4.38 mm, width in widest place (between of hind knees) 1.85-1.90 mm. Epicranium width (between of eyes) 0.80-0.84 mm, pronotum width 1.33 mm. Colour from yellow just after pupation to yellowish brown with

darker edges, becoming almost black, except for lighter wings just before emergence of imago. Antennae curved, reaching 2/3 of length of the shortened elytra (Fig. 5). Pronotum ca. 1.2 x as long as broad at the base with 10-11 setiform long projections at the anterior margin located on protuberances (Figs 4-6). Wings extending to ventral side, distinctly protrude beyond the posterior margin of the



4-6. Pupa of *Philonthus varians*. 4 - ventral aspect; 5 - lateral aspect; 6 - dorsal aspect. Scale bar = 2 mm

first visible abdominal sternite; hind margin of shortened elytra well visible at lateral view only (Fig. 5). Tibiae and tarsi directed obliquely to middle of body. Tibiae of all legs each with a few very high and slim respectively, distinctly protruding of protuberances. Tarsi of hind legs almost reaching posterior margin of 4th visible abdominal sternite (Fig. 4). Abdominal segments narrowed below segment IV (Fig. 6). Abdominal tergite I twice longer than the second and distinctly longer than others. Segments III-VIII each bearing a pair of setiform



7-14. Pupa of *Philonthus albipes and Ph. varians*. 7, 8. Lateral abdominal setiform projection of V segment: 7 - *Ph. albipes,* 8 - *Ph. varians*. 9, 10. Lateral abdominal setiform projection of VIII segment: 9 - *Ph. albipes*, 10 - *Ph. varians*. 11-14. Functional (11, 13) and atrophied spiracles (12, 14): *Ph. albipes* (11, 12), *Ph. varians* (13, 14). Scale bar = 0.1 mm

projections (all VI pairs) situated at middle of lateral margin (Figs 4-6). Setiform projections of abdominal segment VIII distinctly longer than others (Figs 8, 10). Abdominal segments III-VI at most 2 x as long as projections. All setiform projections with numerous sharp cuticular spines. Terminal abdominal prolongation of segment IX with cuticular usually sharp and straight spines apically (Fig. 5). Abdominal tergites I-IV with tuberculate, functional spiracles, first pair situated more laterally than rest; tergites V-VIII with externally visible, but apparently atrophied spiracles (Figs 13, 14).

CONCLUDING REMARKS

The differences in morphological structure between the pupa *Ph. albipes and Ph. varians* involve the following features: (A) measurements - body length and width, head and pronotum width, length of antennae and hind legs; (B) number of setiform projections located at the anterior margin of pronotum (Figs 1-6); (C) structure of setiform projection located laterally on abdominal segments III-VIII (Figs 7-10); (D) structure of apical part of terminal abdominal spines (Figs 1, 4); (E) structure of functional and atrophied spiracles (Figs 11-14).

In the key to known pupae of the Polish Staphylininae (STANIEC 2001), the following modifications are proposed at couplet 8, in order to include *P. albipes* and *Ph. varians.*

8. Anterior margin of pronotum with more than 11 (previously was 10) setiform projectins ……..…..……. 9.
-. Anterior margin of pronotum with at most 11 setiform projections …..…… 8a.
8a. Anterior margin of pronotum with 8 setiform projections. Body length 3.4-3.5 mm. Structure of setiform projections on abdomen, terminal spines and spiracle as in Figs 1, 7, 9, 11, 12). ……..…… *Philonthus albipes* (GRAV.).
-. Anterior margin of pronotum with 10-11 setiform projections. Body length 4.30-6.70 mm ……..……... 8b.
8b. Anterior margin of pronotum with 10 setiform projections. Body length 5.20-6.70 mm. ……..……..…..… *Philonthus longicornis* STEPH.
-. Anterior margin of pronotum with 10-11 setiform projections. Body length 4.30-4.38 mm. Structure of setiform projections on abdomen, terminal spines and spiracle as in Figs 4, 8, 10, 13, 14). ……..…. *Philonthus varians* (PAYK.).

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