

## *Lasius nitidigaster* n. sp. – a New Ant of the Subgenus *Chthonolasius* Ruzsky (Hymenoptera: Formicidae)

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**Abstract.** A taxonomic description of *Lasius nitidigaster* n. sp., a temporary social parasite with mainly subterranean life, is given. Diagnostic characters separating it clearly from other species of the subgenus *Chthonolasius* are described for all three castes. A morphometric argumentation, based on a comparison of a queen sample of *L. nitidigaster* with the type queen of *Lasius rabaudi*, Bondroit 1917 gives strong evidence that both taxa cannot be regarded as synonyms. *L. rabaudi* represents a SW European or Iberian species while *L. nitidigaster* is of Balcan origin and goes north to E Austria and S Moravia.

**Key words:** *Lasius nitidigaster*, taxonomic description

### INTRODUCTION

The workers of many species of the ant subgenus *Chthonolasius* are extremely difficult in determination. They have very few diagnostic structures and the separation of the species often requires the time-consuming morphometric investigation of nest samples. In contrast, the determination of the queens is rather comfortable in most of the species. The queens of 11 European species, which were available in sufficiently large samples, had a much reduced morphometric variability and express more diagnostic characters than conspecific workers. This is valid both for body ratios and absolute size (Seifert 1988). For instance, the coefficients of variation

(SD/mean) of absolute head length and scape length are on average only 2.5 % within one species. The highest coefficient of variation known is 3.7 % for head length in *Lasius balcanicus* and 3.0 % for scape length in *L. distinguendus*.

In view of this reduced variability of queens, it has been a mistake that the author did not recognize, during his work on a revision of the European *Chthonolasius* species (Seifert 1988), that the type queen of *Lasius rabaudi* Bondroit 1917 shows morphometric characters that are not found in any other Westpalaeartic species. *Lasius rabaudi* is most probably restricted to SW Europe and will certainly not occur in Central Europe. As a consequence, all the *Lasius rabaudi* sensu Seifert (1988), having SE to Central European origin, must get another name. The new species *Lasius nitidigaster* n. sp. has similarities to *Lasius rabaudi* but deviates in a way which can not reasonably be explained by extreme intraspecific

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variability. The taxonomic description of *Lasius nitidigaster* n. sp. and its differentiation from related species is given in this paper.

## MATERIAL AND METHODS

*Lasius nitidigaster* n. sp. was studied on the basis of 17 queens, 41 workers, and 19 males. These belong to 19 different samples collected in 17 different sites (4 in Bulgaria, 10 in Slovakia, 2 in Moravia, and 1 in E Austria).

*Lasius rabaudi* is so far known only by the type queen from Amélie-les-Bains /E Pyrenees. This specimen stored in the collection of the Royal Institute of Natural Sciences of Belgium in Brussels was investigated.

### Terminology and explanation of morphometric characters

All measurements were taken in mounted and dried specimens using a pin-holding device freely turnable into each spatial position. A Technival 2 stereomicroscope was used at magnifications of 80–250 $\times$ . The maximum possible magnification to keep a structure within the range of the ocular micrometer was used. A mean measuring error of  $\pm 1 \mu\text{m}$  is given for small and well-defined structures such as hair length, but may reach  $5 \mu\text{m}$  for large measures with difficult positioning and high dependency from air humidity such as CW. To avoid rounding errors, all measurements have been recorded in  $\mu\text{m}$  even for characters where a precision of  $\pm 1 \mu\text{m}$  is impossible. In order to reduce irritating reflexions of the cuticular surfaces and to get an improved visualization of the microsculpture, a plastic diffusor was positioned as close as possible to the specimen. In body measurements (as e.g. CW, SCMIN or IF2) where a dense pubescence might affect the measuring, transmitted-light was used to visualize the real cuticular surface.

Setae are differentiated from pubescence hairs in having a much larger basal diameter (4–8  $\mu\text{m}$  in setae and 1–2  $\mu\text{m}$  in pubescence). Seta counts (nHT) are restricted to standing setae projecting  $>10 \mu\text{m}$  from cuticular surface. The degree of erection of hairs is described with the terms “appressed” ( $=0^\circ$ ), “subdecumbent” ( $\pm 15^\circ$ ), “decumbent” ( $\pm 30^\circ$ ), “suberect” ( $\pm 45^\circ$ ) and “erect” (60–85°).

- CL – maximum head (caput) length in median line; the head must be carefully tilted to the position with real maximum.
- CW – maximum head (caput) width which may be across or behind the eyes.
- GHL – length of longest standing seta on the dorsofrontal face of first gaster tergite – i.e. just that small curved area where the dorsal plane declines into the frontal face of first tergite.
- HTMAX – maximum width of hind tibia at midpoint.
- HTMIN – minimum width of hind tibia at midpoint.
- SCL – maximum straight line scape length excluding the articular condyle.
- SCMAX – maximum width of scape at midpoint.
- SCMIN – minimum width of scape at midpoint.
- IF2 – ratio of median length / maximum width of second funiculus segment measured when viewing at the dorsal plane of scape.
- MW – maximum width of mesosoma before the tegulae.
- nHT – number of standing setae on the extensor profile of hind tibia given as halved number of the sum on both tibiae.
- PDG – pubescence distance on dorsal plane of first gaster tergite; the length of a transversal measuring line is divided by the number of pubescence hairs crossing or touching this line.
- PDF – pubescence distance on head in front of midocellus, obtained as in PDG.
- PESC – maximum width of petiolar scale above the spiracle.

## DESCRIPTION

A type series with the HOLOTYPE (a queen) and 6 PARATYPES (2 queens, 4 workers) was fixed in a nest sample labelled : “BULGARIA mer., Melnik 13–17.6.1984, P. Bezdecka lgt.”. Two other series were designated as paratypes: “Bulgaria, Obsor, 1.8.1980, leg. Lippold” (9 males, 5 workers) and “E Austria, Neusiedlersee, Illmitz (Sandeck), 3.9.1988,” (1 queen, 6 workers). The holotype and the paratypes are kept in the collection of the Staatliches Museum für Naturkunde Görlitz.



**Queen** (Figs 1,2, Tab. 1): Pubescence on head, mesosoma, and particularly on the gaster tergites very sparse and decumbent, on first gaster tergite more subdecumbent. Cuticular surface of head, mesosoma,

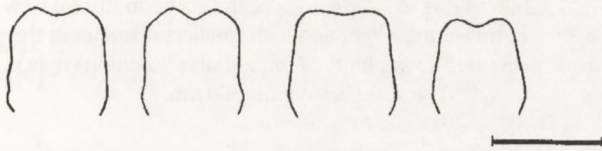


Fig. 1. Variability of the shape of petiolar scale in frontal view in queens of *Lasius nitidigaster* n. sp. The scale bar equals 600  $\mu\text{m}$ .

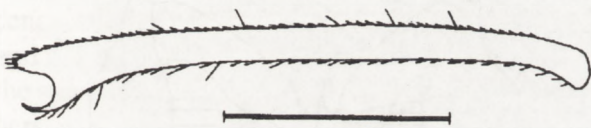


Fig. 2. Scape of the queen of *Lasius nitidigaster* n. sp. in frontal view as seen in transmitted-light and with smallest diameter in the visual plane. The scale bar equals 500  $\mu\text{m}$ .

and gaster brilliantly shining; all these body parts with very long erect setae which are often branched apically or feather-split. Length of longest seta on scutellum 190–285  $\mu\text{m}$ . Dorsal surface of scape with appressed to decumbent pubescence and few decumbent to erect setae, the longest setae project up to 50  $\mu\text{m}$  from cuticular surface (Fig. 2). Extensor profile of hind tibia with appressed to decumbent pubescence and 4–30 subdecumbent to erect setae, which project up to 73  $\mu\text{m}$  from the the profile line. Scape notably flattened, hind tibia very flat. Second funicular segment definitely longer than wide. Petiolar scale in frontal view with straight, parallel, or dorsad slightly converging sides; dorsal crest more or less emarginated (Fig. 1). For morphometric data see Table 1.

**Worker** (Fig. 3): Whole head, mesosoma and gaster with numerous and very long, erect setae; the longest on promesonotum measure 135–170  $\mu\text{m}$ . Pubescence, in particular on the gaster tergites, very sparse; on head and mesosoma more appressed and on gaster tergites decumbent. Cuticular surface of

Table 1. Morphometric comparison of the queens of *Lasius nitidigaster* n. sp. with the type of *Lasius rabaudi*. Values of *L. rabaudi* having a distance >3.09 are outside of the 99.9 % confidence limits of the *L. nitidigaster* normal distribution and are marked with “\*\*\*”. The hind tibial width HTMAX was not exactly measurable in the *L. rabaudi* type but is in any case much larger than in *L. nitidigaster*.

	<i>Lasius nitidigaster</i> (n=17)			<i>Lasius rabaudi</i> type queen	
	mean	SD	[min-max]	value	distance = [value - mean]/SD
CL	1396 $\pm$ 31		[1314–1443]	1525	4.16 **
CW	1596 $\pm$ 44		[1502–1662]	1720	2.82
SCL	1331 $\pm$ 39		[1219–1386]	1509	4.56 **
HTMAX	254 $\pm$ 9		[236–270]	(343)	9.89 **
CL/CW	0.876 $\pm$ 0.017		[0.843–0.912]	0.886	0.59
SCL/CL	0.954 $\pm$ 0.018		[0.925–0.994]	0.990	2.00
SCL/CW	0.836 $\pm$ 0.015		[0.812–0.864]	0.877	2.73
SCMAX/SCMIN	1.714 $\pm$ 0.141		[1.500–2.000]	2.09	2.67
HTMAX/HTMIN	2.298 $\pm$ 0.159		[2.08–2.69]	(2.90)	3.78 **
IF2	1.740 $\pm$ 0.072		[1.618–1.910]	2.24	6.94 **
GHL	214.2 $\pm$ 24.3		[181–257]	156	2.40
nHT	14.4 $\pm$ 6.5		[4–30]	17	0.40
PDG	32.3 $\pm$ 12.6		[9.9–52.0]	21.9	0.82
PDF	15.2 $\pm$ 2.6		[11.8–20.0]	24.1	3.42 **
GHL/SCL	0.160 $\pm$ 0.018		[0.132–0.194]	0.103	3.17 **



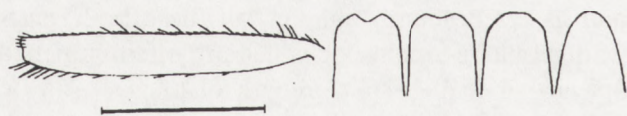


Fig. 3. Hind tibia of the worker of *Lasius nitidigaster* n. sp. as seen in transmitted-light and with largest diameter in the visual plane. Petiolar scales of workers in frontal view: The left 2 drawings represent average, the right 2 drawings rare situations. The scale bar equals 500  $\mu\text{m}$ .

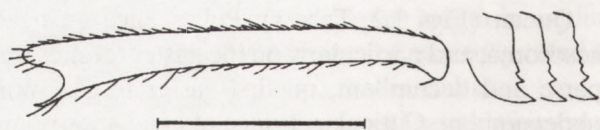


Fig. 4. Male of *Lasius nitidigaster* n. sp.: scape in frontal view as seen in transmitted-light and with smallest diameter in the visual plane (left); variability of mandibular dentition (right). The scale bar equals 300  $\mu\text{m}$ .

head, mesosoma and particularly dorsum of gaster brilliantly shining. This overall impression is due to the very dilute pubescence and the very shallow microfoveae. Scape flattened, its dorsal surface with decumbent pubescence and few to many subdecumbent to erect setae, which project up to 55  $\mu\text{m}$ . Hind tibia flattened, but less than in *jensi* or *meridionalis*; its extensor profile line with  $\pm$  appressed pubescence and few to many subdecumbent to erect setae the longest of which may project up to 65  $\mu\text{m}$ . Petiolar scale rather high, in frontal view normally with straight, parallel sides and emarginated dorsal crest (left drawings in Fig. 3). Scales approaching to the *jensi* standard, having convex sides that converge dorsad to a narrow, rounded or straight, dorsal crest, are sometimes found (right drawings in Fig. 3). Whole body colored yellowish. Morphometric data of 41 workers given as arithmetic mean  $\pm$ SD [lower extreme-upper extreme]:

CL 1025  $\pm$  62 [897–1124], CL/CW 1.052  $\pm$  0.018 [1.009–1.105], SCL/CL 0.897  $\pm$  0.018 [0.868–0.943], SCL/CW 0.944  $\pm$  0.020 [0.882–0.978], SCMAX/SCMIN 1.610  $\pm$  0.119 [1.43–1.84], HTMAX 146  $\pm$  13 [122–170], HTMAX/CW 0.1458  $\pm$  0.0065 [0.135–0.157], GH 119.5  $\pm$  6.8 [103–133], nHT 14.8  $\pm$  6.6 [1.5–26.5], PDG 42.2  $\pm$  14.6 [15.0–72.0], PDF 13.7  $\pm$  2.6 [9.3–19.3].

**Male** (Figs 4,5): Masticatory border of mandibles with 1–4 small denticles in addition to the larger apical and subapical dents (Fig. 4). Outer margin of mandibles frequently with a notable corner before its articulation with head capsule (Fig. 5). Scape flattened, rather similar to the condition in *jensi* but with lower SCMAX and always concave posterior edge,

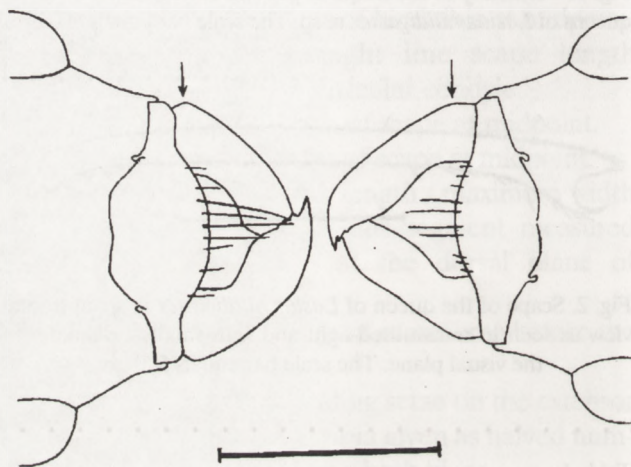


Fig. 5. Frontal head of the males of *Lasius nitidigaster* n. sp. (left) and of *Lasius jensi* Seifert (right). Note the more pronounced corner near the mandibular base and the longer setae of *L. nitidigaster*. The scale bar equals 500  $\mu\text{m}$ .

when viewing at the dorsal plane. Head, mesosoma and gaster brilliantly shining. Pubescence mostly decumbent to subdecumbent and variably dense, often extremely sparse, in particular on gaster tergites. Dorsal surface of scape with decumbent pubescence, which is more dilute compared to other species, and with few subdecumbent to suberect setae which may project 30  $\mu\text{m}$ . Extensor profile of hind tibia with decumbent pubescence and 1–5 subdecumbent to erect setae. Longest seta on posterior border of 8th sternite longer than 100  $\mu\text{m}$  (normally 125–145  $\mu\text{m}$ ). Morphometric data of 19 males given as arithmetic mean  $\pm$ SD:



CW  $1025 \pm 54$ , MW  $928 \pm 73$ , SCMAX  $82.3 \pm 3.8$ , SCMAX/SCMIN  $1.531 \pm 0.089$ , SCL/CW  $0.645 \pm 0.032$ , GHL  $109.2 \pm 20.8$ , nHT  $2.0 \pm 1.2$ , PDG  $42.4 \pm 30.0$ , PESC/CW  $0.299 \pm 0.014$ , CW/MW  $1.106 \pm 0.043$ , SCL/SCMIN  $12.29 \pm 1.02$ .

## DIFFERENTIAL DIAGNOSIS AND DISCUSSION

In the queens, *Lasius nitidigaster* cannot be confused with any other Westpalaeartic species except of *Lasius rabaudi*. A comparison with the data presented by Seifert (1988) shows that *L. nitidigaster* is a unique combination of extremely dilute pubescence, very long body hairs, long and flattened scape and flat hind tibia. The workers are well-separable by the same characters from all Central European members of *Chthonolasius*. Their PDG data are widely outside the range of other species and the means of SCL/CL and GHL are the largest found within this group (see Tab. 2 in Seifert 1988). It is a very rare situation in *Chthonolasius* that even the males express diagnostic characters: a very dilute pubescence, a flat scape, a frequent corner at the lateral mandibular base (Fig. 5) and very long setae at posterior margin of 8th sternite.

Table 1 shows that the type queen of *Lasius rabaudi* has a lot of morphometric characters which are fully outside of the 99.9 % confidence limits of *Lasius nitidigaster*. This refers to several measures of absolute size, 3 independent indices (IF2, HTMAX/HTMIN, GHL/SCL) and PDF. Since the type of *Lasius rabaudi* shows no signs of malformations and has numeric deviations from *nitidigaster* which exceed any known within-species variation of *Chthonolasius* queens, it cannot reasonably be expected to represent the same species. Queens approaching to the type of *Lasius rabaudi* have never

been collected in Central or SE Europe. It must be emphasized that all faunistic records from Central Europe determined as *L. rabaudi* (Wilson 1955, Collingwood 1963, Bourne 1973, Kutter 1977, Werner 1984, Seifert 1988) must be referred to either *Lasius meridionalis*, *L. jensi*, or *L. nitidigaster*. Very likely *Lasius rabaudi* represents a SW European or Iberian species. Its external morphology suggests that it is related to (but not conspecific with) *Lasius nitidigaster*.

*Lasius nitidigaster* is certainly widely distributed in the Balcans and goes northwest to S Moravia and E Austria at least. In Moravia, Slovakia, and E Austria it inhabits xerothermous grasslands or steppes, preferentially but not always on limestone ground. In S Moravia and Slovakia *L. nitidigaster* is in places abundant. The alates have been found in the nests from 13 June to 3 September, the bulk between 18 July and 22 August. The nests are frequently constructed with mounds, apparently lacking the carton-like inner structures seen in several other species.

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Foodnote: The manuscript of this paper was received by the editors in March 1995 with the promise to have it published until summer 1996. The refereeing process and financial problems delayed the publication unpredictably. Meanwhile, the name *Lasius nitidigaster* was published in the key of a book on Central European ants (Seifert, B.: Ameisen beobachten und bestimmen, Naturbuch Verlag Augsburg, 31 December 1996). As a consequence, the presented paper missed its intention to represent the first description of *Lasius nitidigaster* and the name has to be cited correctly *Lasius nitidigaster* Seifert, 1996.