

PONERA TESTACEA EMERY, 1895 STAT. N. – A SISTER  
SPECIES OF *P. COARCTATA* (LATREILLE, 1802)  
(HYMENOPTERA, FORMICIDAE)

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A redescription, rank elevation, and lectotype designation of the neglected taxon *Ponera coarctata* var. *testacea* EMERY, 1895 are published. Two different morphometric approaches resulted in a clear separation of *testacea* from its sister species *coarctata* (LATREILLE, 1802). *P. testacea* is abundant in the Mediterranean region but is also widely distributed in Central Europe where it spreads north to 51°30'N. It is more xerothermophilic than *coarctata* and seems to avoid shaded, moister woodland habitats.

Key words: *Ponera*, lectotype, morphometric

## INTRODUCTION

The genus *Ponera* LATREILLE, 1804 has been revised by TAYLOR (1967) who pointed out that this genus can be distinguished from the otherwise similar *Hypoponera* SANTSCHI, 1938 by the presence of a bilateral subpetiolar tooth-like process and by the two-segmented maxillary palps. Only one species, *Ponera coarctata* (LATREILLE, 1802) was recognised in Europe for many decades. The genus *Ponera* includes about 30 small, hypogaecic species in the world. TAYLOR (1967) mentioned 28 species distributed mainly in the Indo-Australian region and BOLTON (1995) gave a figure of 33 extant taxa, with 5 species from the Palaearctic region. Some representatives live in the North African temperate zone and here-with two occur in Europe, and few species live in the east of North America. TAYLOR (1967) studied a few European *Ponera* taxa, but he considered all of them as junior synonyms of *P. coarctata* (LATR.). TAYLOR realised, that the other forms differed from the nominal form, but he considered them to be local ecotypes and as a result of allometric growth among workers.

Two independent morphometric studies of CSÓSZ and SEIFERT are presented in this paper and show that at least two *Ponera* species occur sympatrically in Southern and Central Europe. As a result *Ponera testacea* EMERY, 1895 is considered as good species close to *coarctata*. The taxonomic situation has remained obscure so far since EMERY did not label types of *testacea* and our efforts to get ac-

cess to original material of LATREILLE, including such of *Ponera coarctata* LATREILLE, 1802, were not successful. We intend to clarify this situation by designating a lectotype of *P. testacea* and by redefining *testacea* and *coarctata*.

## MATERIAL AND METHODS

More than 500 *Ponera* specimens belonging to 180 nest samples were inspected. Morphometric measures were taken from 411 specimens consisting of 147 *testacea* and 182 *coarctata* workers plus 31 *testacea* and 51 *coarctata* gynes. The examined *Ponera* material is deposited in the collections of the Hungarian Natural History Museum, Budapest (Hungary), the Staatliches Museum für Naturkunde, Görlitz (Germany), the Naturhistorisches Museum, Wien (Austria), the Naturhistorisches Museum, Bern (Switzerland), the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn (Germany), the Museo Civico di Storia Naturale Genova (Italy), the Muséum d'Histoire Naturelle Genève (Switzerland), the Muzeul Brukenthal Sectia de Istoria Naturii Sibiu (Romania). Finally specimens were examined from the private collections of Dr. LÁSZLÓ GALLÉ (Szeged, Hungary), XAVIER ESPADALER (Barcelona, Spain) and HEINRICH WOLF (Plettenberg, Germany). Morphological investigation are restricted to workers and gynes.

All measurements were taken on mounted dry preparations. To avoid rounding errors, all measurements were recorded in  $\mu\text{m}$  even for characters for which a precision of  $\pm 1 \mu\text{m}$  is impossible. Two independent morphometric approaches, one of CSÓSZ and one of SEIFERT, based on different microscopic equipments, different samples, and differing character selection were applied.

CSÓSZ: An Olympus BX 40 stereomicroscope was used at a magnification of  $\times 100$ . The accuracy of the measurements is  $\pm 2 \mu\text{m}$ . Seta length on eyes was measured at a magnification of  $\times 200$  with an accuracy estimated as  $\pm 1 \mu\text{m}$ .

SEIFERT: All measurements were made using a pin-holding stage, permitting endless rotations around X, Y, and Z axes. A Wild M10 high-performance stereomicroscope equipped with a  $\mu 1.6$  planapochromatic objective was used at magnifications of  $\times 200$ – $320$ . A Leica cross-scaled ocular micrometer with 120 graduation marks ranging over 65% of the visual field was used. A cross-scale is inevitable for exact measurements of characters such as NOH. A mean measuring error of  $\pm 0.7 \mu\text{m}$  was calculated for small and well-defined structures measured at highest magnifications and one of  $\pm 2 \mu\text{m}$  for larger structures with difficult positioning such as gyne mesosoma length.

Acronyms and definitions of morphometric characters are as follows:

CL: Cephalic length – maximum median length of head capsule. The head must be carefully tilted so the maximum length is positioned in measuring plane. Excavations of occiput or clypeus reduce CL.

CS: Cephalic size – the arithmetic mean of CL and CW.

CW: Maximum cephalic width in full-face view. Measurement of the real cuticular surface and not of the diffuse pubescence surface.

FL: Maximum width of frontal lobes.

FoDG: (SEIFERT) mean distance of foveolae on dorsum of 1st gaster tergite. Count the number of foveolae  $n$  in an area  $A$ :  $\text{FoDG} = \sqrt{A/n}$ . To enable the most accurate counting, select a shining part and adjust the counting area longitudinally. Explicitly, counting was performed within two longitudinal areas of  $10 \mu\text{m} \times 40 \mu\text{m}$  graduation marks at a magnification of  $\times 320$  with the Wild M10. Foveolae with centres exactly at the margin of counting areas got the score 0.5.

FR: Minimum distance between frontal carinae.

MH: The maximum height of mesosoma, measured from the ventralmost point of katepisternum to the dorsal surface of mesonotum (Fig. 3).

ML: Diagonal length of the alitrunk in profile. Measured in lateral view from the anteriormost point of anterior pronotal slope to the caudalmost point of the lateral metapleural lobe (Fig. 3).

MW: (SEIFERT) maximum mesosomal width in workers; maximum mesosomal width before the tegulae in gynes.

NOH: (SEIFERT) petiole node height; measured in a right angle from a reference line beginning at the transition point between caudal node profile and caudal petiolar neck and ending at the most dorsal point of node corner (Fig. 1).

PEL: (SEIFERT) petiole length; horizontal distance from the tip of the frontolateral node corner to the caudalmost point of petiole (Fig. 1).

PEW: The maximum width of petiole in dorsal view.

PEH: The maximum height of petiole, measured from the subpetiolar tooth-like process to the top of the petiole (Fig. 2).

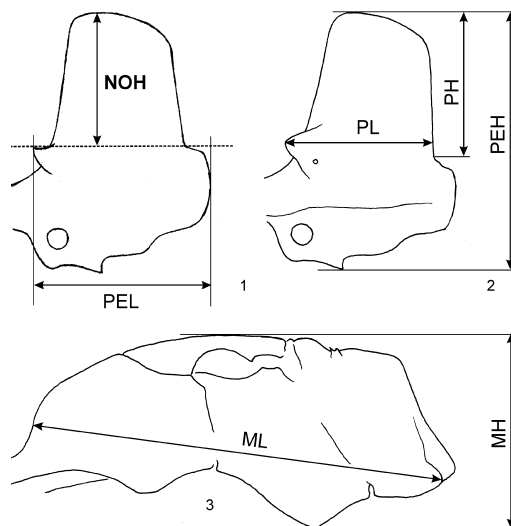
PH: (CSŐSZ) Height of the petiolar node (Fig. 2)

PiMe: Pigmentation score of dorsal mesosoma (SEIFERT) as mean of the three dorsal sclerites. Pigmentation scaling was performed by simultaneous subjective comparison of the microscopic picture with a standard colour table ranging from whitish yellow (score 1) to dark blackish brown (score 12). The specimen was observed with the right eye under use of a Schott KL 1500e cold-light source in position 3 (colour temperature 2200 K) at a magnification of  $\mu 128$ . The standard colour table was illuminated by 60 W desk lamp and was simultaneously observed with the left eye in a distance equal to the microscopic picture distance.

PL: (CSŐSZ) Length of the petiolar node (Fig. 2).

SL: The maximum straight-line scape length excluding the articular condyle.

The terminology of pilosity is similar to the system used by HÖLLDOBLER and WILSON (1990). Adpressed (0–5 $\zeta$ ) hairs run parallel or nearly parallel to the body surface, decumbent hairs stand 10–15 $\zeta$ , subdecumbent hairs 30 $\zeta$ , suberect hairs 35–45 $\zeta$ , and erect hairs more than 45 $\zeta$  from the body surface.



**Figs 1–3.** Morphometric measurements in *Ponera*

**Table 1.** Morphometric measurements of workers of *Ponera testacea* and *P. coarctata*. The length of a string of asterisks is proportional to the discriminative power of a character

	CSŐSZ	SEIFERT		CSŐSZ	SEIFERT
	<i>coarctata</i> (n = 72)	<i>coarctata</i> (n = 74)		<i>testacea</i> (n = 58)	<i>testacea</i> (n = 48)
CS	635±14 [595,662]	638±17 [597,678]	***	576±13 [533,613]	587±14 [547,615]
CL/CW	1.243±0.028 [1.183,1.336]	1.255±0.017 [1.219,1.302]	**	1.279±0.035 [1.242,1.387]	1.278±0.018 [1.239,1.317]
SL/CS	0.790±0.098 [0.751,0.897]	0.811±0.016 [0.773,0.851]		0.788±0.116 [0.782,0.841]	0.811±0.013 [0.787,0.833]
FL/CS	0.251±0.032 [0.226,0.283]	0.246±0.008 [0.231,0.264]		0.238±0.035 [0.217,0.261]	0.246±0.009 [0.231,0.272]
FR/CS	0.115±0.016 [0.100,0.137]	0.116±0.010 [0.095,0.137]	*	0.113±0.018 [0.102,0.139]	0.125±0.010 [0.101,0.147]
ML/CS	1.412±0.173 [1.359,1.627]	1.470±0.027 [1.404,1.521]		1.393±0.205 [1.351,1.496]	1.477±0.039 [1.422,1.564]
PEW/CS	0.472±0.059 [0.448,0.559]	0.481±0.016 [0.443,0.521]		0.492±0.073 [0.483,0.535]	0.498±0.020 [0.452,0.549]
PEH/CS	0.667±0.082 [0.641,0.780]			0.634±0.094 [0.617,0.711]	
PH/CS	0.364±0.045 [0.335,0.441]			0.339±0.050 [0.325,0.369]	
MW/CS		0.662±0.014 [0.634,0.711]			0.658±0.013 [0.628,0.686]
PL/CS	0.339±0.042 [0.322,0.398]			0.357±0.053 [0.335,0.388]	
PEL/CS		0.425±0.013 [0.384,0.459]			0.440±0.012 [0.401,0.460]
FL/FR	2.196±0.022 [1.880,2.540]			2.117±0.020 [1.810,2.420]	
PH/PL	1.073±0.043 [1.000,1.190]	[0.900,1.050]	*	0.950±0.034	
CL/SL	1.384±0.029 [1.310,1.460]	1.394±0.022 [1.330,1.440]			
CSxPH/PL	680±33 [618,776]	[477,598]	***	546±27	
NOH/CS		0.367±0.011	*	0.346±0.013	

			[0.337,0.388]	[0.322,0.370]
PEL/NOH	1.160±0.048	**	1.274±0.053	
		[1.062,1.260]		[1.183,1.422]
ML/MW	2.223±0.063			2.244±0.058
		[2.056,2.346]		[2.146,2.359]
FoDG	19.46±0.94	***	16.38±0.88	
			[17.2,21.8]	[14.7,18.7]
PiMe	8.87±1.27	**	7.00±1.28	
		[5.0,12.0]		[4.0,9.0]

*Ponera coarctata* (LATREILLE, 1802)

(Figs )

*Formica coarctata* LATREILLE, 1802a*Formica contracta* LATREILLE, 1802b [unnecessary replacement name for *coarctata* LATREILLE 1802a]*Ponera coarctata* (LATREILLE, 1802), see LATREILLE (1804)

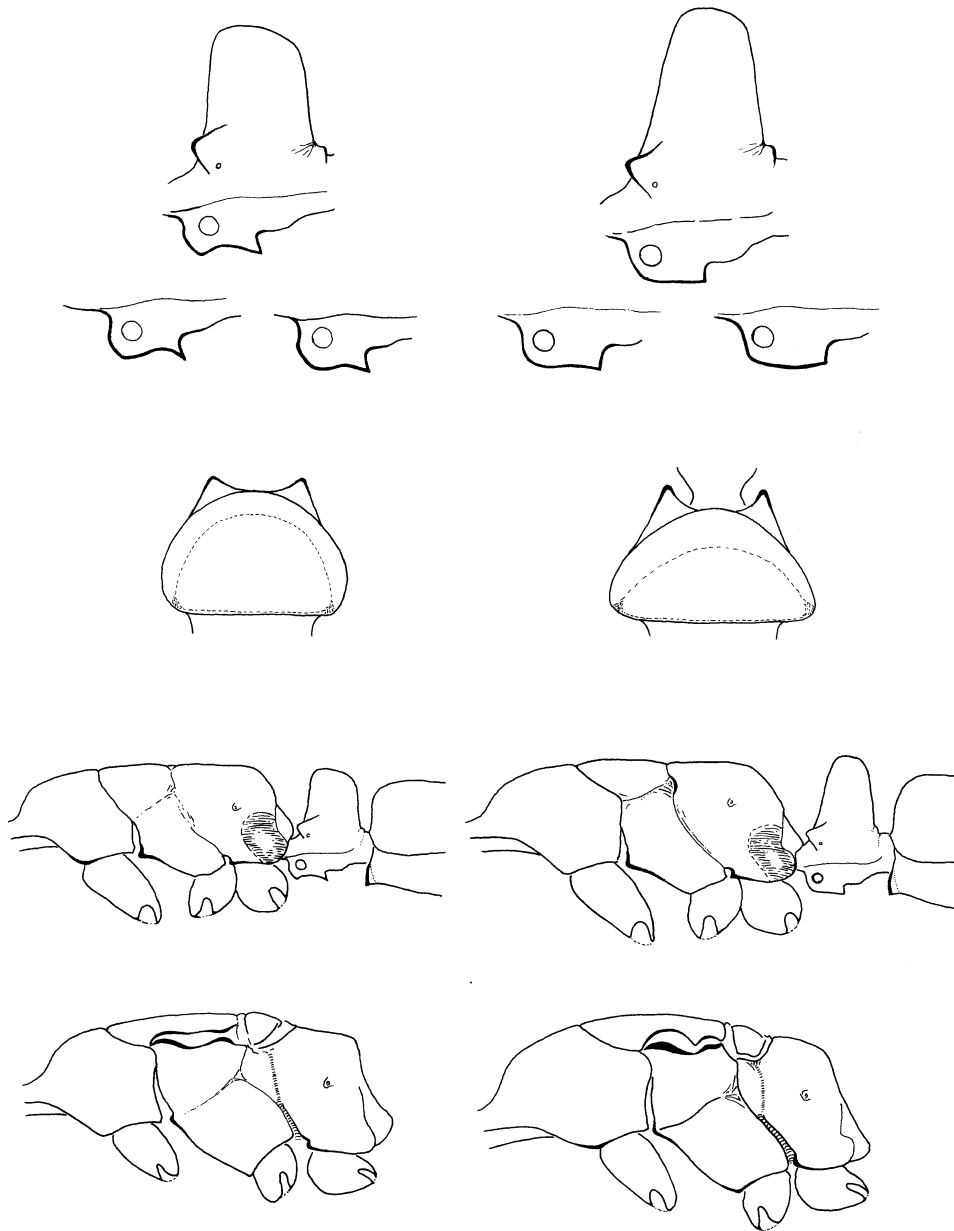
Material studied: Altogether 116 nest samples with 182 workers and 51 gynes were investigated. The localities are given below in alphabetic order.

**Austria** – Albern, Donauauen (Linz 20 km ESE), leg. Scheerpeltz; Bad Vöslau, leg. Mücke 1937.07.30; Bisamberg (E of Wien), leg. Scheerpeltz 1940.05.01; Dornbach, leg. G. Mayr 1862; Kirchberg a. Wechsel, leg. Ganglbauer 1901; Gamino am Kienberg, leg. Rausch 1971.10.09; Granatneusiedl, leg. Schödl 1995.08.13; Hohe Wand, 1947.07.22; Hohe Wand, Stollhof, leg. Schödl 1998.09.10; Krems vic.: Paudorf 0.5 km N, leg. Seifert 1994.05.12.; Loich, Steinfeldberg (28 km SW St. Pölten), leg. Faber 1965.06.05; Mandling, leg. Franz; Purgstall/Niederösterreich, Steinfeldberg, leg. Hüttinger 1971.10.10; Mödling, Kl. Anninger, leg. Schödl 1998.09.10; Purgstall, railway station, leg. Ressler 1972.07.02; Schauboden, leg. Ressler 1972.09.27; Wien, City, leg. Christian 2001.07; Wien vicinity, leg. Mader; Zöbing, Kamptal, leg. Lacroix; **Croatia** – Buccari, 1890.04.02. leg. Bíró; Fiume, 1885.03.31. (No. 718/272). **Germany** – Aschersleben vic.: Nachterstedt 2 km N, leg. Seifert 1988.06.16; Aschersleben vic.: Gatersleben, leg. Seifert 1988.06.16; Augsburg vic.: Kinsau / Lech, leg. U. Heckes 1989.07.01; Benzingerode 1.6 km WNW, leg. Seifert 2002.05.14; Diemberbachtal (Umg. v. Junkersmühle, Bader Weg), 1942.04.14. leg. Schmaus; Dillenburg, Burg, leg. H. Wolf 1956.08.27; Dillenburg, leg. H. Wolf 1946.08.10; Eisleben vic.: Wormsleben, leg. Seifert 1983.05.28; Gerolstein vic.: Schönecken 1.5 km NE, leg. Seifert 1991.09.06; Gotha vic.: Wanderslebener Gleiche, leg. Seifert 1984.09.03; Görlitz vic.: Thiemendorf 0.5 km N, leg. Seifert 1989.06.11; Heimbürg 1.3 km WNW (near Wernigerode), leg. Seifert 2002.05.14; Herborn-Schloss – 2 km SSE, Galgenkopf, 232 m, leg. H. Wolf 1949.06.09; Jena vic.: NSG Leutratal bei Jena, Arrhenateretum, coll. Dunger 1974; Jena vic.: NSG Leutratal bei Jena, Mesobrometum, coll. Dunger 1974; Jena vic.: Reinstädt – 1 km NW, leg. Seifert 1993.07.20; Jena vic.: Wittersroda – 1 km W, leg. Seifert 1993.07.20; Kaiserstuhl: Oberbergen 2 km N, leg. Lamparsky 1990.08, 1991.04; Kaiserstuhl: Oberbergen 2 km N, leg. Seifert 1993.05.01; Kirn/Nahe, Rheinland, 1934.04.15. leg. Schoop; leg. Dauber 1994.07; Kuppenheim near Rastatt, leg. Sonnenburg 1995; Löbau vic.: Löbauer Berg,

Eisenturm 0.2 km S, leg. Seifert 1983.07.13, 1983.08, 1987.07.09, 2002.05.07; Mainz, Oberstadt, Römersteine; Marburg /Lahn, Lollar, leg. H. Wolf 1954.05.; Meissen vic.: Oberau 1.3 km NW, leg. Seifert 1982.07.26, 2002.05.31; Ochsenfurt /Main, leg. C. Trabert 1953.06.11; Pirna, Weesenstein, leg. Bobawetzky 1961.07.25; Rehberg, Rheinland (Kuppe unter Stein), 1968.04.14. leg. Schmaus; Rudolstadt vic.: Schwarza, leg. Sander 1987.09.17; Spice, (? illegible), Sammlung, 1964 F. Rüschkamp; Würzgassen 2 km SW, leg. Sonnenburg 200.06.03; Würzburg 2.5 km N, Dürrbach, leg. Seifert 1991.05.27; Würzburg vic.: Iphofen 2 km N, leg. Seifert 1991.05.29; Würzburg vic.: Lindelbach 1 km N, leg. Seifert.

**Hungary:** Baán, 1881.08.22. (No. 718/278); Badacsony, 1929.08.24. leg. Szabó-Patay; Badacsony, 1929.08.24. leg. Szabó-Patay; Badacsony, 1929.08.24. leg. Szabó-Patay; Badacsony, 1929.08.28.; Beregsz., 1883.10.15.; Debrecen, 1914.09.02. leg. Bíró; Érd, 1935.09.11. leg. Csiki 1; Felsőlövő, 1911.04.03.; Fonyód, leg. Sieber 1988.06.19.; Gyula, 2000.06.20. leg. Csósz; Hu. Baranya megye, 1949.01.31. leg. Dr. Székessy; Hu. Nyírség, Bátorliget, 1948.06.17–28. leg. Kaszab; Hu. Nyírség, Bátorliget, 1948.05.10–15. leg. Kaszab & Székessy; Hungaria, Bátorliget, /marshland/ 1990.10.04. leg. Merkl; Hungaria, Bátorliget, 1989.06. leg. Mahunka (No. HU 2636); Hungaria, Bátorliget, Tölgy-Szil erdő, 1989.04.05. Szalóki; Keő, 1881.09.09; Kölked 1924.05.23. leg. Bokor; Körtvélyes; Mezőkovácsháza, 1886.07.15. leg. Mocs. (No. 388.); Nagyvázsony, Kab-hegy 1924.05.06. leg. Dudich; Nagyvázsony, Kab-hegy, 1924.05.06. leg. Dudich; Nyírség, Bátorliget 1948.06.17–23, leg. Kaszab; Hu. Nyírség, Bátorliget, Ligeterdő 1949.09.28.–10.01. leg. Kaszab; O. sebeshely, 1913.07.03. leg. Bíró; O. Sebeshely, 1913.06.30. leg. Bíró; Orehovica, 1885.06.04.; Pálmakert, 1912.09.19. leg. Horváth; Pálmakert, 1912. leg. Horváth; Pálmakert, leg. Com. Békés; Simontornya, (No. 718/283); Simontornya, 1882.04.08.; Simontornya, 1882.04.08.; Simontornya, Hung. occ. 1912.03–25 leg. Pillich; Simontornya, Hung. occ. 1913.06.18.; Szeged, Úszegedi tiszapart 1936.10.15. leg. Czögler; Szentes, 3/5. **Italy:** Prov. Avellino: Montanella – 4 km S, leg. A. Schulz 1994.05.13.; Segrate, 1971.09.26; Isola Ponza, 1967.01.18; Sardinia: Monte Limbara, 1050 m, 1994.05.03; **Morocco:** Moyen Atlas: Ibel Tazzeke, leg. A. Schulz 1995.05.15. **Romania** – Hermannstadt, house garden, 1924.03.26. leg. A. Müller; Hermannstadt, vicinity, 1930.06.20. leg. A. Müller; Mts. Meszes, Zilah, 1925.01.14. leg. Tréger; N. Károly, 1882.05.25.; S. Regen, Aussischwarte, 1921.07.10. leg. Müller; T. szarvad 1882.12.12.; Tasnád Szarvad (No. 718/274); Zlatica (Krassó-Szörény Com.) 1886.06.07.; Zlatica, 1886.06.07. **Slovakia** – Kormos, 1881.09.12. (No. 718/279). **Spain** – Sant Llorenç de Morunys, Lleida, Spain, 1984.06.06. leg. Espadaler. **Switzerland** – Bern: Neuenstadt, coll. P. Louis 1948.07.27; Valais: Pfynwald, leg. F. Schmid 1972.; Enge, 1880.04.12.; Neuenstadt, Kanton Bern, 1948.07.27.; Valais: Pfynwald, leg. F. Schmid 1972. **Tunisia:** Ain Draham 15.3 km S, leg. Schulz 1995.10.07; **Unknown locality:** 1948.10.15. leg. V. H. Kolt.

*Worker* (Figs 5, 7 & 9, Table 1) – Average body length 3.0–3.5 mm. Colour darker; brown to dark brown, somewhat brownish black. Mandibles triangular, with 3 apical teeth at the tip of the masticatory border, followed by a regular series of 9–14 minute denticles. Clypeus slightly produced anteriorly, with a rather distinctly raised longitudinal carina. Whole body covered with thick decumbent hairs. Head strongly punctured, the frontal furrow generally reaches the middle part of head. Eyes small, with 1–5 minute facets. Scape with subdecumbent and suberect hairs. Tibiae with decumbent, or subdecumbent hairs. Alitrunk relatively higher than in *testacea*. Mesonotal furrow between the mesonotum and anepisternum well developed. Petiole higher and more scale-like than in *testacea*, the anterior and posterior profiles running subparallel. The subpetiolar tooth-like process small but distinct, frequently not forming a well-developed triangular projection down- and backward; subpetiolar fenestra small. First gaster tergite with dense hairs. Average distance of the fine cuticular points on the first gaster tergite 19.4  $\mu\text{m}$  [17.2–21.8  $\mu\text{m}$ ]. Overall pigmentation in mature



**Figs 4–11.** 4–5 = Lateral aspect of the petiole: 4 = *Ponera testacea*, 5 = *P. coarctata*; 6–7 = petiole feature of the worker from above: 6 = *P. testacea*, 7 = *P. coarctata*; 8–9 = Lateral aspect of the worker mesosoma and petiole: 8 = *P. testacea*, 9 = *P. coarctata*; 10–11 = Lateral aspect of the gynecal mesosoma: 10 = *P. testacea*, 11 = *P. coarctata*

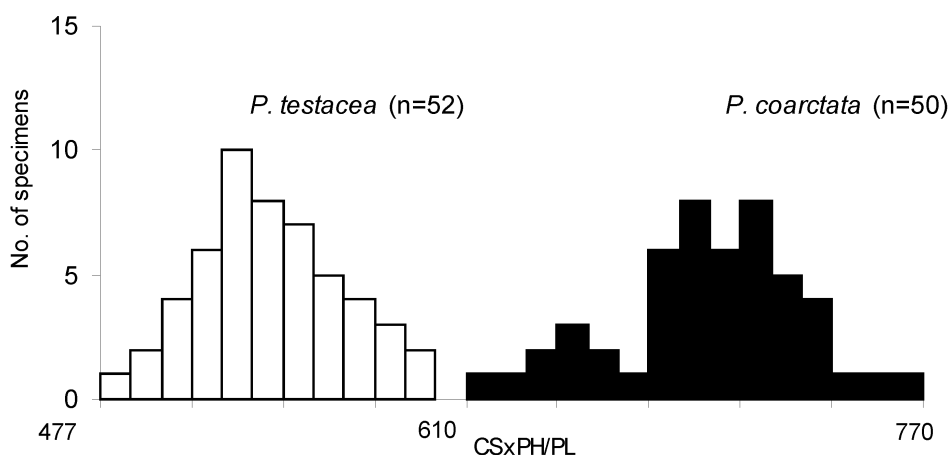
specimens significantly darker than in *testacea*. Whole nest populations with all individuals light brown are unknown. For morphometric measurements of altogether 146 workers see Table 1.

*Gyne* (Fig. 11) – Similar to the worker. Average body length over 3.5 mm. Colour darker, brown to dark brown somewhat black. Whole body with thick decumbent hairs. Scape with subdecumbent and suberect hairs. Tibiae with decumbent hairs. Metanotal furrow between the katapisternum and anepisternum well-developed and always visible. Petiole high and scale-like in profile. The subpetiolar tooth-like process frequently not forming a well-developed caudoventral triangular projection. First gaster tergite with dense hairs, similar to the worker.

Morphometric measurements of 19 gynes (SEIFERT): CS  $714 \pm 27$  [662,752], FoDG  $19.57 \pm 0.77$  [18.3,20.8], PEL/NOH  $1.100 \pm 0.047$  [1.021,1.196], PiMe  $9.71 \pm 1.04$  [8.0,12.0], CL/CW  $1.214 \pm 0.019$  [1.179,1.248], SL/CS  $0.817 \pm 0.008$  [0.802,0.830], ML/CS  $1.661 \pm 0.030$  [1.589,1.706], MW/CS  $0.767 \pm 0.019$  [0.734,0.798], PEW/CS  $0.525 \pm 0.022$  [0.478,0.559], PEL/CS  $0.431 \pm 0.013$  [0.410,0.457], NOH/CS  $0.392 \pm 0.017$  [0.355,0.426].

Morphometric measurements of 11 gynes (Csósz): CL  $769 \pm 17$  [745,790], CW  $635 \pm 12$  [620,650], CS  $702 \pm 14$  [685,720], FR/CS  $0.117 \pm 0.006$  [0.1,0.125], FL/CS  $0.245 \pm 0.01$  [0.226,0.260], SL/CS  $0.793 \pm 0.016$  [0.825,0.778], ML/CS  $1.588 \pm 0.037$  [1.533,1.632], MH/CS  $0.80 \pm 0.038$  [0.758,0.858], PEH/CS  $0.724 \pm 0.018$  [0.702,0.759], PH/CS  $0.397 \pm 0.016$  [0.379,0.421], PL/CS  $0.353 \pm 0.016$  [0.323,0.365], PEW/CS  $0.534 \pm 0.016$  [0.518,0.557], CL/CW  $1,210 \pm 0.0218$  [1.188,1.242], FL/FR  $2.075 \pm 0.114$  [1.938,2.205], PH/PL  $1.143 \pm 0.042$  [1.10,1.196], ML/MH  $1.972 \pm 0.051$  [1.902,2.018], CL/SL  $1.383 \pm 0.254$  [1.355,1.411],

*Male* – Average body length over 3.00 mm. Colour always black. Whole body with numerous thick decumbent hairs. Head with dense long hairs. Eyes with long hairs among the facetes. Alitrunk more robust in profile view than in its sibling species.



**Fig 12.** Values of the index  $CS \times PH / PL$  show no overlap between species based on altogether 139 workers



*Ponera testacea* EMERY, 1895 **stat. n.**  
(Figs )

*P. coarctata* var. *testacea* EMERY, 1895 Memoria letta alla R. Accademia delle Science dell' Instituto di Bologna (5) v. 5 p. 294.

Lectotype (worker) by present designation: Bonifacio, leg. REVEL 1872, deposited in the "EMERY collection", MCSN Genova (Italy). Its measurements: CL 655; CW 495; FR 65; FL 140; SL 460; ML 840; PEH 360; PEW 300. Para-lectotypes (3 workers) deposited in "Forel collection", Muséum d'Histoire Naturelle (Genève, Switzerland). One specimen Rapallo / Liguria / Mai 1891 / Flach and two other specimens (at one pin) labelled by EMERY "Gallia merid." and with a blue label "Cotypus".

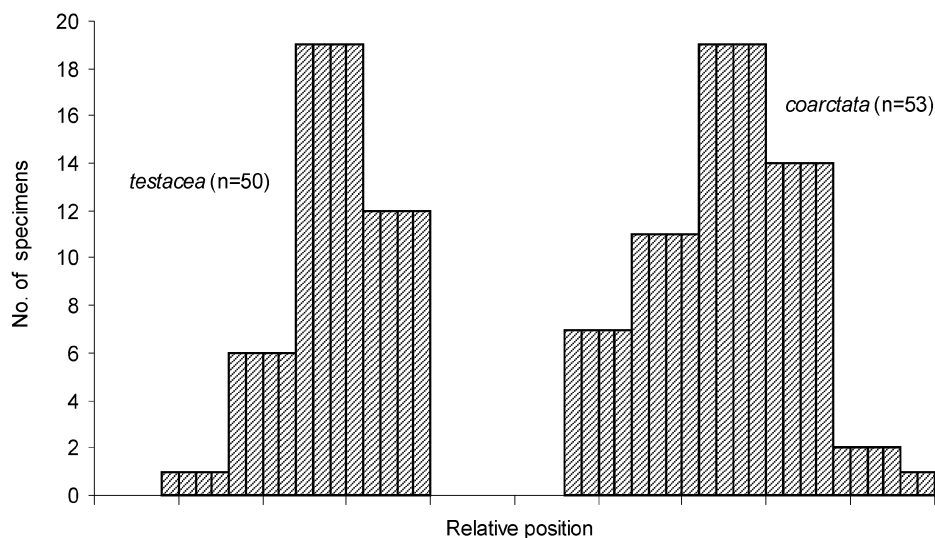
Material studied – Altogether 59 nest samples with 147 workers and 31 gynes were investigated. The localities are given below in alphabetical order.

**Austria** – Gainfahn, leg. G. Mayr 19th century; Kirchberg a. Wechsel, leg. Ganglbauer 1901; Klosterneuburg, leg. Hummler appr. 1860; Loich, Steinfeldberg (28 km SW St. Pölten), leg. Faber 1965.06.05; Oberndorf, leg. Rausch 1970.07.31; Pernitz (37 km SW of Vienna), leg. Franz; **Bulgaria** – Melnik, Valley of the Melnik River, leg. Seifert 1982.08.30 and 1982.09.01; Melnik 2 km N, leg. Seifert 1982.08.31; Melnik: Rozen 8 km N, 1400 m, leg. Seifert 1982.09.01. **Corsica** – Bonifacio, 1872, leg: Revel 1 lectotype worker. **Croatia** – Buccari, 1927.04.21.; Gospic, 1918.08. leg. Bíró; Krivoriđe, Dalmatie, 1927. leg. Fodor; Sucurac, Dalmazia, (No. 55/2) leg. Novák; Zelenika, leg. Gerger; Zengg; Dalmatien, Castelnuovo, leg. Reiter; **France** – Gallia merid. with a blue label "Cotypus" 2 paralectotype workers. **Germany** – Bad Kreuznach 4 km SSW: Münster am Stein, leg. Rüschkamp 1929.09.18; Eisleben vic.: Wormsleben, leg. Seifert 1983.05.28; Friedrichsau near Aschersleben, leg. Seifert 2002.05.13; Herborn, Schloss 2 km SSE, Galgenkopf, 232 m, leg. Wolf 1949.06.09; Jena vic.: NSG Leutratal, Mesobrometum, coll. Dunger 1974; Jena vic.: NSG Leutratal, Arrhenateretum, coll. Dunger 1974; Kaiserstuhl: Oberbergen 2 km N, leg. Lamparsky 1990.08; Kyffhäuser: Steinhaleben 1 km SSE, leg. Seifert 1987.05.25; Kyffhäuser: Bad Frankenhausen 1 km NW leg. Seifert 1987.05.26; Mainz-Gonsenheim, leg. Dauber 1994.07.; Marburg /Lahn, Weimar'scher Kopf, leg. Wolf 1949.04.29; Marburg /Lahn, leg. Wolf 1951.09.08; Meissen vic.: Niedermuschütz 2 km NE, leg. Seifert 1982.07.29; Münster a. S. (hill top under stone), 1929.09.18. leg. F. Rüschkamp; Sangerhausen vic.: Ichstedt–NW, leg. Weipert 1998.07.08. Dillenburg, leg. Wolf 1946.08.10. **Hungary** – Bp. Sashegy, (Cribnope), 1886.03.28.; Budapest, 1914. leg. Horváth; Farkasd, 1901.10.08. (No. 718/280); Füle, 1933.05.16. Úhelyi; Pálmátér, Com. Békés; Hu. Com. Bors. Nagysalló, 1923.08.24. leg. Dudich; Keő, 1881.09.09. (No. 1.) leg. André 1885; Kun. szt. Miklós, 1928.08. Újhelyi; Pálmakert, 1912.09.19. leg. Horváth; Pusztapoó, 1929.02.11. leg. Vársárhelyi; Pusztapoó, 1929.02.11. leg. Vársárhelyi; Rimaszombat 1909.07.10. leg. Szabó; Sátoraljaújlak, 1882.10.03. (No. 718/275); Szigetszentmiklós, 1909.05.15. leg. Bíró; Szigetszentmiklós, 1912.10.12. leg. Bíró; Szigetszentmiklós, 1912.10.16. leg. Bíró; Szigetszentmiklós, 1912.10.19. leg. Bíró; Szöd, 1920.05.15. leg. Bíró; Újhely (No. 718/276); Valkó, 1903.09.13. leg. Bíró; Veszprém, 1881.09.20. (No. 718/281); Villány, leg. Sieber 1982.05; **Italy** – Rapallo (Liguria) V. 1891, leg Flach; Portomzurizio, 1914.11. leg. A. Andreini. **Romania** – Déva, leg. Mallász; Hermannstadt vicinity, 1948.05.20. leg. Dr. Worell; Kolozsvár, 1882.10.18. (No. 718/277). **Serbia** – Bacaka. **Spain** – Montnegre, Barcelona, 1998.09.17. leg. Espadaler. **Switzerland** – Pfynwald, Sion 1 km S leg. Seifert 1990.07.14.; Veyrier GE, 11.12.

*Worker* (Figs 4, 6, 8, Table 1) – Average body length 2.5–3.0 mm. Colour light ochraceous yellow to brownish yellow. Whole body covered with thick decumbent hairs. Mandibles triangular, with 3 apical teeth at the tip of the masticatory border, followed by a regular series of 9–14 minute denticles. Clypeus produced anteriorly, with a rather distinctly raised longitudinal carina. Eyes very small, or invisible, with 0–3 minute facets. Scape with subdecumbent and suberect hairs. Tibiae frequently with short, decumbent hairs only. Alitrunk relatively lower than in *coarctata*. Furrow between the mesonotum and anepisternum often missing, or hardly visible. Petiole low and stubby in profile with the anterior and posterior surface running almost parallel. Dorsal surface of petiole large and flat viewed from above, forming more approaching to a half circle than in *coarctata*. The subpetiolar tooth-like process of petiole forms a well-visible caudoventral triangular projection. Subpetiolar fenestra slightly larger than in *coarctata*. First gaster tergite with very dense hairs. Average distance of the fine cuticular foveolae on first gaster tergite 16.4 (14.7–18.7)  $\mu\text{m}$ . For morphometric measurements of altogether 106 workers see Table 1.

*Gyne* (Fig. 10) – Similar to the worker. Average body length 3.0 mm. Colour light ochraceous yellow to brownish yellow. Whole body with thick decumbent hairs. The frontal furrow clearly reaches the anteriormost ocellus. Scape with subdecumbent and suberect hairs. Tibiae with exuberant short, decumbent hairs only. Alitrunk relatively lower than in *coarctata*. Metanotal furrow between the katapisternum and anepisternum not so deep, hardly visible, or sometimes missing. Petiole low and stubby in profile, the anterior and posterior surface running almost parallel in profile. The subpetiolar tooth-like process of petiole often forms a well-visible triangular caudoventral projection. First gaster tergite with very dense hairs, similar to the worker.

Morphometric measurements of 9 gynes (SEIFERT): CS  $671 \pm 12$  [650,690], FoDG  $16.36 \pm 1.03$  [14.9,17.8], PEL/NOH  $1.238 \pm 0.063$  [1.130,1.342], PiMe  $8.26 \pm 1.10$  [7.3,10.0], CL/CW  $1.234 \pm 0.023$  [1.190,1.255], SL/CS  $0.811 \pm 0.011$  [0.797,0.828], ML/CS  $1.663 \pm 0.023$  [1.635,1.703], MW/CS



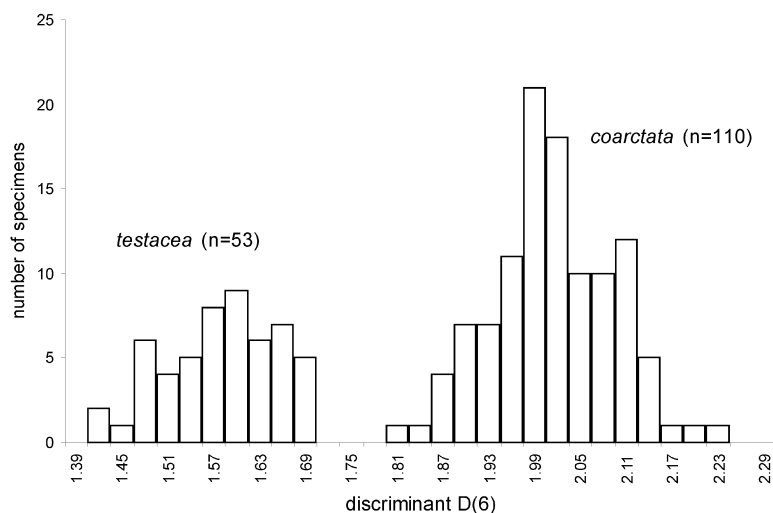
**Fig. 13.** Multivariate discriminant analysis of 103 worker individuals of *Ponera coarctata* and *P. testacea* as combined histogram for all groups. Distribution of the sample along the canonical root. Number of variables in the model: 9, Wilks' Lambda: 0.10839,  $F(9, 82) = 74.945$ ,  $P < 0.0001$

0.761±0.025 [0.735,0.811], PEW/CS 0.532±0.020 [0.513,0.571], PEL/CS 0.441±0.014 [0.411, 0.457], NOH/CS 0.357±0.017 [0.330,0.392].

Morphometric measurements of 16 gynes (Csósz): CL 725±14 [710,750], CW 588±13 [570,610], CS 656±13 [640,680], FR 76±5 [68,80], FL 160±7 [150,168], SL 530±12 [515,550], ML 1066±25 [1040,1110], MH 499±25 [480,550], PEH 442±15 [420,460], PH 240±11 [225,260], PL 240±10 [230,260], PEW 0.525±0.017 [0.50,0.566], CL/CW 1,233±0.0154 [1.210,1.256], FL/FR 2.113±0.928 [1.938,2.206], PH/PL 1.004±0.515 [0.923,1.061], ML/MH 1.972±0.051 [1.902,2.018], CL/SL 1.368±0.332 [1.324,1.413]

*Male* – Average body length smaller than 3.00 mm. Colour always black. Whole body with thick decumbent hairs. Head with sparse shorter hairs. Eyes with long hairs among the facets. Alitrunk less robust in profile view than in *coarctata*.

Differential diagnosis and comments – In the workers, *P. testacea* differs from *coarctata* by a number of metric characters (Table 1). These are smaller absolute size, lower distance of small foveolae on dorsum of first gaster tergite, a lower height vs length ratio of petiole node, a lower average pigmentation score, a lower height vs. length ratio of petiole, and a wider frons ratio (FR/CS). These differences are repeated in the gynes. Both a multivariate discriminant analysis with 9 characters and 107 individuals (CSÓSZ) and a multiple discriminant function with 7 characters and 126 individuals (SEIFERT) resulted in perfect separation of the two species (Figs 13, 14). A simplified discrimination for the practical use is provided by a multiplicative index  $CS \times PH/PL$  (Fig. 12) that is  $546 \pm 27$  [477–598] in *testacea* and  $679 \pm 33$  [618–776] in *coarctata*. Preliminary attempts to find reliable mor-



**Fig. 14.** Multiple linear discriminant score  $D(7) = 0.068 \text{ FoDG} + 0.002 \text{ CS} - 0.43 \text{ PEL/NOH} + 0.02 \text{ PiMe} - 0.13 \text{ CL/CW} - 0.2 \text{ FR/CS} - 0.10 \text{ PEW/CS}$ . for 126 individual workers of *Ponera coarctata* and *testacea*

phological discriminators of males, including genitalia characters, were not successful.

*Designation of the lectotype* – EMERY's original material of *Ponera* was found to contain no specimens with any type labelling as it had been stated by TAYLOR. Altogether 15 specimens were received from the Museo Civico di Storia Naturale, Genova and one specimen was fixed by present designation as lectotype of *Ponera coarctata* var. *testacea* EMERY, 1895. The lectotype had been collected in Bonifacio by REVEL in 1876. Bonifacio is a small village at the S coast of Corsica. The specimen is in agreement with the type localities and descriptive statements given by EMERY who stated "...Francia meridionale, la Liguria, Corsica, e la Spagna... colore testaceo uniforme, o talvolta piu o meno bruno sul dorso...". Other specimens that could belong to the original material of EMERY were not available from the Museo Civico. EMERY repeatedly sent ant material to FOREL and three specimens within the Forel collection in Muséum d'Histoire Naturelle, Genève are considered by us as belonging to the original series. One specimen, collected by FLACH at Rapallo (Liguria) in May 1891, and two other specimens (at one pin) labelled by EMERY "Gallia merid." and with a blue label "Cotypus" made by FOREL were designated as paralectotypes during the course of this study.

*Distribution and biology* – EMERY (1895, 1909) roughly stated the occurrence of *testacea* in the Mediterranean region (S France, entire Italy, Corsica, and Spain). Our examinations revealed that it is widely distributed in C Europe and spreads north to 51°30'N at least (Eisleben, Germany). According to the data base of SEIFERT, 122 sites with *Ponera* are known from Germany, stretching north to 52°05'N (Niedersachsen). Since the possible occurrence of the sibling species has not been recognised earlier, voucher specimens were available for only 34 sites. *P. testacea* was found in 16 and *coarctata* in 24 localities with syntopic occurrence of both species in as many as 6 sites. *P. testacea* is in Germany typical for open and very xerothermous grasslands on limestone, silicate rock, or sand. It has so far not been found in xerothermous woodland with higher humidity and seems to be rare in urban habitats. *P. coarctata* is found in any of these habitat types, on the average it is less xerothermophilic and is expected to spread farther north.

In Hungary, *coarctata* is widely distributed and frequently found in loess grasslands as well as deep in forests, and occurs mainly in less xerothermous habitats. *P. testacea* often had been collected in warm and dry habitats like sandy grasslands and dry rocky calcareous grasslands, altogether 20 localities are known with *testacea* and with only one syntopic occurrence of both species.

The situation in other countries is almost unknown. The few data of *testacea* from Switzerland, and Romania do not indicate rarity, since voucher specimens for *coarctata* are similarly sparse.

As result of the species splitting and the most difficult discrimination of *coarctata* and *testacea*, a post hoc interpretation of literature data is almost impossible and the natural history of both species must be written anew. However, the most detailed studies on the biology of Central European *Ponera* (LIEBIG *et al.* 1995, 1997) can be exclusively referred to *Ponera coarctata* as our recent investigation of LIEBIG's voucher specimens showed.

\*

*Acknowledgements* – We wish to thank the following curators of entomological collections for providing loans of ant specimens: VALTER RAINERI (Museo Civico di Storia Naturale, Genova), STEFAN SCHÖDL (Naturhistorisches Museum, Wien), BERNHARD MERZ (Muséum d'Histoire Naturelle, Genève), HANNES BAUR (Naturhistorisches Museum, Bern), KARL-HEINZ LAMPE (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn), MARIANA PASCU (Muzeul Brukenthal Sectia de Istoria Naturii, Sibiu). Furthermore we are grateful to LÁSZLÓ GALLÉ (Szeged, Hungary), HEINRICH WOLF (Plettenberg, Germany) and XAVIER ESPADALER (Barcelona, Spain) for giving valuable suggestions to this study and lending or donating material from their private collections.

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Revised version received September 12, 2003, accepted October 22, 2003, published November 30, 2003