A new funnel-web spider species (Araneae: Agelenidae, *Tegenaria*) from Mercantour National Park, France

Angelo Bolzern
Naturhistorisches Museum Basel, Abteilung Biowissenschaften, Augustinergasse 2, CH-4001 Basel; and
Department of Environmental Sciences, Section of Conservation Biology, University of Basel, St. Johanns-Vorstadt 10, CH-4056 Basel, Switzerland
e-mail: angelo.bolzern@arachnodet.com

and

Christophe Hervé
Muséum national d'Histoire naturelle, Département Systématique et Evolution, Unité Origine, Structure et Évolution de la Biodiversité (UMR 7205), Section Arthropodes terrestres, CP 53, 57 rue Cuvier, 75231 Paris CEDEX 05, France
e-mail: phil@mnhn.fr

Summary

During a survey of the spider fauna of the Mercantour National Park in the French Alps, several interesting and new taxa were found. One of these new taxa, *Tegenaria mercanturensis* n. sp. (Agelenidae) is described here. The new species shows distinct morphological characters which allow easy separation from all other *Tegenaria* or *Malthonica* species. The most important characters in males are the short, truncated embolus (a character shared with *T. domestica,* the type species of *Tegenaria*, and *T. mirifica*), the broad, curved hammerhead-shaped conductor and the RTA. Distinct characters in females are the atrium with wide spiral copulatory openings anterior to an anchor-shaped sclerotised ground plate, the strongly sclerotised and irregularly formed "shield" around the tubular-shaped spermathecae, and the conspicuous anterolateral lentiform areas of the spermathecae, covered only by membrane.

Introduction

The Mercantour National Park (MNP) is one of seven National Parks in France and was designated in 1979. The Park is situated in the most south-western part of the Alps along the Italian border (Map 1). The core area of the Park occupies 68,500 ha, mainly from 1,600 to 2,800 m a.s.l., entirely protected under a "Natura 2000" directive. This area is surrounded by a peripheral zone of about 146,300 ha from 490 to over 3,000 m a.s.l., not covered by specific legislation. Owing to its location, the Park is under Provencal, Alpine, Ligurian and Mediterranean climatic influences, providing a great variety of habitats. The Park is also characterised by the presence of over 200 lakes, as a result of the quaternary glaciation history of this part of the Alps. All these characteristics provide an exceptional biodiversity for plants and invertebrate fauna, including a large number of endemic species. While the flora and fauna of the MNP have been the subject of considerable taxonomic interest in several groups, until now no exhaustive work has been specifically devoted to spiders. Indeed, since the "*Arachnides de France*" of Simon (1937), only two works have provided some taxonomic information about spiders of this area. The first concerned a small annotated list of about 11 species collected at the "Col de la Cayolle" (Berland, 1935). The second was a taxonomic work about some interesting species, including endemics, occurring in this part of the Alps (Maurer & Thaler, 1988).

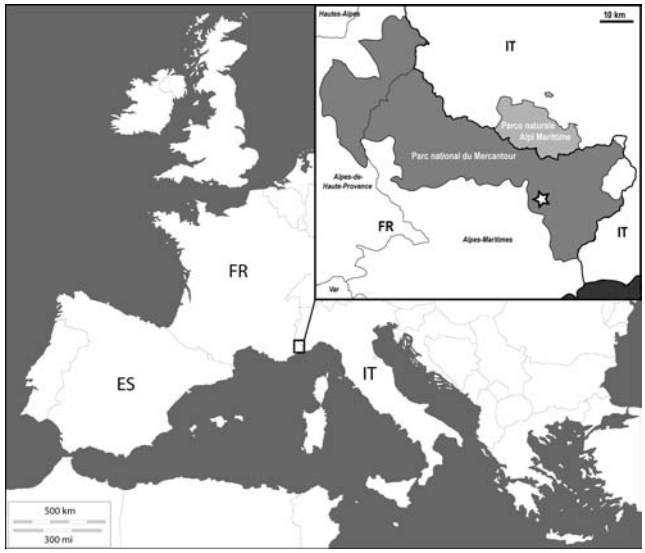
During a taxonomic survey between the years 2004 and 2006, C. Hervé and collaborators identified more than 300 spider species. As expected, several problematic taxonomic groups were encountered within this collection. For example, two species of Gnaphosidae had to be newly described: *Drassodes thaleri* Hervé (Hervé & Rollard, 2009) and *Drassodex simoni* (Hervé, Roberts & Murphy, 2009). Here, we describe another new species from the MNP, belonging to the family Agelenidae.

Material and methods

The specimens described here are deposited in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN) and the Naturhistorisches Museum Basel (NMB). The newly collected specimens (in 2005) were caught by hand and transferred to 70% ethanol by C. Hervé.

Drawings were made using a Leica stereomicroscope MZ12 (up to 110× magnification) with a drawing tube. Measurements were taken from digital pictures made with a Leica DFC320 camera and calculated with the programme ImageJ 1.38× (freeware available on the internet at URL: http://rsb.info.nih.gov/ij/). All measurements are given in mm. The photographs were taken with the same camera and processed with Adobe Photoshop CS3. For clearing the vulva, the removed epigynum was placed in clove oil for several minutes. The descriptions of the palpal bulb are given from a ventral view. The spines on the male palp are not illustrated as they are of minor taxonomic significance.

Abbreviations used: AER=anterior eye row; ALE=anterior lateral eyes; AME=anterior median eyes;



Map 1: Outline map showing location of the Mercantour National Park in southeastern France. The star indicates the locus typicus of *Tegenaria mercanturensis* n. sp. Digital map of Europe provided by http://histgeo.ac-aix-marseille.fr.

ALS=anterior lateral spinnerets; AT=atrium of epigynum; C=conductor; CD=copulatory duct; CO=copulatory opening; FD=fertilisation duct; MA=median apophysis; PMS=posterior median spinnerets; PA=patellar apophysis; PER=posterior eye row; PLA=posterior lateral eyes; PME=posterior median eyes; PLS=posterior lateral spinnerets; RTA=retrolateral tibial apophysis (used here as the sum of all structures in retrolateral position on the male palp); ST=spermathecae.

Taxonomy

Family AGELENIDAE C. L. Koch, 1837
Genus *TEGENARIA* Latreille, 1804

Type species: *Tegenaria domestica* (Clerck, 1757), sub *Araneus domesticus*.

Remarks: *Tegenaria* Latreille represents a species-rich genus of agelenid spiders. It is predominantly Palaearctic in distribution. Currently 102 *Tegenaria* species are listed in the catalogue of Platnick (2009).The genus is notorious for its taxonomic problems: (1) lack of good diagnoses of the genus; (2) confusion with the closely related genus *Malthonica* Simon; (3) information available only for one sex in many species; and (4) unknown internal phylogenetic relationships. To some extent, these problems have been discussed in recent papers (Barrientos & Cardoso, 2007; Bolzern *et al*., 2008, 2009; Guseinov *et al*., 2005; Levy, 1996) and will be further investigated by the PhD thesis of the first author. After the examination of agelenids, in particular of the genus *Tegenaria*, in the collections of Simon and Dresco (MNHN), Roewer (Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main), Brignoli (Museo Civico di Storia Naturale, Verona) and various other collections (natural history museums of Basel, Bergamo, Bern, Geneva and Vienna), the present specimens have to be considered as a new species. The generic affiliation of the new species is based on the original description of the genus by Latreille (1804) and that provided earlier by Walckenaer (1802). Additionally, several important works have been checked for the group affiliation of the new species (e.g. Brignoli, 1971; Lehtinen, 1967; Maurer, 1992a, b; Simon, 1937). Since the grouping of the *Tegenaria-Malthonica* complex is not based on a widely accepted phylogeny, a revision of this complex could result in a revised placement of the new species.

Tegenaria mercanturensis sp. n. (Figs. 1–11)

Types: Holotype ♂, 2♀ paratypes, 6 juv. (holotype MNHN, AR 14603, 1♀ paratype and all juv. MNHN, AR 14604, 1♀ paratype NMB), France, Mercantour National Park, Alpes-Maritimes, La Bollène-Vésubie, Malagratta (44°00′02″N, 7°22′16″E, 1030 m), leg. C. Hervé, 27 September 2005.

Other material examined: 1♀ (MNHN, AR 14605, Dalmas collection V333; sub *T. pagana*), France, Alpes-Maritimes, Menton, leg. R. Dalmas, 22 May 1915.

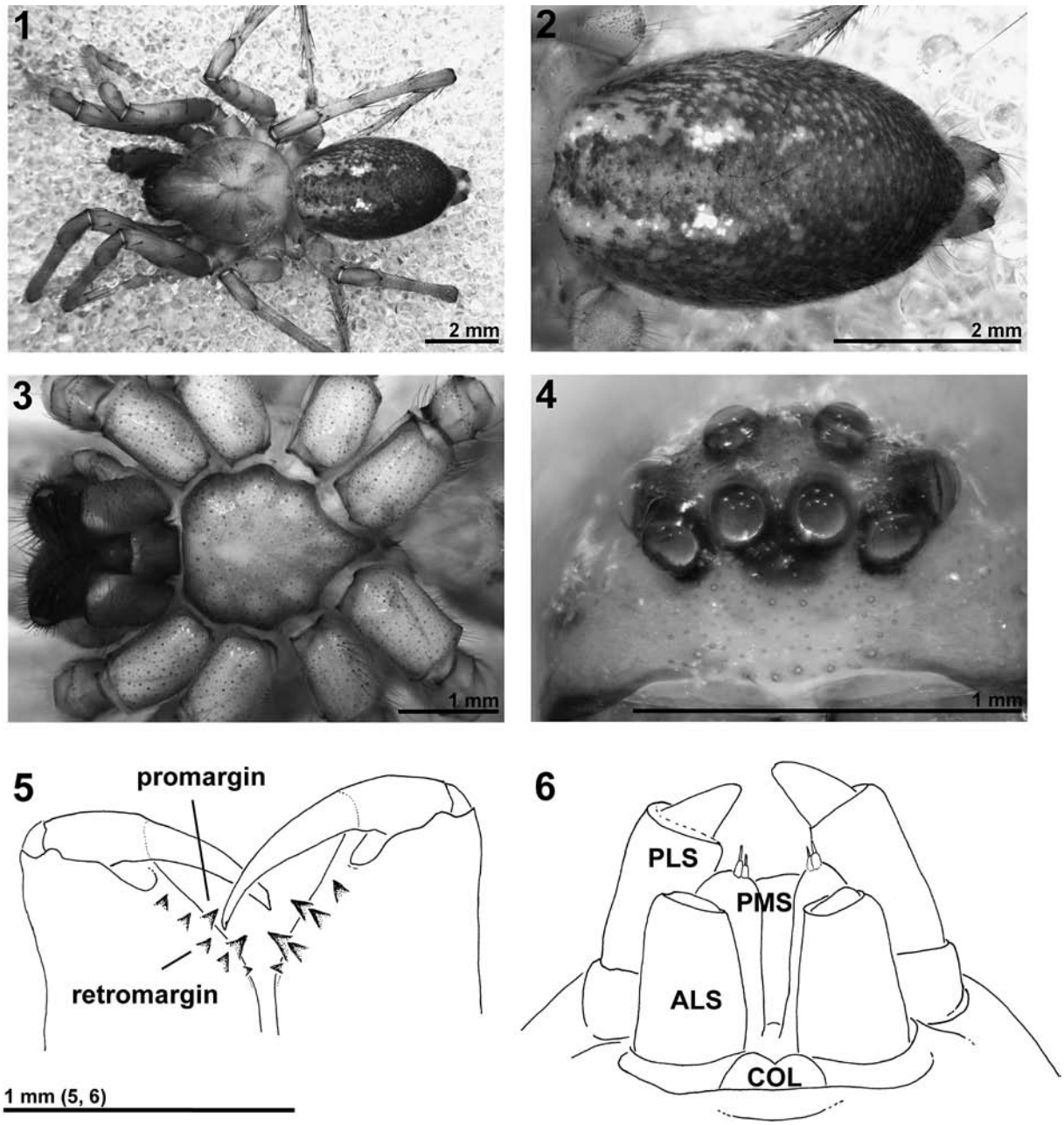
Etymology: The specific epithet is derived from "Mercantour", the name of the National Park where the type specimens of the new species were found.

Diagnosis: The short, truncated embolus, the broad, curved hammerhead-shaped conductor and the RTA are the characters most useful for delimiting *T. mercanturensis* n. sp. from all other *Tegenaria* and *Malthonica* species (Figs. 7–8). The epigynum and vulva of *T. mercanturensis* (Figs. 9–10) are very distinct and not confusable with any other known *Tegenaria* or *Malthonica* species. Particularly remarkable is the irregularly sclerotised and anchor-shaped groundplate of the atrium, anteriorly with wide spiral copulatory openings (Fig. 9). Additionally, the strongly sclerotised and irregularly formed "shield" around the tubular-shaped spermathecae is very distinct (Figs. 10–11); these plates also show conspicuous anterolateral lentiform areas, covered only by membrane.

After Simon (1937), *T. mercanturensis* n. sp. would most likely belong to the *ferruginea*-group. Owing to several characteristics, in particular the female genitalia (Figs. 9–10), the new species cannot strictly be assigned to one group only. The similarly alpine-endemic species *T. mirifica* Thaler, 1987 is morphologically related to the new species. The male of *T. mercanturensis* can be differentiated from *T. mirifica* by the overall form and proximal end of the conductor, the shorter median apophysis, the clearly differently shaped and more pronounced RTA, as well as the length of the palpal tibia being much shorter than the cymbium (Figs. 7–8, cf. Thaler, 1987: 392, figs. 1–5). Additionally, the specimens of *T. mercanturensis* are larger than those of *T. mirifica* and the colour patterns of the sternum and opisthosoma are different (for *T. mirifica* see Bolzern, 2007: 26, figs. 2a–b). The RTA of *T. mercanturensis* also shows affinities to species from Corsica and Sardinia (*T. femoralis* Simon, 1873, *T. henroti* Dresco, 1956 and *Malthonica eleonorae* (Brignoli, 1971)) or some species of the *campestris*-complex (Bolzern *et al*., 2008; Brignoli, 1974; Dresco, 1956; Kraus, 1955; Simon, 1873; Wunderlich, 1995). However, none of these species has a short, truncated embolus as present in the male of the new species. Only *T. domestica*, *T. mirifica* and some species from Eastern Europe and Asia (*T. longimana* Simon, 1898, *T. percuriosa* Brignoli, 1978, *T. vignai* Brignoli, 1978, *T. angustipalpis* Levy, 1996 and *T. halidi* Guseinov *et al*., 2005) have a similarly short embolus comparable with that of *T. mercanturensis*, but they differ in the shape of the conductor (somewhat reduced in the Asian species, not broad, curved hammerhead-shaped in *T. domestica* and *T. mirifica*).

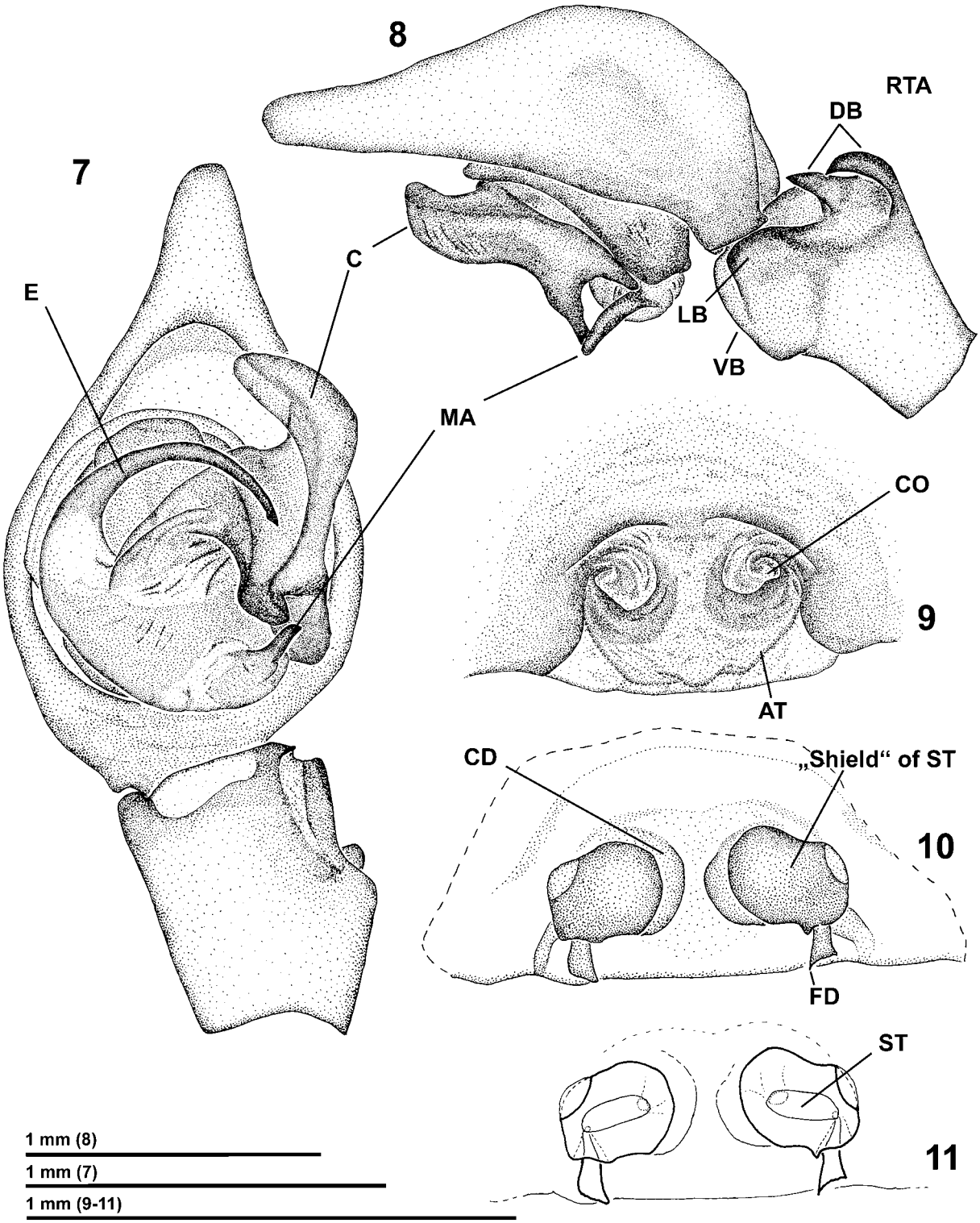
Description: *Cephalothorax*: Male (holotype): 4.31 long, 3.17 wide; head-region 1.58 wide; PER 0.99 wide. Female (paratypes, $n=2$): 3.28–3.95 long, 2.22–3.02 wide; head-region 1.14–1.59 wide; PER 0.79–0.95 wide. Plumose hairs present on carapace. Border of carapace not darkened, dorsally with two longitudinal darkened bands, reduced to triangular dots, continuing to head-region as symmetrical darkened stripes (Fig. 1). *Eyes and clypeus*: Dorsal view: AER recurved, PER straight. Frontal view: both rows slightly procurved (Fig. 4).

Measurements and ratios of holotype and paratypes: PME 0.15–0.17, PLE 0.15–0.21, AME 0.12–0.16, ALE 0.15–0.18; PME–PME, PME–AME and PME–PLE = diameter of PME; PME–ALE = 1.5 × diameter of PME or slightly less; AME–AME *c*. 0.5 × diameter of AME; AME–ALE <0.5 × diameter of AME. Clypeus height (measured under AME) 2–2.5 × diameter of AME; clypeus height (measured under ALE) 1–1.5 × diameter of ALE (Fig. 4). *Chelicerae and mouth parts*: Male (holotype): chelicerae 1.91 long, 0.76 wide. Female (paratypes): chelicerae 1.44–1.81 long, 0.65–0.76 wide. Labium wider than long; gnathocoxa 2 × longer than wide. Promargin of chelicerae with 3 teeth, most proximal one smaller than others; retromargin of chelicerae with 3–4 teeth, almost equal in size (surprisingly, in all 4 specimens there were 4 on right and 3 on left chelicerae) (Fig. 5). Chelicerae uniform brown without pattern, fangs normally developed. *Sternum*: Male (holotype): 2.1 long, 1.95 wide. Female (paratypes): 1.59–2.11 long, 1.43–1.85 wide. Distinct but weakly expressed pattern: irregular pale median band and symmetrical spots laterally, somewhat fused together (Fig. 3). *Legs*: Annulated. Plumose hairs present. Trochanters straight or slightly concave. Tarsal trichobothria on legs I–III: 6–8, on leg IV: 6–9. Number of teeth on paired claw of leg I: 13, on unpaired claw: 3. Leg and palp measurements and all observed spination-formulae in Table 1. *Opisthosoma*: Male (holotype): 4.88 long, 3.09 wide. Female: 3.62–5.54 long, 2.37–3.31 wide. Plumose hairs present. Ground colour ash-grey. Anteriorly 1–3 pairs of white pigmented spots. Dorsolaterally on anterior half two light bands, continuing posteriorly as weakly pronounced chevrons and more posteriorly as dots (Fig. 2). *Spinnerets*: Colulus a trapezoidal plate with deep median notch on



Figs. 1–6: *Tegenaria mercanturensis* n. sp., somatic characters. **1** Habitus of male holotype; **2** Opisthosoma of male holotype; **3** Sternum and coxae of female paratype; **4** Eyes of male holotype, frontal view; **5** Chelicerae of male holotype, posterior view; **6** Spinnerets of male holotype. ALS = anterior lateral spinnerets; COL = colulus; PLS = posterior lateral spinnerets; PMS = posterior median spinnerets.

posterior margin (Fig. 6), basally darkened. PLS longer than all others, two-segmented; distal segment shorter than basal; both segments darkened (especially dorsally); PLS separated by 1–2 diameters. PMS as long as ALS. ALS somewhat darkened, separated by less than their diameter (Fig. 6). *Male palp* (holotype) (Figs. 7–8): Without pigmentation. Patellar apophysis absent. RTA with 3 branches; dorsal branch ending in 2 acute, strongly sclerotised points, more proximal one more robust and double width of distal one; lateral branch forms transverse ridge on distal part of tibia; ventral branch forms long extended bulge. Additionally, tibia with large broad dorso-prolateral swelling distally. Cymbial modifications absent. Ratio bulb length to cymbium length 0.63. Embolus strong and broad, truncated at end (in both palps; since no fracture was detectable, it is unlikely that the end was broken off), shorter than cymbium width and coiling approximately



Figs. 7–11: *Tegenaria mercanturensis* n. sp., genitalia. **7** Left male palp of holotype, ventral view; **8** Ditto, retrolateral view; **9** Epigynum of female paratype, ventral view; **10** Vulva of female paratype, dorsal view; **11** Vulva of female paratype, cleared. AT=atrium; C=conductor; CD=copulatory duct; CO=copulatory opening; DB=dorsal branch; E=embolus; FD=fertilisation duct; LB=lateral branch; MA=median apophysis; RTA=retrolateral tibial apophysis; ST=spermatheca; VB=ventral branch.

Leg		Male (holotype)	Female (paratypes, $n=2$)	Spination
Palp	Femur	1.97	1.31–1.77	1–0–0–0
	Patella	0.71	0.57–0.74	2–0–0–0
	Tibia	0.83	0.81–1.07	1–2–0–0, 2–2–0–0
	Cymbium	1.69	1.27–1.77	–
	Bulb	1.07	–	–
	Total	**5.20**	**3.96–5.35**	–
I	Coxa	1.33	0.91–1.21	0
	Femur	5.58	3.76–5.20	1–2–1–0, 1–2–2–0, 1–3–1–0, 1–3–2–0
	Patella	1.76	1.29–1.69	2–0–0–0
	Tibia	5.46	3.58–5.17	0, 0–0–0–1, 0–0–0–1p, 0–0–0–1+1p
	Metatarsus	5.70	3.66–5.24	0–0–0–3p+1
	Tarsus	2.56	1.77–2.28	0
	Total	**22.39**	**14.97–20.79**	–
II	Coxa	1.23	0.87–1.07	0
	Femur	5.13	3.40–4.68	1–2–2–0, 1–3–2–0
	Patella	1.66	1.17–1.53	2–0–0–0
	Tibia	4.68	2.90–4.18	0–1–0–1, 0–1–0–2
	Metatarsus	5.04	3.08–4.50	0–1–0–3p+1
	Tarsus	2.14	1.37–1.94	0
	Total	**19.88**	**12.79–17.90**	–
III	Coxa	1.18	0.84–1.14	0
	Femur	4.65	3.01–4.13	1–2–2–0, 1–3–2–0
	Patella	1.46	1.05–1.41	2–0–0–0
	Tibia	3.90	2.33–3.36	0, 2–2–1–0
	Metatarsus	4.77	2.89–4.09	0–2–2–3p+1
	Tarsus	1.95	1.23–1.57	0
	Total	**17.91**	**11.35–15.70**	–
IV	Coxa	1.30	0.98–1.25	0
	Femur	5.61	3.90–5.36	0–1–1–0, 1–1–1–0, 1–2–1–0
	Patella	1.59	1.17–1.54	2–0–0–0
	Tibia	5.20	3.33–4.80	0, 2–2–1–3, 2–2–2–2, 2–2–2–3
	Metatarsus	5.80	3.91–5.59	0–2–3–1p+1+2p+1, 0–3–3–1p+1+2p+1
	Tarsus	2.26	1.53–1.99	0, 0–0–1–0
	Total	**21.76**	**14.82–20.53**	–
Formula		I>IV>II>III	I=IV>II>III	–

Table 1: Leg and palp measurements (range, in mm) and spination of male holotype and female paratypes of *Tegenaria mercanturiensis* n. sp. Number of spines given as follows: dorsal–prolateral–retrolateral–ventral. A "p" indicates that at this position the spine is paired (1p=2 spines at almost the same longitudinal position). All observed formulae are presented. More than one entry indicates variation. Left tibia III and IV in holotype male are without spines.

135°. Embolus base of left palp at 9 o'clock position, distal tip between 2–3 o'clock position, somewhat arrowhead-shaped (in lateral view). Median apophysis consists of membranous base, elongated at 5 o'clock position, and finger-shaped, strongly sclerotised distal part. Connection between median apophysis and tegulum membranous, smaller than length of apophysis. Conductor broad, curved hammerhead-shaped, parallel to cymbium, shorter than alveolus and laterally folded along its entire length. Proximal end consists of two strongly sclerotised plates. Connection between conductor and tegulum membranous with narrow longitudinal, somewhat sclerotised ridge. Distal apex of conductor longer than wide and visible dorsally. Other tegular apophysis absent. *Epigynum and vulva* (Figs. 9–11): Epigynal plate 0.58–0.64 long, 0.98–1.21 wide; atrium 0.38–0.44 long, 0.64–0.81 wide. Epigynal plate and groundplate of atrium strongly sclerotised. Groundplate of atrium with well delimited, more sclerotised and anchor-shaped plate-like area, anteriorly limited by strongly sclerotised margin, posteriorly almost reaching epigastric furrow. Copulatory openings clearly visible as holes, entrances large and spiral-shaped, located at anterior margin of atrium. Pair of posterior epigynal teeth absent. Ducts and spermathecae not visible through plate. Vulva consists of distinguishable copulatory ducts, spermathecae and fertilisation ducts. Copulatory ducts very short. Spermathecae covered by strongly and irregularly sclerotised shield, anterolaterally with conspicuous lentiform areas, covered only by membrane. Shield of spermatheca 0.24 wide. Spermathecae tubular. Distance between shields of spermathecae smaller than their diameter. Fertilisation ducts short and broad.

Natural history: All the specimens collected in the MNP were caught by hand from their small funnel-webs, along the artificial rock face created by the gravel road crossing the deciduous forest (dominated by hornbeam *Carpinus betulus* Linneaus) of the Malagratta valley (Plate 1). It is interesting to note that the

Plate 1: Photograph of exact location of the type specimens of *T. mercanturensis* n. sp., showing the rock face (arrow) to which the funnel webs were attached.

specimens show the same general coloration, ash-grey, as the rocky substratum. The only two records known indicate that adults of this species can be found between May and the end of September.

Distribution: The species is known only from the type locality and further south, from Menton (Map 1).

Acknowledgements

We are grateful to Christine Rollard (MNHN) and Ambros Hänggi (NMB) for supporting our PhD projects and comments on an earlier version of the manuscript. We thank Peter Merrett for valuable comments about this manuscript. C. Hervé also thanks Benoît Lequette (ex scientific director of the MNP), Philippe Bouchet and Olivier Gargominy (MNHN), who initiated the fieldwork and provided financial support, as well as all the Staff of the Park, who provided accommodation and logistical assistance. The first author received support from the SYNTHESYS Project http://www.synthesys.info/ which is financed by European Community Research Infrastructure Action under the FP6 ''Structuring the European Research Area'' Programme and the ''Freiwillige Akademische Gesellschaft Basel''.

References

BARRIENTOS, J. A. & CARDOSO, P. 2007: The genus *Malthonica* Simon, 1898 in the Iberian Peninsula (Araneae: Agelenidae). *Zootaxa* **1460**: 59–68.

BERLAND, L. 1935: Araignées du col de la Cayolle. *Revue fr. Ent.* **2**(1): 28.

BOLZERN, A. 2007: Zweitnachweis von *Tegenaria mirifica* Thaler, 1987 (Araneae, Agelenidae) für die Schweiz – oder die Wichtigkeit von präzisen Fundortsangaben. *Mitt. ent. Ges. Basel* **57**: 22–28.

BOLZERN, A., CRESPO, L. & CARDOSO, P. 2009: Two new *Tegenaria* species (Araneae: Agelenidae) from Portugal. *Zootaxa* **2068**: 47–58.

BOLZERN, A., HÄNGGI, A. & BURCKHARDT, D. 2008: Funnel web spiders from Sardinia: taxonomical notes on some *Tegenaria* and *Malthonica* spp. (Araneae: Agelenidae). *Revue suisse Zool.* **115**(4): 759–778.

BRIGNOLI, P. M. 1971: Contributo alla conoscenza degli Agelenidae Italiani (Araneae). *Fragm. ent.* **8**: 57–142.

BRIGNOLI, P. M. 1974: Ragni d'Italia XXI. Settimo contributo alla conoscenza dei ragni cavernicoli di Sardegna e descrizione di una nuova specie di Corsica (Araneae). *Revue suisse Zool.* **81**: 387–395.

BRIGNOLI, P. M. 1978: Ragni di Turchia V. Specie nuove o interessanti, cavernicole ed epigee, di varie famiglie (Araneae). *Revue suisse Zool.* **85**: 461–541.

DRESCO, E. 1956: *Tegenaria henroti*, espèce nouvelle des grottes de Sardaigne (Araneae, Agelenidae). *Fragm. ent.* **2**: 115–119.

GUSEINOV, E. F., MARUSIK, Y. M. & KOPONEN, S. 2005: Spiders (Arachnida: Aranei) of Azerbaijan. 5. Faunistic review of the funnel-web spiders (Agelenidae) with the description of a new genus and species. *Arthropoda Selecta* **14**: 153–177.

HERVÉ, C. & ROLLARD, C. 2009: *Drassodes* species from the Parc national du Mercantour (French Alps), with the description of a new species (Araneae: Gnaphosidae). *In* C. Kropf & P. Horak (eds), Towards a natural history of arthropods and other organisms. In memoriam Konrad Thaler. *Contr. nat. Hist.* **12**(2): 627–642.

HERVÉ, C., ROBERTS, M. J. & MURPHY, J. A. 2009: A taxonomic revision of the genus *Drassodex* Murphy, 2007 (Araneae: Gnaphosidae). *Zootaxa* **2171**: 1–28.

KRAUS, O. 1955: Spinnen von Korsika, Sardinien und Elba (Arach., Araneae). *Senckenberg. biol.* **36**: 371–394.

LATREILLE, P. A. 1804: Tableau méthodique des insectes. *Nouveau Dictionnaire d'Histoire Naturelle, Paris* **24**: 129–200.

LEHTINEN, P. T. 1967: Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha. *Annls zool. fenn.* **4**: 199–468.

LEVY, G. 1996: The agelenid funnel-weaver family and the spider genus *Cedicus* in Israel (Araneae, Agelenidae and Cybaeidae). *Zoologica Scr.* **25**: 85–122.

MAURER, R. 1992a: *Checkliste der europäischen Agelenidae nach der Roewerschen Systematik 1954 – unter Berücksichtigung angrenzender östlicher Gebiete, I.* Holderbank, 28 pp.

MAURER, R. 1992b: *Checkliste der europäischen Agelenidae nach der Roewerschen Systematik 1954 – unter Berücksichtigung angrenzender östlicher Gebiete, II.* Holderbank, 99 pp.

MAURER, R. & THALER, K. 1988: Über bemerkenswerte Spinnen des Parc National du Mercantour (F) und seiner Umgebung (Arachnida: Araneae). *Revue suisse Zool.* **95**(2): 329–352.

PLATNICK, N. 2009: *The world spider catalog, version 9.5.*<http://research.amnh.org/entomology/spiders/catalog/INTRO1.html>

SIMON, E. 1873: Aranéides nouveaux ou peu connus du midi de l'Europe (2ème mémoire). *Mém. Soc. r. Sci.* (2)**5**: 187–351 (1–177).

SIMON, E. 1898: Descriptions d'arachnides nouveaux des familles des Agelenidae, Pisauridae, Lycosidae et Oxyopidae. *Annls Soc. ent. Belg.* **42**: 1–34.

SIMON, E. 1937: *Les arachnides de France* **6**(5): 979–1298. Roret, Paris.

THALER, K. 1987: Drei bemerkenswerte Grossspinnen der Ostalpen (Arachnida, Aranei: Agelenidae, Thomisidae, Salticidae). *Mitt. schweiz. ent. Ges.* **60**: 391–401.

WALCKENAER, C. A. 1802: *Faune parisienne. Insectes. Ou histoire abrégée des insectes des environs de Paris, classés d'après le système de Fabricius* **2**: 187–250. Dentu, Paris.

WUNDERLICH, J. 1995: Zur Kenntnis der Endemiten, zur Evolution und zur Biogeographie der Spinnen Korsikas und Sardiniens, mit Neubeschreibungen (Arachnida: Araneae). *Beitr. Araneol.* **4**: 353–383.