Two new species of ant (Hymenoptera: Formicidae) for Europe, from southern Iberia

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Dos nuevas especies de hormigas (Hymenoptera: Formicidae) para Europa, del sur de la Península Ibérica

Keywords: *Formicidae; Europe; Strait of Gibraltar; Southern Iberia; Temnothorax convexus, Stenamma punctiventre*
Palabras claves: *Formicidae; Europa; Estrecho de Gibraltar; Sur de Iberia; Temnothorax convexus, Stenamma punctiventre*

Abstract

A number of interesting ant species are shared between southern Iberia and northern Morocco. Here, we report two new species to Europe from southern Iberia, both of which were described from North Africa. Temnothorax convexus *is an arboreal species that we report from Gibraltar and Cadiz Province in southern Andalusia.* Stenamma punctiventre *is an unusual and poorly-known member of its genus, so far known only from northern Morocco. We provide a record from southern Andalusia.*

Resumen

El sur de la Península Ibérica y el norte de Marruecos comparten varias especies de hormigas interesantes. En este artículo, citamos dos especies nuevas para la fauna Europea, desde el sur de Iberia, ambas descritas del norte de África. Temnothorax convexus *es una especie arbórea que citamos de Gibraltar y la provincia de Cádiz en el sur de Andalucía. Se han localizado varios nidos en distintos puntos cerca del Estrecho, sobre todo dentro de agallas, pero parece ser más escasa que otras especies del grupo 'angustulus'. Además, se presenta por primera vez la fenología de los alados de la especie.* Stenamma punctiventre *es un miembro de su género de características inusuales y poco conocido, que hasta ahora se había citado solamente del norte de Marruecos. Ofrecemos un registro del sur de Andalucía. La especie se localizó mientras muestreábamos hormigas endógeas, al igual que un registro reciente del norte de Marruecos, y estos aparentes hábitos subterráneos puede que expliquen la escasez del citas desde la fecha de su descripción. Resalta esta cita de* Stenamma punctiventre*, porque formó parte de una prospección 'bioblitz' organizada por la Sociedad Gaditana de Historia Natural.*

Introduction

Southern Iberia is separated from North Africa by the Strait of Gibraltar, which is 14km wide at its narrowest point. The two shores of the Strait and their hinterlands share some interesting ants. These include rare species, such as *Stigmatomma emeryi* Saunders, 1890 (Tinaut 1989) and *Technomyrmex vexatus* (Santschi, 1919) (Guillem & Bensusan 2008). Other unusual species occur in the region and some are known only from North Africa. This unique geographical area has its own microclimate and this could explain its rich and distinct biodiversity (Tinaut 1989).

Temnothorax convexus (Forel, 1894) was first described from northern Algeria, as *Leptothorax convexus*. Few published records exist. Currently it is only known from Tangier in northern Morocco (= *L. submuticus* Emery, 1915), Cap Spartel (near Tangier, as *L. convexus* var. *timida* Santschi, 1912), and the cork oak *Quercus suber* L. forest of M'Sila in northern Algeria, from which it was originally described. In their revision of the *Temnothorax angustulus* group, to which this species belongs, Galkowski & Cagniant (2017) state that *T. convexus* hasn't been collected again since the description of it and its junior synonym.

Stenamma punctiventre Emery, 1908 was originally described based on an alate female from Tangier, Morocco. Later, Santschi (1921) placed a worker of this species, also from Morocco, in a new genus, as *Theryella myops*. However, in a later publication he concluded that it was a *Stenamma* and provisionally synonymised it as *S. punctiventris* (*sic*) (Santschi 1923). Dubois (1998) confirmed this synonymy. Only three

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specimens were known up to 1998, all collected prior to 1920, leading Dubois (1998) to hypothesise that it could be extinct as a result of habitat loss, or that the species was only present at times of the year when entomologists are less active. The species was relocated in 2009, when nine specimens were found on the Tangier Peninsula whilst searching for endogean beetles (Espadaler & Hernando 2012).

Here, we provide new records for these two species, from Europe. Both are reported from Cádiz province, southern Spain, with *Temnothorax convexus* also recorded from Gibraltar.

Methods

Workers and colonies of *Temnothorax convexus* were collected whilst routinely searching for ants in woodland and maquis habitats. Colonies were found by collecting dead twigs and abandoned galls on *Quercus canariensis* Willd. and *Quercus lusitanica* Lam., as well as collecting dead twigs from *Olea europea* L. and *Pistacia lentiscus* L. Sexuals of this species were recorded using Rothamsted and Robinson moth traps at the Gibraltar Botanic Gardens. The former is run on a nightly basis, allowing us to accurately record the phenology of alates. *Stenamma punctiventre* was collected whilst searching for endogean ants, by soil-washing and Berlese extraction. A sample of soil and organic debris was collected from an open meadow, around the base of *Asphodelus* L., to some 30-50cm in depth (Fig. 1). Annual plants comprised the dominant ground cover, with scattered *Asphodelus* and some *Chaemaerops humilis* L.. A second visit to the site two weeks later failed to locate additional specimens.

Material Examined

All specimens are in the private collection of Rhian Guillem and the Gibraltar Ornithological & Natural History Society (GONHS), held at the Gibraltar Botanic Gardens. A map (Fig. 2) shows the distribution of our records for both species.

***Stenamma punctiventre* Emery, 1906**

3 workers: Montes de Propios de Jerez, Parque Natural Los Alcornocales, Cadiz, Spain. 26.V.2018. 36.6117500° - 05.5409000° 320m. RG-18-112. Leg R. Guillem & K. Bensusan, det. R. Guillem. Worker illustrated (Fig. 3).

The specimens were taken during a bioblitz organised by the Ayto. de Jerez. They were identified as *S. punctiventre* using a key to the Palaearctic *Stenamma* (Bharti *et al*. 2012), and by comparison with photographs in AntWeb and Espadaler & Hernando (2012). The distinct, long subpetiolar process is the primary distinguishing feature of this species (Fig. 3).

***Temnothorax convexus* (Forel, 1894)**

Details for all material collected are summarised (Table I). Worker, male and female illustrated (Figs. 4-6). A colony from Gibraltar RG-09-098 det. X. Espadaler (2009). All other specimens det. R. Guillem.

First recorded from Gibraltar in 2007, based on a single specimen. A worker was then collected whilst beating vegetation in nearby Spain in 2011 (Leg. J.L. Torres) and all

Figure 1. Meadow habitat of *Stenamma punctiventre*, Parque Natural Los Alcornocales, with a hole dug ca. 50cm deep around the roots of *Asphodelus*.
Figura 1. Hábitat de *Stenamma punctiventre*, Parque Natural Los Alcornocales, con agujero de ca. 50cm de profundidad, alrededor de raíces de *Asphodelus*.

Figure 2. Distribution of *Stenamma punctiventre* (triangle) and *Temnothorax convexus* (circles) in southern Iberia.
Figura 2. Distribución de *Stenamma punctiventre* (triángulo) y *Temnothorax convexus* (círculos) en el sur de la península.

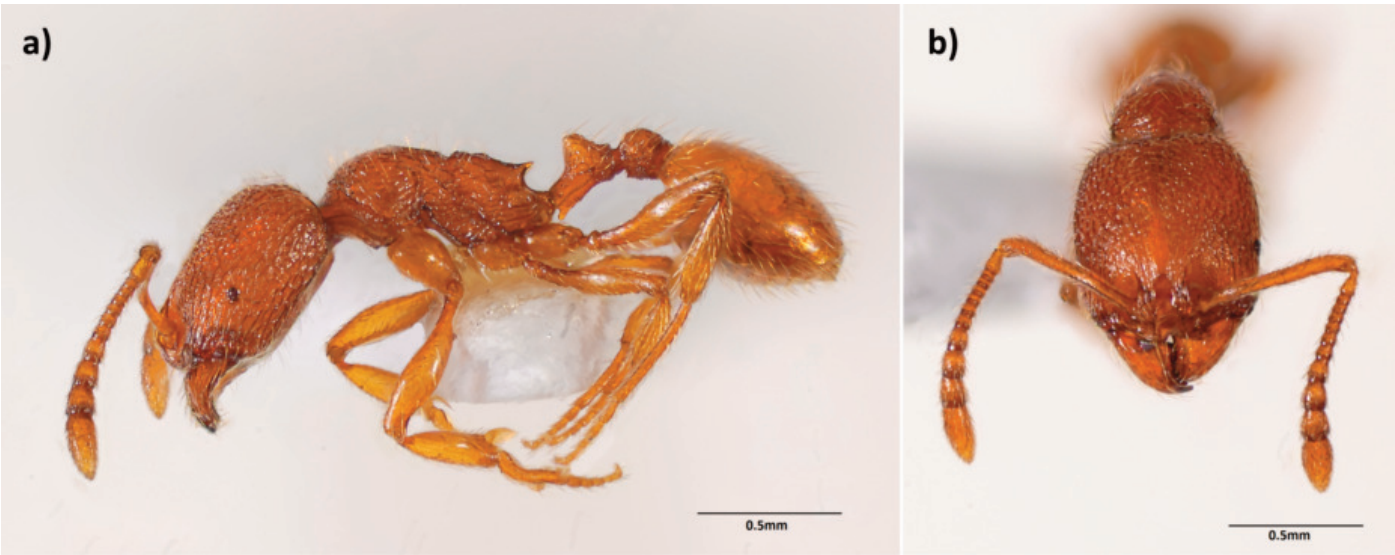

Figure 3. *Stenamma punctiventre* worker, lateral a) and head b) view.
Figura 3. Obrera de *Stenamma punctiventre*, a) perfil lateral, y b) cabeza.

subsequent records from Spain are of colonies nesting in old galls of *Andricus quercustozae* (Bosc, 1792) on *Quercus* spp. (Table I). Colonies found were monogynous, ranging from 14-134 workers. A queenless colony collected in 2014 (RG-14-033) was kept and worker-produced males were reared. This allowed identification of numerous males collected with light traps during June-August 2007-2017. 226 males and 3 alate females were captured during this period and their phenology is summarised (Fig. 7), with emergence ranging from 18th June (2017) to 3rd September (2009), peaking during the first half of July.

Distinguishing features of the workers are the highly reduced propodeal spines (triangular teeth), in combination with short, thick blunt hairs on thorax, head and gaster, dark colouration, head reticulate, petiole with a rounded apex and thorax convex (Cagniant & Espadaler 1997; Galkowski & Cagniant 2017). The sculpture on the head, thorax, petiole and post petiole is areolate-rugulose (appearing punctuated), distinctly matte with some additional longitudinal striae on the dorsum and lateral side of the thorax. Gaster is smooth and shining. We also note that spine length is slightly variable, but always short. Workers can vary in colour, with some uniformly dark, with others slightly bicoloured orange-brown on the thorax and petiole. This variation has been observed both within and between colonies, and may reflect age of individuals. We have also found queens to be either completely dark or bicoloured, with the head, pronotum and mesoscutum orange-brown (Fig. 5). There are also differing degrees of bicolouration between queens. Males are completely dark brown, funiculus and legs paler yellow-brown, with no propodeal spines (Fig. 6). Head and petiole are punctuated as in the workers and queen. When Santchi (1912) described a variety of *T. convexus* (*Lepthothorax convexus* var. *timida*), he also described the

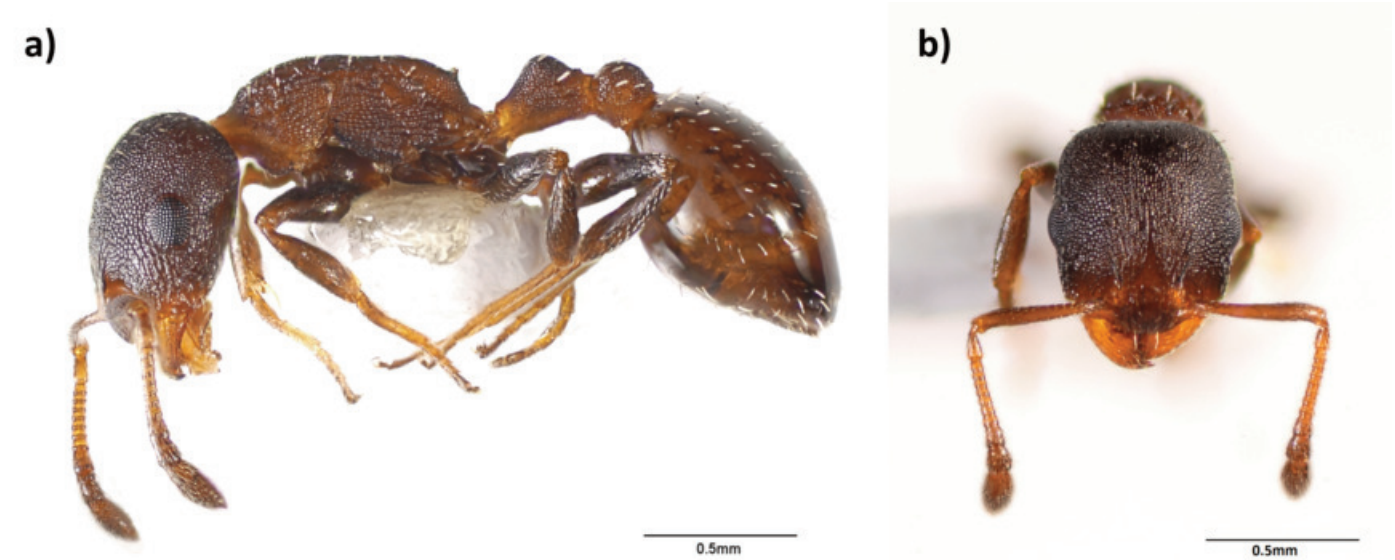

Figure 4. *Temnothorax convexus* worker a) lateral, b) head.
Figura 4. Obrera de *Temnothorax convexus*, a) perfil lateral, y b) cabeza.

male. Of particular note is the sentence "Tête et pédicule submats ponctués comme chez l'ouvrière" – head and petiole matte punctuated like the workers; a distinguishing feature of the males that we have collected.

Discussion

These two new records for Europe further unite the myrmecofaunas of North Africa and Iberia. Cagniant (2006) states that 30% of Moroccan ant species are found in Iberia but the affinity is greater when only northern Morocco and southern Iberia are considered. Although there is evidence to suggest that one of the species shared by both shores – *Anochetus ghilianii* (Spinola, 1851) – was introduced to Europe from Morocco (Jowers *et al*. 2015), it is unlikely that *Stenamma punctiventre* at least was introduced, given its scarcity, habitat and only known locality in Iberia, so far within the Parque Natural Los Alcornocales.

The record of such a poorly known species as *S. punctiventre* is surprising, but Europe lies close to known localities in northern Morocco. Espadaler & Hernando's (2012) records from the Tangier Peninsula are from very similar habitat to that at our locality, and they were again collected whilst searching for endogean species. These data together suggest that the species is more endogean in its habits than other *Stenamma* species in the region, perhaps entirely so. These subterranean habits would explain the paucity of records.

Temnothorax convexus too is an under-recorded species. Its preferred habitat in Iberia seems to be shaded, wooded areas where there is high humidity, and it is not common. For example, at Pinar del Rey, 200 galls of *Andricus quercustozae* collected from branches of *Quercus lusitanica* produced one colony, with some scouts in another gall. In *Quercus* forests around Castellar de la Frontera, 1320 galls of *A. quercustozae* collected from *Q. canariensis* produced one colony. In mixed *Quercus* woodland at El Bujeo, 480 galls produced three colonies (Table 1 for details on each of these sites). Other arboreal *Temnothorax* such as *T. aveli* (Bondroit, 1918) and *T. continentalis* Galkowski & Cagniant 2017 were more frequently encountered at these sites, with ratios of ca. 5:1 *T continentalis*: *T. convexus* and 11:1 to *T. aveli: T. convexus*, suggesting that either *T. convexus* is rare or it has different nesting habits. In Gibraltar, where there is no *Quercus* forest, *T. convexus* has been found in association with *Pistacia lentiscus* and *Olea europaea*. Again, it is not commonly encountered despite frequently searching within dead twigs/branches on trees.

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Figure 5. *Temnothorax convexus* female alate
Figura 5. *Temnothorax convexus*, hembra alada.

Figure 6. *Temnothorax convexus* male
Figura 6. *Temnothorax convexus*, macho.

Table I. Localities of *Temnothorax convexus* in southern Iberia.
Tabla I. Localidades de las que citamos *Temnothorax convexus* en el sur de la Península Ibérica. w = número de obreras.

Species	Locality	Municipality & Province	Country	Latitude	Longitude	Altitude	Date	Leg	No. present	Collection No.	Notes
T. convexus	The Mount, Gibraltar Nature Reserve		Gibraltar	36.1246139°	-05.3483778°	115m	17/08/2007	R. Guillem	1w	-	Forager on log within relict woodland.
T. convexus	Queen's Road, Gibraltar Nature Reserve		Gibraltar	36.1313000°	-05.3473500°	241m	12/01/2009	R. Guillem	57w	RG-09-098	Queenless colony in twig on *Pistacia lentiscus*. Det. X. Espadaler
T. convexus	The Mount, Gibraltar Nature Reserve		Gibraltar	36.1239167°	-05.3487000°	100m	01/07/2014	R. Guillem	8w	RG-14-033	Queenless colony with male pupae within twig. 32 males reared.
T. convexus	The Mount, Gibraltar Nature Reserve		Gibraltar	36.1247167°	-05.3485333°	113m	11/08/2015	A. Prince	1w	RG-15-032	Pitfall trap
T. convexus	Picadilly Bar, Rosia Road		Gibraltar	36.1339167°	-05.3529667°	14m	01/06/2017	R. Guillem	1w, 1♂	RG-17-043	On outside table
T. convexus	Gibraltar Botanic Gardens		Gibraltar	36.131583°	-5.351600°	28m	16/07/2007 – 20/7/2017	R. Guillem	226 ♂, 3 alate ♀	-	In light traps.
T. convexus	Zona Bacinete, Los Alcornocales	Los Barrios, Cádiz	Spain	36.1917333°	-05.5607000°	116m	18/02/2011	J.L Torres	1w	-	Beating vegetation.
T. convexus	Hotel Convento, La Almoraima, Los Alcornocales	Castellar de la Frontera, Cádiz	Spain	36.2846000°	-05.4327333°	34m	24/01/2016	R. Guillem & K. Bensusan	1♀, 14w	RG-16-002	Colony in gall of *Andricus quercustozae* on *Quercus canariensis*.
T. convexus	Pinar del Rey	San Roque, Cádiz	Spain	36.2462500°	-05.4072833°	71m	14/02/2016	R. Guillem & K. Bensusan	1♀, 96w 4w	RG-16-017 RG-16-024	In galls of *Andricus quercustozae* on *Quercus lusitanica*.
T. convexus	Pinar del Rey	San Roque, Cádiz	Spain	36.2342000°	-05.3979500°	71m	14/02/2016	R. Guillem & K. Bensusan	1♀, 134w	RG-16-029	Colony in gall of *Andricus quercustozae* on *Q. canariensis.* 26 males reared
T. convexus	Near Castellar	Castellar de la Frontera, Cádiz	Spain	36.2934667°	-05.3718500°	118m	28/02/2016	R. Guillem & K. Bensusan	1♀, 18w	RG-16-040	Colony in gall of *Andricus quercustozae* on *Q. canariensis*.
T. convexus	El Bujeo, Los Alcornocales	Tarifa, Cádiz	Spain	36.0733667°	-05.5301667°	337m	14/03/2016	R. Guillem & K. Bensusan	1♀, 57w 1♀, 125w 1♀, 94w	RG-16-120 RG-16-121 RG-16-122	3 queenright colonies in galls of *Andricus quercustozae* on *Q.canariensis*.

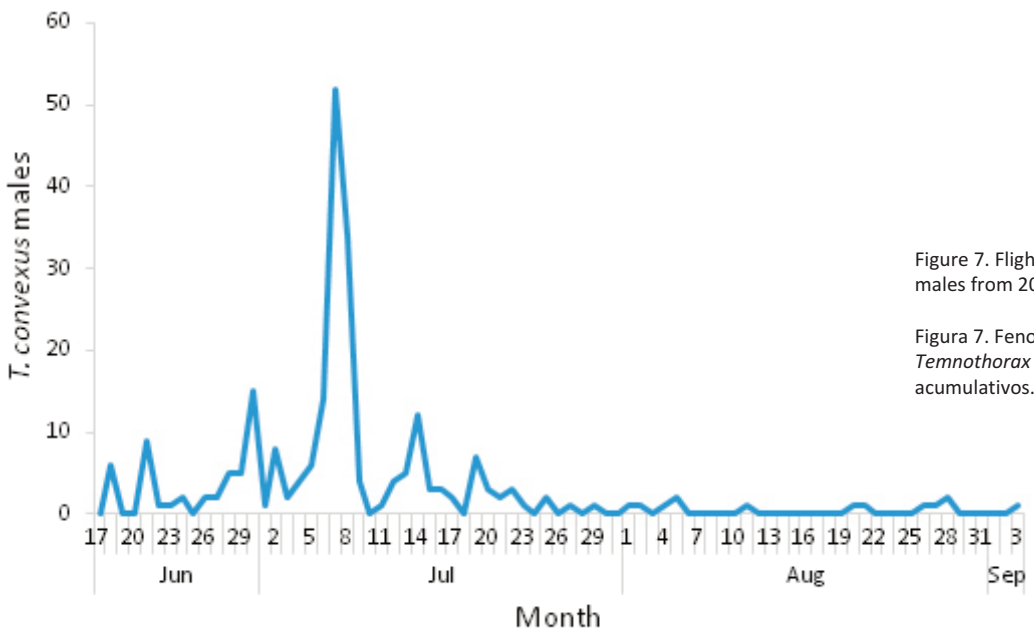

Figure 7. Flight phenology of *Temnothorax convexus* males from 2007-2017. Values are cumulative.

Figura 7. Fenología de vuelo de machos de *Temnothorax convexus*, 2007-2017. Los valores son acumulativos.

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