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Four new species of *Andricus* Hartig oak gallwasp from Turkey (Hymenoptera: Cynipidae, Cynipini)

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Abstract

Four new species of oak gallwasps, *Andricus ahmeti*, *A. anatolicus*, *A. bakrachus* and *A. turcicus* (Hymenoptera: Cynipidae: Cynipini) are described from Turkey. All four species are known only from asexual females and induce galls on twigs and young shoots on *Q. infectoria*, *Q. macranthera* and *Q. petraea*. Data on the diagnosis, distribution and biology of the four new species are given. *Andricus stonei* and *Aphelonyx kordestanica* are listed for the first time for the Turkish oak gallwasp fauna.

Keywords: Cynipini, *Andricus*, taxonomy, Turkey, distribution, new species

Introduction

Only a few records on Cynipidae from Turkey were listed in the reference work by DallaTorre & Kieffer (1910). Later studies subsequently added new species to the cynipid fauna of Turkey: Karaca (1956) listed 21, Baş (1973)—34, Kıyak *et al*. (2008)—30 species. For now, 81 species of cynipids from 16 genera are listed from Turkey, which from 77 species are associated with oaks (tribe Cynipini), and in particular, 50 species belong to the genus *Andricus* Hartig (Katılmış & Kıyak 2008).

In the south western part of Turkey (Antalya, Burdur, Isparta, Denizli, Aydın, Muğla), 30 species of oak gallwasps (Cynipini) were found (Kıyak *et al*. 2008). Katılmış and Kıyak (2011) listed 58 species from 11 genera of the tribe Cynipini from western Anatolia. A recent study added a new gallwasp species to the Turkish cynipid fauna (Mutun & Dinç 2011). In the last decades, two new oak gallwasp species were described from Turkey: *Andricus askewi* Melika & Stone (Melika & Stone 2001) and *A. megalucidus* Melika (Melika *et al*. 2004), and another one new species will be published soon (Dinç *et al*. 2013, in press).

During this study, two species, *Andricus stonei* Melika, Tavakoli & Sadeghi and *Aphelonyx kordestanica* Melika, were found for the first time in Turkey, which are new species for the oak gallwasp fauna of Turkey; earlier, they were known only from Iran (Azizkhani *et al.* 2006; Melika *et al*. 2010).

Here we describe another four new species from Turkey, *Andricus ahmeti* **n. sp.,** *Andricus anatolicus* **n. sp.,** *Andricus bakrachus* **n. sp.** and *Andricus turcicus* **n. sp.,** all known to induce galls on twigs and shoots of *Quercus infectoria* Olivier, *Q. macranthera* Fisch. & C.A.Mey, and *Q. petraea* (Mattuschka) Liebl. (Section Quercus of *Quercus* L., white oaks; Fagaceae).

Material and methods

Galls were collected in Turkey in August–September, 2012 from *Q. macranthera*, *Q. infectoria* and *Q. petraea*.

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Gall (Figs 55–58). Gall resembles *Andricus truncicolus* with patterned surface, monolocular inner chamber and similar coloration. On the other hand patterned plates consist of prickly protrusions and gives maze-like appearance. Gall develops over the branch of lateral and terminal buds, 9–11 mm in diameter, including the spines; in the center is the larval chamber. Galls have spiny extensions.

Comments. The mitochondrial *Cytb* gene sequence most closely resembles that of *A. truncicolus* (query cover 95%, max. identity 97%, accession # DQ218002.1), *A. curtisii* (Müller) (query cover 95%, max. identity 96%, accession # AF539566.1) and *A. hartigi* (Hartig) (query cover 95%, max. identity 96%, accession # AJ228454.1).

Biology. Only the asexual females are known to induce galls on *Q. infectoria* and *Q. petraea*, with preferring lateral branches. The gall develops through the summer and matures at the beginning of September and till late October. Our wasps emerged from galls at the beginning of September.

Distribution. Currently known from the vicinities of Adıyaman, Konya and Manisa cities of Turkey.

Discussion

The phylogenetic relationships within the western Palaearctic *Andricus* species were studied on the basis of gall structures, adult morphology, and gene sequences and were divided into six clades: a) *mayri–lucidus*, b) *kollari*, c) *coriarius*, d) *quercuscalicis*, e) *hartigi*, and f) *foecundatrix* clade, and a few species (*Andricus inflator* Hartig, *A. hystrix* Kieffer, *A. gallaeurnaeformis* (Fonscolombe)) appeared to be nested on the tree away from the main *Andricus* clades (Stone & Cook 1998, Rokas *et al*. 2003, Melika 2006). On the basis of morphological peculiarities and *cytB* sequences the herein described as new species, *Andricus anatolicus*, belongs to the *kollari* clade of *Andricus*, showing that this species is falling into a subclade with *A. kollari*, *A. corruptrix* and others which was named as Adleria kollari group of species. Three other species, *A. ahmeti*, *A. bakrachus* and *A. turcicus* belong to the *quercuscalicis* clade (Rokas *et al*. 2003). Species which belong to the *kollari* and *quercuscalicis* clades have alternate generations and the sexual generations are known to associate with the Cerris section of oaks (Stone *et al*. 2008). Probably the herein described new species also might have a sexual generation which develops on Cerris section of oaks. However, this must be approved by further research.

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