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New data on parasitoids living in oak (*Quercus* spp.) galls from Georgia (Sakartvelo)

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Abstract

Eighteen species of Chalcid inquiline wasps have been reared during our survey from Oak galls from all regions of Georgia. Four genera and 10 species were new records for the Caucasus, with two more new records for Georgia, and one species with a new host record was also confirmed. Recorded chalcids belong to 7 families and 12 genera.

Keywords

Inquilines, Chalcidoidea, New records, Gall wasps.

Introduction

Cynipid wasps (Hymenoptera: Cynipoidea) are considered as major pests of oak (Nozadze *et al.* 2023). Oak gall wasps (Cynipidae: Cynipini) are by far the most species-rich group of gall wasps, with about 1,000 known species in about 50 genera worldwide (Melika *et al.* 2021). Gall-inducing species of cynipid are well-known to suffer considerable mortality from chalcid parasitoids (Hymenoptera: Chalcidoidea) (Stone *et al.* 2002, Csóka *et al.* 2005). The first comprehensive studies on cynipids in Georgia began with Supatashvili, Kharazishvili (1964), where 23 species were identified. The present study was conducted in different geographical regions of Georgia to identify parasitoid communities, inhabitants of numerous *Quercus* spp. galls and includes the first records of some insect species from Georgia and their new host information.

Material and Methods

The selection of localities was done according to the distribution of oak species and subspecies. We started to collect from June and continued until the end of October in 2020. We repeated collecting in the months of May-June and September-October

during 2022. During the field work, we examined and collected the oak cynipid galls from all plant organs. We placed the visually different galls in separate containers for further rearing of adult wasps. The collected material was transported to the Laboratory of the Tbilisi National Botanical Garden of Georgia. In the laboratory the obtained materials were placed in containers, jars and tubes with appropriate labels, covered with fine mesh in order to provide aeration in the containers and not to allow development of different pathogenic fungi on the galls. We were awaiting emergence of parasitoids at the room temperature (20°C). The material was kept for about 6 months, because some parasitoid development needs considerable time to emerge. We checked the emergence of parasitoids once a week. Reared parasitoids were placed in 95% ethanol with an appropriate label. The insects preserved in ethanol were stored in the refrigerator. Some of the parasitoid samples were dried and card mounted. Mounted adult parasitoids were placed in the collection boxes with the labels. New records for Georgia and for Caucasus are marked with one and two asterisk respectively.

Results

List of species

1. Family-Torymidae

Genu *Torymus* Dalman, 1820

1. *Torymus affinis* (Fonscolombe, 1832) Material examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Andricus coriarius* - asexual Generation. 13.10.20-4.02.21. Previous record from Georgia according Zerova, Seryogina (2003).

2. *T. auratus* (Muller, 1764) Material examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Andricus*

coriarius - asexual Generation. 10.09.20-22.09.20. Georgia, Kvareli, Gremi. Host plant: *Q. robur* subsp. *pedunculiflora*. Host gall: *Cynips quercusfollii* - asexual Generation. 14.10.20-17.02.21. Georgia, Chokhatauri, Tskhratskaro. Host plant: *Q. pontica*. Host gall: *Andricus mammadovi* - Sexual Generation. 2.09.20 - 10.10.20. Previous record from Georgia according Zerova, Seryogina (2003).

3. *T. laetus* (Walker, 1833)** (Fig. 1A) Materia examined: Georgia, Algeti national park. Host plant: *Quercus macranthera*, Host gall: *Biorhiza pallida* - Sexual Generation. 11.09.20-12.09.20.

4. *T. geranii* (Walker, 1833) Materia examined: Georgia, Algeti national park. Host plant: *Quercus macranthera*. Host gall: *Cynips korsakovi* - Asexual Generation. 11.09.20-15.10.20

5. *T. macrurus* Forster, 1859** (Fig. 1B) Materia examined: Georgia, Kvareli, Gremi. Host plant: *Q. robur* subsp. *pedunculiflora*. Host gall: *Cynips divisa* - Asexual Generation. 9.07.20 - 1.03.21.

2. Family-Eulophidae

Genus *Aprostocetus* Westwood, 1833

6. *Aprostocetus aethiops* (Zetterstedt, 1838)** (Fig. 1C) Materia examined: Georgia, Chokhatauri, Tskhratskaro Host plant: *Q. pontica*. Host gall: *Andricus mammadovi* - Sexual Generation. 22.10.20 - 15.12.20. Georgia, Chokhatauri, Tskhratskaro Host plant: *Q. pontica*. Host gall: *Andricus mammadovi* - Sexual Generation. 2.09.20 - 4.09.20.

7. *A. andalusiacus* (Graham, 1987) ** (Fig. 1D) Materia examined: Georgia, Mtskheta, Mukhatskaro. New Host plant: *Q. petrea* subsp. *iberica*. New Host gall: *Andricus coriarius* - asexual Generation. 10.09.20- 12.09.20.

New host record.

Genus *Aulogymnus* Förster, 1851*

8. *Aulogymnus skianeuros* (Ratzeburg, 1844)** Materia examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Biorhiza pallida* - Sexual Generation. 9.09.20 11.09.20. Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Biorhiza pallida* - Sexual Generation. 9.09.20-12.02.21. Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Biorhiza pallida* - Sexual Generation. 9.09.20-17.02.21. Genus ***Baryscapus***

Förster, 1856.

9. *Baryscapus diaphantus* (Walker, 1839)** (Fig. 1E) Materia examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Biorhiza pallida* - Sexual Generation. 10.07.20 16.08.20. Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 15.10.20 - 16.03.21.

3. Family-Eurytomidae

Genus *Eurytoma* Illiger, 1807

10. *Eurytoma brunniventris* (Ratzeburg, 1852) Materia examined: Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 15.10.20 - 7.04.21. Georgia, Adjara, Gobroneti. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Neuroterus numismalis* - sexual generation. 19.10.20-15.02.21.

Previous record from Georgia according Zerova (1995).

Genus *Sycophila* Walker, 1871

11. *Sycophila iracemae* (Nieves-Aldrey, 1984)** (Fig. 1F,G) Materia examined: Georgia, Kvareli, Grem. Host plant: *Q. robur* subsp. *pedunculiflora*. Host gall: *Cynips divisa* - Asexual Generation. 7.09.20 - 23.09.20. (Fig. 1G). Georgia, Kvareli, Grem. Host plant: *Q. robur* subsp. *pedunculiflora*. Host gall: *Cynips divisa* - Asexual Generation. 7.09.20 - 21.09.20. (Fig. 1F)

12. *Sycophila biguttata* (Swederus 1795) Materia examined: Georgia, Chokhatauri, Tskhratskaro. Host plant: *Q. pontica*. Host gall: *Andricus mammadovi* - Sexual Generation. 2.09.20 - 9.09.20. Georgia, Chokhatauri, Tskhratskaro. Host plant: *Q. pontica*. Host gall: *Andricus mammadovi* - Sexual Generation. 2.09.20 - 13.09.20. Previous record from Georgia according Zerova (1995).

4. Family- Pteromalidae

Genus *Arthrolytus* Thomson, 1878*

13. *Arthrolytus glandium* (Boucek, 1967)** (Fig. 1H) Materia examined: Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 11.09.20-12.09.20.

Genus *Cecidostiba* Thomson, 1878*

14. *Cecidostiba semifascia* (Walker, 1833)** (Fig. 1I) Materia examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*. Host gall: *Andricus coriarius* - asexual Generation. 13.10.20 3.12.20. Georgia, Algeti national park.

Host plant: *Q. macranthera*. Host gall: *Cynips korsakovi* – Asexual Generation.

11.09.20-9.03.21; Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 11.09.20 2.03.21.

Genus *Hobbia* Delucchi, 1957*

15. *Hobbia stenonota* (Ratzeburg, 1848)**
Materia examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. petrea* subsp. *iberica*.

Host gall: *Andricus coriarius* - asexual Generation. 13.10.20-9.03.21. Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 11.09.20-10.10.20; Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 11.09.20-12.10.20.

Genus *Mesopolobus* Westwood, 1833

16. *Mesopolobus tibialis* (Westwood, 1833)**
Materia examined: National Botanical Garden of Georgia. Host plant: *Q. iberica* Host gall: *Andricus curvator* - sexual generation. 4.05.22-7.05.22.

5. Family-Eupelmidae

Genus *Eupelmus* Dalman, 1820

17. *Eupelmus urozonus* (Dalman, 1820)* Materia examined: Georgia, Algeti national park. Host plant: *Q. macranthera*. Host gall: *Biorhiza pallida* -SexualGeneration.11.09.2022.03.21.

Georgia,Algeti national park. Host plant: *Q. Macranthera*. Host gall: *Biorhiza pallida* - Sexual Generation. 15.10.20 7.04.21.

6. Family- Encyrtidae

Genus *Isodromus* Howard, 1887

18. *Isodromus flaviscutum* Hoffer & Trjapitzin, 1978*Materia examined: Georgia, Mtskheta, Mukhatskaro. Host plant: *Q. iberica*. Host gall: *Andricus coriarius* - asexual Generation. 12.10.20-15.02.21.

Comment: According to Trjapitzin (1978), the species is distributed in Transcaucasus, he does not show collecting location or country, therefore it's not clear where the species is collected from. Later Hertevtsyan (1986) records its finding in Armenia. In his later paper Trjapitzin (2001) mentions Georgia in distribution list, however this data undoubtedly is coming from his previous record - "Transcaucasia" (Trjapitzin, 1978).

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Conflict of interest

We don't have any conflict of interest.

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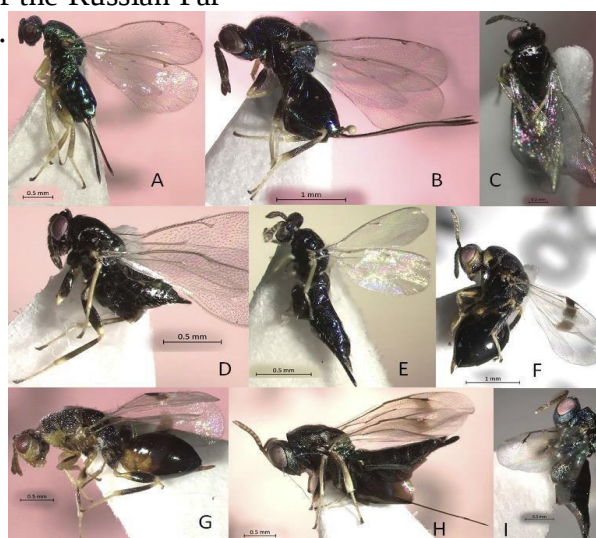


Figure 1. A - *Torymus laetus* (Walker, 1833), female, lateral habitus; B - *T. macrurus*, 1859, female, lateral habitus; C- *Aprostocetus aethiops* (Zetterstedt, 1838), female, dorsal habitus; D - *A. andalusiacus* (Graham, 1987), female, lateral habitus; E-*Baryscapus diaphantus* (Walker, 1839), female, lateral habitus; F, G -*Sycophila iracemae* (Nieves-Aldrey, 1984), females lateral habitus; H-*Arthrolytus glandium* (Boucek, 1967), female, lateral habitus; I-*Cecidostiba semifascia* (Walker, 1833), female, lateral habitus.