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CECIDIA IN THE ZOOLOGICAL COLLECTION OF THE DEPARTMENT OF BIOLOGY, FACULTY OF SCIENCE IN ZAGREB, INCLUDING SPECIES NEW TO CROATIA

LUCIJA ŠERIĆ JELASKA[1,2,3]*, DINKA MATOŠEVIĆ[4], ENRICO DE LILLO[5], MARCELA SKUHRAVÁ[6] & GEORGE MELIKA[7]

[1]Faculty of Science, University of Zagreb, Horvatovac 102 a, 10000 Zagreb, Croatia (slucija@biol.pmf.hr)
[2]Institute for Security and Defense Studies, Defense and Security University Dr. Franjo Tuđman, Ilica 256 b, HR-10000 Zagreb, Croatia (lucija.seric.jelaska@sois-ft.hr)
[3]Department of Ecology, Agronomy and Aquaculture, University of Zadar, Mihovila Pavlinovića 1, HR-23000 Zadar, Croatia
[4]Croatian Forestry Institute, Cvjetno naselje 41, Jastrebarsko, Croatia (dinkam@sumins.hr)
[5]Department of Soil, Plant and Food Sciences, University of Bari Aldo Moro, via Amendola, 165a, 70121 Bari, Italy (enrico.delillo@uniba.it)
[6]Bitovska 1227/9, 140 00, Prague 4, Czech Republic (marcela.skuhrava@gmail.com)
[7]Várkör 20-22, 3, 9730 Kőszeg, Hungary, (Retired entomologist at Directorate of Plant Protection, Soil Conservation and Agri-environment, Budapest) (melikageorge@gmail.com)

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This paper presents the cecidological collection held in the Zoological collection of the Department of Biology, Faculty of Science, University of Zagreb. The collection was assembled by Vlasta Mužny as part of her graduate thesis research in 1953. Most of the galls were sampled in the vicinity of the town of Nova Gradiška, in continental Croatia. In total, 56 galls were recorded, induced by insect species belonging to the orders Hymenoptera, Hemiptera and Diptera, and by Acari. Most of them are well preserved, and *Contarinia cybelae* Gagné, 1972, is new to Croatia. This collection is one of the few publicly available zoocecidia collections in Croatia stressing the importance of preserving natural history collections within university departments. By making this collection accessible, it can support further research in taxonomy, systematics, and conservation.

Key words: Acari, Diptera, first record, galls, Homoptera, Hymenoptera, University collection

Šerić Jelaska, L., Matošević, D., De Lillo, E., Skuhravá, M. & Melika, G.: Šiške u Zoološkoj zbirci Biološkog odsjeka Prirodoslovno-matematičkog fakulteta u Zagrebu, uključujući novu vrstu za Hrvatsku. Nat. Croat., Vol. 35, No. 1, _____, 2026, Zagreb.

Rad predstavlja zbirku šiški (cecidija) koja se čuva u Zoološkoj zbirci Biološkog odsjeka Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu. Zbirku je prikupila Vlasta Mužny, kao dio svog diplomskog rada 1953. godine. Većina šiški sakupljena je u blizini Nove Gradiške, u kontinentalnoj Hrvatskoj. Ukupno je zabilježeno 56 šiški, induciranih kukcima iz rodova Hymenoptera, Hemiptera i Diptera te paučnjacima iz skupine Acari. Većina šiški je dobro očuvana, a vrsta *Contarinia cybelae* Gagné, 1972 je nova za Hrvatsku. Ova zbirka jedna je od rijetkih javno dostupnih zbirki zoocecidija u Hrvatskoj, čime se naglašava važnost prirodoslovnih zbirki pohranjenih u sveučilišnim institucijama. Njena dostupnost omogućuje daljnja istraživanja u taksonomiji, sistematici i zaštiti prirode.

Ključne riječi: Acari, Diptera, prvi nalaz, šiške, Homoptera, Hymenoptera, fakultetska zbirka

INTRODUCTION

Galls, or cecidia, are of interest to botanists, plant pathologists, microbiologists, and zoologists, as they involve interactions between the host plants and the organisms that induce

*corresponding author

them. Since the late 19th century, galls have attracted increasing scientific attention, particularly among botanists, and have been preserved in herbarium collections—often referred to as cecidological herbaria (MERTZ *et al*., 2022).

There is ongoing discussion in the literature about how is the best way to organize cecidological collections - either by host plant species, to facilitate ecological and community-level research as suggested by MERTZ *et al*. (2022), or by the gall-inducing organisms. For example, several historical cecidological collections (e.g., *Cecidotheca Italica*) are sorted by host plant species, while others categorize galls by their inducers - whether bacteria, fungi, or animal species (MANDRIOLI *et al*., 2024).

From an evolutionary perspective, galls are polyphyletic in origin, with gall-inducing traits evolving independently across various unrelated groups. In nematodes, gall formation is limited to a few closely related genera, such as *Meloidogyne* spp., whereas in some dipteran families (e.g., Cecidomyiidae, Tephritidae, and Anthomyiidae), the gall-forming habit evolved independently in multiple genera (WELLS, 1921).

Zoocecidia - galls induced by animals - can be formed by a wide range of taxa: Rotifera, Copepods, nematodes, mites of the superfamily Eriophyoidea (Acarina), and multiple insect orders including Orthoptera, Neuroptera, Thysanoptera, Coleoptera, Lepidoptera, Diptera, and Hemiptera (e.g., Psyllidae, Aphididae, Coccidae, etc.), as well as Hymenoptera (WELLS, 1921).

In their review of European cecidological collections, MANDRIOLI *et al.* (2024) highlight the contributions of several early naturalists - such as Ulisse Aldrovandi (16th century), Francesco Redi (17th century), and Marcello Malpighi and Antonio Vallisneri (late 17th to early 18th century) - who laid the foundations of cecidology. Interest in galls intensified at the end of the 19th century, when cecidology emerged as a distinct scientific discipline. During that period, major European cecidological collections were established in museums, universities, and botanical gardens (MANDRIOLI *et al*., 2024).

Knowledge of gall diversity in Croatia remains limited (e.g. KORLEVIĆ, 1890, 1903a, b; LANGHOFFER, 1915; BAUDYS, 1928; MATOŠEVIĆ, 1993, 2004; JANEZIC, 1984; PERNEK & MATOŠEVIĆ, 2009; MATOŠEVIĆ *et al*. 2010; MATOŠEVIĆ & PERNEK, 2011; KWAK, 2012; GRUBIŠIĆ, 2019; SKUHRAVÁ & SKUHRAVÝ, 2021), and cecidological collections in the country are rare. LANGHOFFER (1915) published part of the gall collection from the Croatian Natural History Museum in Zagreb (Zoological Department of the National Museum at the time), assembled by Antun Korlević in 19th century from various parts of Croatia (e.g. Opatija, Rijeka, Zagreb, Psunj, etc.). One new species sampled in Ika near Opatija was described by Kieffer and named *Cynipis korlevicii* (now *Andricus korlevici* (KIEFFER, 1902)) after A. Korlevic who

sampled it (KIEFFER, 1902; KORLEVIĆ, 1093b; LANGHOFFER, 1915). Gjuro Koča donated his gall collection, sampled in 1910-1912 at Papuk Mt. in Eastern Croatia, to the Croatian Natural History Museum in Zagreb (Zoological Department of the National Museum at the time) (GJURAŠIN, 1996). Some galls from Croatian regions, such as Dalmatia and Istria, were sampled in the past by foreign researchers - for example, by the botanist Otto Jaap (JAAP, 1919/20; ROSS & JAAP, 1922). These specimens are now preserved in Ross's cecidological herbarium at the Botanische Staatssammlung München, which is part of the Bavarian Natural History Collections (SKUHRAVÁ *et al.*, 2014).

To our knowledge, based on literature survey and personal communication with curators, there are a few gall collections in Croatia: at the Croatian Natural History Museum in Zagreb (LANGHOFFER, 1915); the Varaždin City Museum (Franjo Koščec collection, pers. comm. with M. Jelić); the Forest Research Institute in Jastrebarsko, which curates a collection partly available online (https://stetnici.sumins.hr/SumskiStetnici/); and a small teaching collection at the Faculty of Forestry, University of Zagreb (pers. comm. with M. Franjević).

Cecidological collections play an important role in preserving specimens that may provide an opportunity to designate types when the originals are lost, destroyed, or were never preserved. This is especially important for species that are old, poorly described, subject to taxonomic uncertainty, or originally published as *nomen nudum*. The cecidological collection assembled by Vlasta Mužny for the Croatian territory, as part of her graduate thesis research (MUŽNY, 1954), preserved within the zoological collection of the Department of Biology, Faculty of Science, University of Zagreb, have those characters and deserves to be revised and presented.

MATERIAL AND METHODS

Specimens were collected in July, August, and November of 1952, and each month from April to November of 1953, at seven locations - Kovačevljansko brdo (known also as Kovačevačko brdo), Ljupina, Okučani, Prvča, Slavča, Strmac and Šumetlica, in continental Croatia (Fig. 1). Studied material has been deposited in the Zoological Collection of the Department of Biology, Faculty of Science, University of Zagreb. For each specimen, the gall inducer species, location, sampling date, and host plant species were recorded. Besides the preserved material of sampled galls, V. Mužny legacy also includes original drawings of the sampled species as a part of her diploma thesis (MUŽNY, 1954), and part of them are also presented here (Figs 2-4).

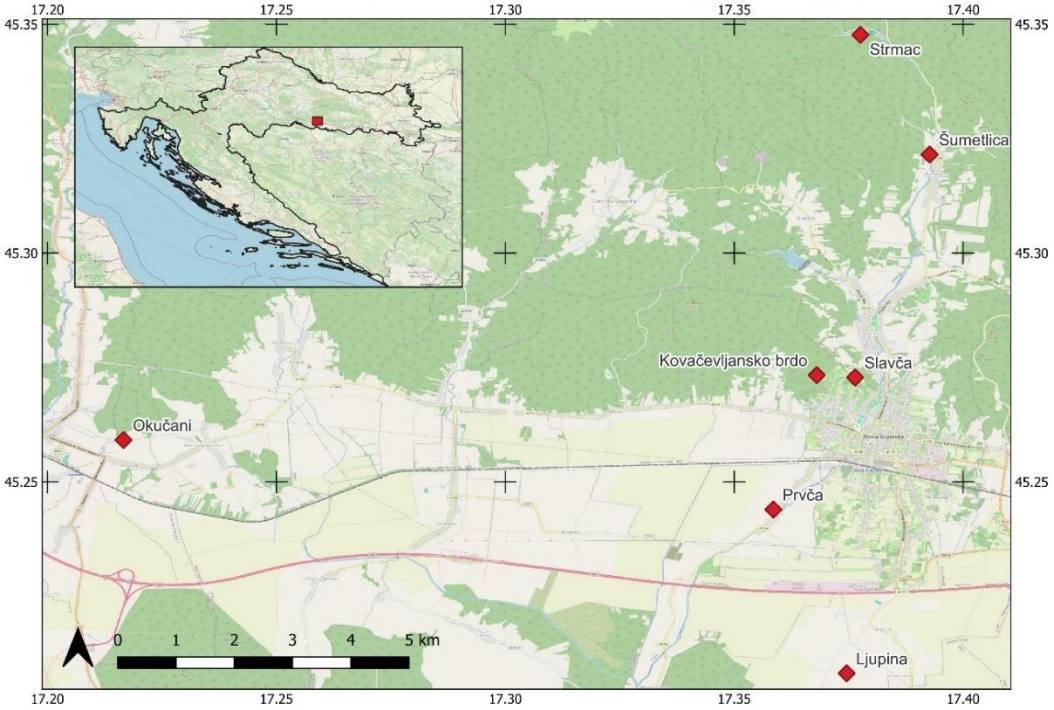


Fig. 1. Inner (smaller) map show position of the study area (red rectangle) in Croatia. Red diamonds indicate approximate position of surveyed localities listed in the Tab. 1. Background map is OpenStreetMap (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA), https://www.openstreetmap.org and contributors).

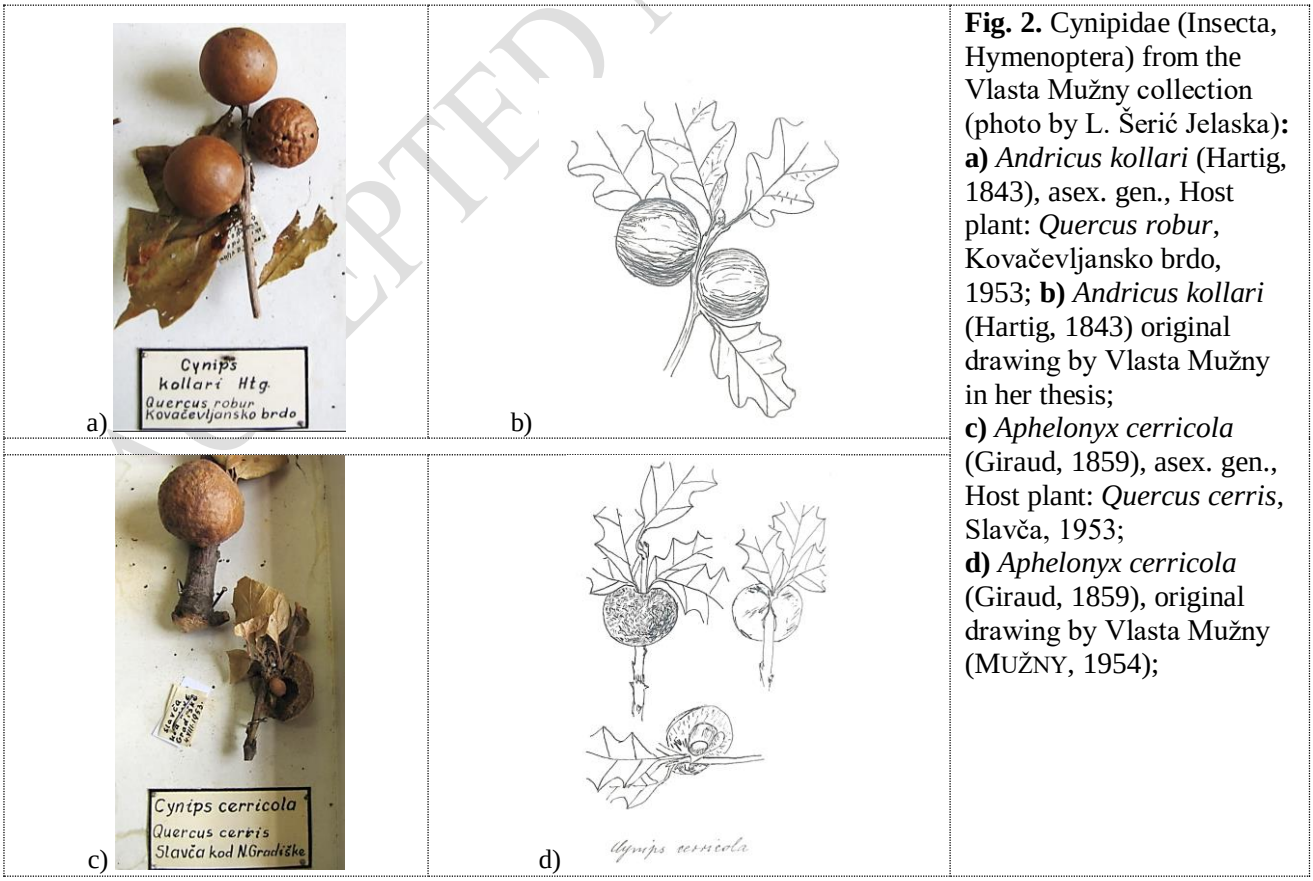
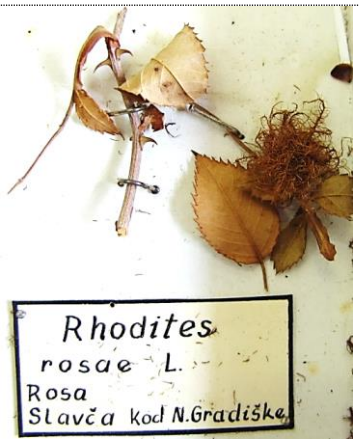


Fig. 2. Cynipidae (Insecta, Hymenoptera) from the Vlasta Mužny collection (photo by L. Šerić Jelaska)**:** **a)** *Andricus kollari* (Hartig, 1843), asex. gen., Host plant: *Quercus robur*, Kovačevljansko brdo, 1953; **b)** *Andricus kollari* (Hartig, 1843) original drawing by Vlasta Mužny in her thesis; **c)** *Aphelonyx cerricola* (Giraud, 1859), asex. gen., Host plant: *Quercus cerris*, Slavča, 1953; **d)** *Aphelonyx cerricola* (Giraud, 1859), original drawing by Vlasta Mužny (MUŽNY, 1954);

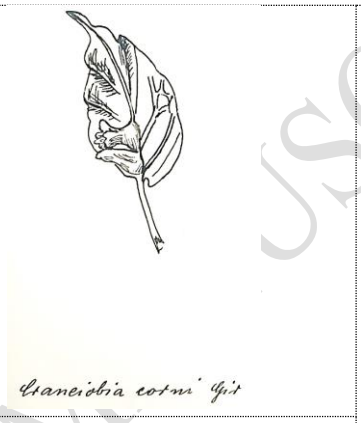


e)

f)

e) *Diplolepis rosae* (Linnaeus 1758), Host plant: *Rosa* sp., Slavča, 1953;
f) *Diplolepis rosae* (Linnaeus 1758), original drawing by Vlasta Mužny.

a)



b)

c)

d)

e)

f)

Fig. 3. Cecidomyiidae (Insecta, Diptera) from the Vlasta Mužny collection (photo by L. Šerić Jelaska)**:**
a) *Craneiobia corni* (Giraud, 1863), Host plant: *Cornus sanguinea*, Kovačevljansko brdo, 1953;
b) original drawing of *Craneiobia corni* by Vlasta Mužny;
c) *Eriosoma lanuginosa* (Hartig, 1839), Host plant: *Ulmus campestris*, Slavča, 1953;
d) original drawing by Vlasta Mužny;
e) *Contarinia cybelae* (syn. *Contarinia coryli*), and
f) *Contarinia subulifex*, from the Vlasta Mužny collection.

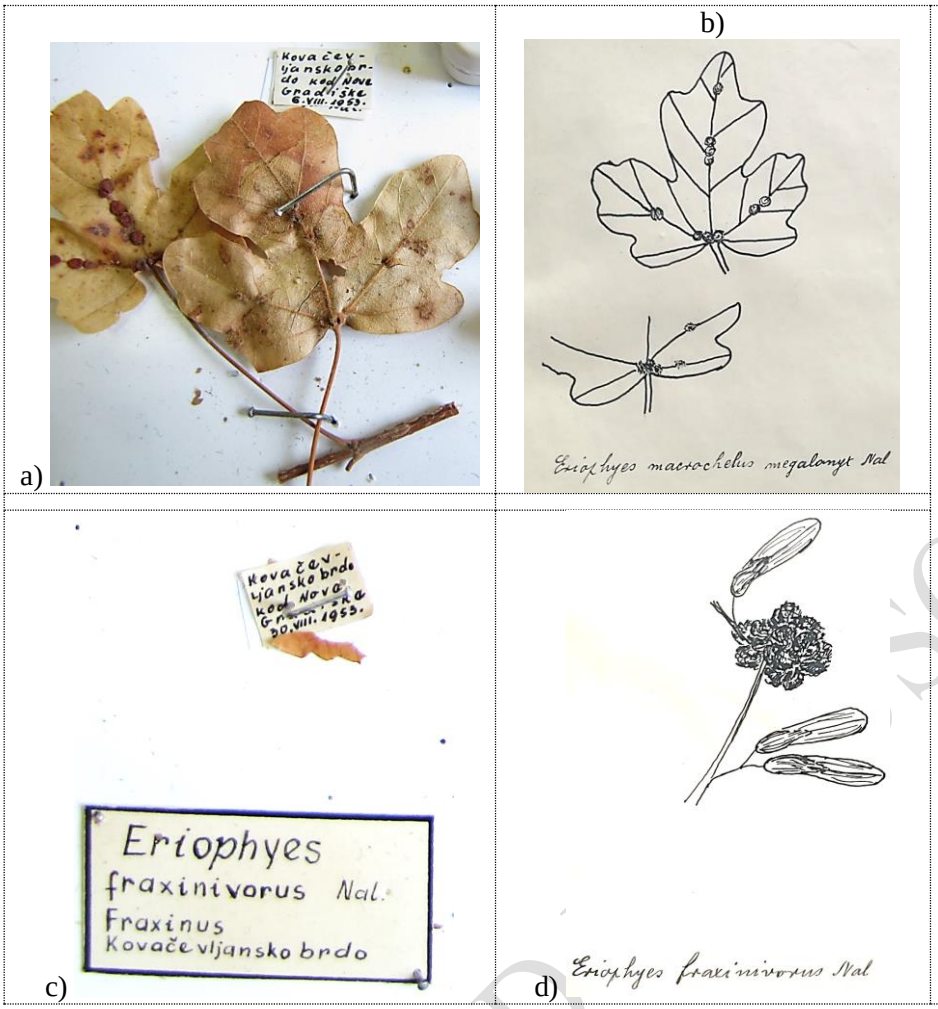


Fig. 4. Eriophydae (Arachnida, Acari) from the Vlasta Mužny collection (photo by L. Šerić Jelaska)**:** **a)** *Aceria macrochela* (Nalepa, 1891), host plant: *Acer campestris*, Kovačevljansko brdo, 1953; **b)** original drawing by Vlasta Mužny; **c)** *Aceria fraxinivora* (Nalepa, 1909), Kovačevljansko brdo, 1953, an exemplar from the collection was damaged and is not present in the collection in its current stage; **d)** the original drawing by Vlasta Mužny in her thesis.

RESULTS

In the cecidological collection of Vlasta Mužny 56 galls were recorded. They were induced by insect species from the orders Hymenoptera with 23 species and 27 specimens, Homoptera Sternorrhyncha with 9 species, and Diptera with 8 species, as well as by 12 species of mites. The specimens are sorted in five entomological boxes arranged by arthropod groups. Two galls are fully damaged, specifically those induced by *Aceria fraxinivora* (Nalepa, 1909) (Acari Eriophyidae) and by *Pemphigus vesicarius* Passerini, 1861 (Homoptera Sternorrhyncha), but labels remained in the boxes and the specimens' outer morphology can be patterned by the drawings in V. Mužny thesis (Tab. 1, Fig. 4c). Galls were collected from 21 host plant species. In addition to the gall-inducing species, the host plant species for each gall is also recorded (Tab. 1).

Tab. 1. List of gall-inducing species, host plants species, sampling dates and sites, and identification codes in the zoological collection, ordered by the position of galls within entomological boxes. This collection is part of the internal *Catalogus collectionum entomologicarum Divisionis zoologicae Facultatis Scientiarum Naturalium et Mathematicarum Zagrabiae*, volume II: *Cecidia – Vlasta Mužny* (VM 1–56).

Animal species	Host plant	Sampling date D/M/Y	Sampling site	Collection ID code
Arachnida, Acari, Eriophydae				
Eriophyes tiliae (Pagenstecher, 1857)	*Tilia* sp.	28.08.1953.	Kovačevljansko brdo	VM01
Aculus tetanothrix (Nalepa, 1889)	*Salix* sp.	30.07.1953.	Strmac	VM02
Aceria inangulis (Nalepa, 1919)	*Alnus glutinosa* (L.) Gaertn.	4.07.1952.	Kovačevljansko brdo	VM03
Aceria fraxinivora (Nalepa, 1909),	*Fraxinus* sp.	30.08.1953.	Kovačevljansko brdo	VM04 no exemplar
Aceria macrochelus (Nalepa, 1891)	*Acer campestre* L.	6.08.1953.	Kovačevljansko brdo	VM05
Aceria cephaloneus (Nalepa, 1922)	*Acer campestre* L.	20.08.1953.	Kovačevljansko brdo	VM06
Eriophyes exilis (Nalepa, 1892)*	*Tilia* sp.	28.08.1953.	Kovačevljansko brdo	VM07
Aculops macrotrichus (Nalepa, 1889)	*Carpinus betulus* (L.)	8.8.1953	Kovačevljansko brdo	VM08
Aceria tenella (Nalepa, 1892)	*Carpinus betulus* (L.)	9.09.1953.	Strmac	VM09
Colomerus vitis (Pagenstecher, 1857)	*Vitis vinifera* L.	20.07.1953.	Slavča	VM10
Aceria populi (Nalepa, 1889)	*Populus nigra* L.	3.07.1953.	Ljupina	VM11
Eriophyes pyri (Pagenstecher, 1857)	*Malus sylvestris* Mill.	20.08.1953.	Slavča	VM12
Insecta, Homoptera, Sternorrhyncha				
- **Aphidoidea, Aphididae**				
Pemphigus bursarius (Linnaeus, 1758)	*Populus nigra* L.	10.05.1953.	Okučani	VM13
Pemphigus filaginis (Boyer der Fonscolombe, 1841)	*Populus nigra* L.	12.09.1953.	Prvča	VM14
Pemphigus vesicarius Passerini, 1861	*Populus nigra* L.	28.11.1953.	Prvča	VM15 no exemplar
Pemphigus immunis Buckton, 1896 *Syn. Pemphigus lichtensteini* Tullgr.	*Populus nigra* L.	3.07.1953.	Ljupina	VM16
Pemphigus spyrothecae Passerini, 1860	*Populus nigra* L.	12.09.1953.	Prvča	VM17
Tetraneura ulmi (Linnaeus, 1758)	*Ulmus glabra* Huds.	4.06.1953.	Slavča	VM18
Eriosoma lanuginosum (Hartig, 1839)	*Ulmus glabra* Huds.	20.10.1953.	Slavča	VM19
Eriosoma ulmi (Linnaeus, 1758)	*Ulmus glabra* Huds.	4.06.1953.	Slavča	VM20
- **Aphidoidea, Adelgidae**				
Adelges (Sacchiphantes) abietis (Linnaeus, 1758), Syn. *Chermes abietis* L.	*Abies alba* Mill.	9.09.1953.	Strmac	VM21
Insecta, Diptera, Cecidomyiidae				
Hartigiola annulipes (Hartig, 1839), *Syn. Cecidomyia piligera* Loew, 1850	*Fagus sylvatica* L.	9.09.1953.	Strmac	VM22
Janetia cerris (Kollar, 1850)	*Quercus cerris* L.	30.08.1953.	Slavča	VM23
Dryomyia circinans (Giraud, 1861)	*Quercus cerris* L	30.08.1953.	Slavča	VM24
Contarinia subulifex Kieffer, 1897	*Quercus cerris* L	5.07.1953.	Slavča	VM25
Craneiobia corni (Giraud, 1863)	*Cornus sanguinea* L.	5.07.1953.	Kovačevljansko brdo	VM26
Macrodiplosis roboris (Hardy, 1854), *Syn. Macrodiplosis volvens* Kieffer, 1895	*Quercus robur* L.	30.07.1952.	Kovačevljansko brdo	VM27

Animal species	Host plant	Sampling date D/M/Y	Sampling site	Collection ID code
Macrodiplosis pustularis (Bremi, 1847), *Syn. Diplosis dryobia* Löw, 1877	*Quercus robur* L.	21.08.1952.	Strmac	VM28
Contarinia cybelae Gagné, 1972, Syn. Contarinia coryli (Kaltenbach, 1859) , *Diplosis corylina* Löw, 1878	*Corylus avellana* L.	9.09.1953.	Strmac	VM29
Insecta, Hymenoptera				
- **Cynipidae**				
Andricus conglomeratus (Giraud, 1859), asex gen., Syn. *Cynips conglomeratus* Giraud, 1859	*Quercus robur* L.	19.08.1953.	Slavča	VM30
Andricus lignicolus (Hartig, 1840), asex. Gen., Syn. *Cynips lignicolus* Hartig, 1840	*Quercus robur* L.	26.07.1953.	Kovačevljansko brdo	VM31
Andricus kollari (Hartig, 1843), asex.gen.	*Quercus robur* L.	6.08.1953.	Kovačevljansko brdo	VM32
Andricus polycerus (Giraud, 1859), asex.gen., *Cynips polycerus* Giraud, 1859	*Quercus robur* L.	19.08.1953.	Slavča	VM33
Andricus glutinosus (Giraud, 1859), asex.gen., Syn. *Cynips glutinosa* Giraud, 1859	*Quercus robur* L.	9.09.1953.	Strmac	VM34
Aphelonyx cerricola (Giraud, 1859), asex. Gen., Syn. *Cynips cerricola* Giraud, 1859	*Quercus cerris* L	4.08.1953.	Slavča	VM35
Andricus quercuscalicis (Burgsdorf 1783), asex.gen., Syn. *Cynips quercuscalicis* Burgsdorff, 1783	*Quercus robur* L.	29.7.1953.	Kovačevljansko brdo	VM36
Andricus hungaricus Hartig, 1843, asex.gen., Syn. *Cynips hungaricus* Hartig, 1843	*Quercus robur* L.	18.10.1953.	Kovačevljansko brdo	VM37
Andricus quercuscalicis (Burgsdorf, 1783), asex.gen., Syn. *Cynips quercuscalicis* Burgsdorff, 1783	*Quercus robur* L.	2.08.1953.	Strmac	VM38
Synophrus politus Hartig, 1843	*Quercus cerris* L	4.08.1953.	Slavča	VM39
Andricus foecundatrix (Hartig, 1840), asex.gen.	*Quercus cerris* L	9.07.1953.	Strmac	VM40
Andricus quercusradicis (Fabricius, 1798), sex.gen.	*Quercus cerris* L	15.08.1953.	Slavča	VM41
Andricus curvator Hartig, 1840, sex.gen.	*Quercus robur* L.	6.08.1953.	Kovačevljansko brdo	VM42
Neuroterus anthracinus (Curtis, 1838), asex. Gen.	*Quercus robur* L.	5.08.1952.	Kovačevljansko brdo	VM43
Neuroterus quercusbaccarum (Linnaeus, 1758), asex.gen.	*Quercus robur* L.	9.09.1953.	Strmac	VM44
Neuroterus quercusbaccarum (Linnaeus, 1758), sex.gen.	*Quercus robur* L.	2.04.1953.	Strmac	VM45
Animal species	**Host plant**	**Sampling date D/M/Y**	**Sampling site**	**Collection ID code**
Neuroterus albipes (Schenck, 1863), asex.gen.	*Quercus robur* L.	12.08.1953.	Strmac	VM46
Biorhiza pallida (Olivier, 1791), sex.gen.	*Quercus robur* L.	1.04.1953.	Kovačevljansko brdo	VM47
Aphelonyx cerricola (Giraud, 1859), asex.gen.	*Quercus cerris* L	27.11.1952.	Slavča	VM48

Animal species	Host plant	Sampling date D/M/Y	Sampling site	Collection ID code
Synophrus politus Hartig, 1843, sex.gen.	*Quercus cerris* L	6.08.1953.	Slavča	VM49
Cynips quercusfolii (Linnaeus, 1758), asex.gen.	*Quercus robur* L.	1.09.1953.	Slavča	VM50
Cynips longiventris Hartig, 1840, asex. Gen.	*Quercus robur* L.	29.09.1953.	Strmac	VM51
Cynips divisa Hartig, 1840, asex.gen.	*Quercus robur* L.	4.09.1953.	Kovačevljansko brdo	VM52
Diplolepis rosae (Linnaeus, 1758), Syn. *Rhodites rosae* (Linnaeus, 1758)	*Rosa* sp.	6.08.1953.	Slavča	VM53
Diastrophus rubi (Bouché, 1834)	*Rubus* sp.	9.09.1953.	Strmac	VM54
- **Tenthredinidae**				
Nematus miliaris (Panzer, 1797)	*Salix alba* L.	9.09.1953.	Šumetlica	VM55
Phyllocolpa leucapsis (Tischbein, 1846), Syn. *Pontania leucapsis* (Tischbein, 1846)	*Salix cinerea* L.	9.09.1953.	Šumetlica	VM56

***The precise identification of the exemplar can not be confirmed.**

Among the galls induced by Cynipidae (Hymenoptera), 23 specimens were collected from *Quercus robur* L. and *Q. cerris* L., two from *Salix*, and one each from *Rosa* and *Rubus*. Homopteran galls were collected from *Populus* (5), *Ulmus* (3), and *Picea* (1). Dipteran galls were found on *Quercus* (5), *Fagus* (1), *Cornus* (1), and *Corylus* (1). Mite-induced galls were collected from various host trees, including *Tilia*, *Salix*, *Alnus*, *Fraxinus*, *Acer*, *Carpinus*, *Populus*, and *Pyrus*, and one species was collected from the *Vitis vinifera*.

DISCUSSION

This collection is one of the few zoocecidia collections in Croatia, and it is relatively well preserved, with just two specimens being almost completely damaged and the rest was preserved to be available for revision (Tab. 1, Fig. 4c). The aim of revising and publishing this material is to make it accessible to students and researchers. The availability of gall collections can support new projects in Croatia in order to enlarge the knowledge on this ecological group of organisms, and allow for comparisons between present and historical biodiversity. It could also help compile a comprehensive checklist of Croatian galls, as current data are scattered across various sources.

In addition to gall specimens collected in Croatia in the end of 19th and beginning of 20th century - such as Korlević and Koča collection in Natural History Museum in Zagreb and Koščec collection in Varaždin City Museum in Croatia, Ross's cecidological herbarium at the Botanische Staatssammlung München, in Germany, with Jaap's samples from Dalmatia and Istria (LANGHOFFER, 1915; JAAP, 1919/20; ROSS & JAAP, 1922, GJURAŠIN, 1996; SKUHRAVÁ *et al*., 2014; MANDRIOLI *et al*., 2024) – there are few publications of sampling events and

individual records of galls in the recent decades (e.g., PERNEK & MATOŠEVIĆ, 2009; MATOŠEVIĆ *et al*., 2010; MATOŠEVIĆ & PERNEK, 2011; KWAST 2012; GRUBIŠIĆ, 2019; BERNARDO *et al*., 2021; SKUHRAVÁ & SKUHRAVÝ, 2021).

Few invasive alien species have also been recorded in Croatia up to now. *Obolodiplosis robiniae* Haldeman (Diptera: Cecidomyiidae), the locust gall midge, was first reported in 2008 in the continental, sub-Mediterranean, and Mediterranean regions, *Dasineura gleditchiae* Osten Sacken (Diptera: Cecidomyiidae), which forms galls on *Gleditsia* leaves. *Dryocosmus kuriphilus* Yatsumatsu (Hymenoptera: Cynipidae), the chestnut gall wasp, has been now found in both the continental and sub-Mediterranean parts of Croatia, and is considered a significant pest of sweet chestnut (*Castanea sativa* Mill.), with quarantine status in both Europe and Croatia (MINISTARSTVO POLJOPRIVREDE, RIBARSTVA I RURALNOG RAZVOJA, 2008; EPPO, 2010; MATOŠEVIĆ *et al*., 2010). To protect natural sweet chestnut forests from the invasive *D. kuriphilus*, the parasitoid wasp *Torymus sinensis* Kamijo was introduced and released in Croatia, Hungary and Slovenia in 2014 and 2015 (MATOŠEVIĆ *et al*., 2016).

Some current findings in Croatia can be found at the website https://stetnici.sumins.hr/SumskiStetnici/Index/ maintained by The Forest Research Institute in Jastrebarsko that regularly updates new records of galls among other forest pests recorded in Croatian forests. A recent contribution was made by Eckbert Kwast. He recorded 87 species in the north-western part of Croatia with Istrian peninsula during the period of 1997–2009 and described an asexual female of the rare species *Andricus korlevici* Kieffer (KWAST, 2012). Additionally, a recently described species, *Asphondylia micromeriae* Bernardo et al. (Diptera: Cecidomyiidae), which induces flower bud galls on *Micromeria graeca* (L.) was also found in Slatina (Dalmatia, Croatia) (BERNARDO *et al*., 2021).

Vlasta Mužny's cecidological collection, dating from the mid-20th century, helps bridge a gap in the inventory of gall-inducing species in Croatia. Although it does not contain a large number of species (52), it represents a valuable contribution to our knowledge, particularly regarding galls in the continental part of the country with a new record for Croatia, as no previous published data have been found. However, some material, such as that held at the Varaždin City Museum, still needs to be inventoried and documented (pers. Comm. With M. Jelić). Among Diptera, we found no published records for Croatia for *Contarinia cybelae* (syn. *Contarinia coryli* (Fig. 3e), and for *Contarinia subulifex* (Fig. 3f) there is a record from 'Yugoslavia' in SKUHRAVÁ & SKUHRAVÝ (2021), but without a specific toponym, so we are not sure whether the location was in Croatia or in another republic of the former Yugoslavia. Also, though some species have been recorded for the country like adult of *Nematus miliaris* (Hymenoptera:

Symphyta), but to our knowledge their galls were not collected nor published for Croatia. Therefore, making the collections from other institutions like Varaždin or Zagreb museums available would enhance the overall knowledge on biology, ecology and distribution of these groups, and can provide the possibilities to the specialist to get a new type specimens for species that have been poorly described and more. Although some species, such as *Nematus miliaris* (Hymenoptera: Symphyta) adults, have been recorded in Croatia (PEROVIĆ, 1996/1997), to our knowledge their galls have neither been collected nor published. Therefore, making collections from other institutions - such as the Varaždin or Zagreb museums - available would significantly enhance the overall knowledge of the biology, ecology, and distribution of these groups. It could also provide specialists with the opportunity to obtain new type specimens for species that have been poorly described, or designate types when the originals are lost, destroyed, or were never preserved.

The collection is well-preserved and can be used for morphological comparisons and to better understand the distribution of galls in Croatia. Two specimens - one Acari and one Homopteran - that are completely damaged are nonetheless recorded in Mužny's thesis and depicted in her drawings, which adds further value to the collection (Figs. 4c, d).

CONCLUSION

Gall collections can significantly contribute to research in taxonomy, systematics, and ecology. Even a small, well-preserved collection such as Vlasta Mužny's can have national significance, especially given the scarcity of such collections in Croatia. This highlights the importance of preserving natural collections not only in museums, but also in university departments and research institutions, and making them accessible not only to researchers studying gall biology, but also to those working in plant and animal taxonomy. Such efforts can make meaningful contributions to the knowledge of cecidia in continental Croatia and may help stimulate future inventory efforts in the country, thereby enhancing our understanding of its biodiversity.

Author contributions

Conceptualization, dana curation, and funding acquisition were carried out by LSJ. Validation, including taxonomic identification and species revision, was performed by DM, MS, EDL, LSJ and GM. The methodological approach and taxonomic updates were agreed upon by all authors. LSJ wrote the original draft, which was thoroughly reviewed and edited by all co-authors.

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SUMMARY

Cecidia in the Zoological Collection of the Department of Biology, Faculty of Science in Zagreb, including species new to Croatia

L. Šerić Jelaska, D. Matošević, E. De Lillo, M.Skuhravá & G. Melika

Galls, or cecidia, have been studied by botanists, zoologists, and microbiologists, as they can be induced by various animals, bacteria, viruses, and fungi. Although galls may occur on certain host plants, they are typically induced by specific species.

This paper presents the cecidological collection held in the zoological collection of the Department of Biology, Faculty of Science, University of Zagreb. The collection was assembled by Vlasta Mužny as part of her graduate thesis research in 1953. Most of the galls were sampled in seven locations in the vicinity of the town of Nova Gradiška, in continental Croatia.

In total, 56 galls were recorded, induced by insect species belonging to the orders Hymenoptera (23 species, 27 specimens), Hemiptera (9 species) and Diptera (8 species), and by Acari (12 species). Most of them are well preserved, and dipteran species *Contarinia cybelae* Gagné, 1972 is new to Croatia.

This collection is one of the few publicly available zoocecidia collections in Croatia stressing the importance of preserving natural history collections within university departments. It makes a valuable contribution to our understanding of cecidia in continental Croatia. By making this collection accessible, it can support further research in taxonomy, systematics, and conservation.