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OAK GALL WASPS OF UKRAINE (HYMENOPTERA: CYNIPIDAE, CYNIPINI)

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Oak gallwasps of Ukraine (Hymenoptera: Cynipidae, Cynipini). – George Melika – *Cynipid gallwasps (Hymenoptera: Cynipidae) comprise 1,364 species worldwide, predominantly in temperate regions of the Holarctic. The vast majority of recorded species are from the Nearctic and the Western Palaearctic. The most species-rich tribe is the oak gallwasps (Cynipini) with 158 described species from the Western Palaearctic, which from 116 species are known from Europe. In the present paper we summarise the current knowledge of oak gallwasps (Cynipini) of Ukraine, and list a total of 79 species.*
Keywords: *asexual generation, sexual generation, distribution, lifecycle, phenology, Quercus.*
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Дубові горіхотворки України (Hymenoptera: Cynipidae, Cynipini). – Жорж Меліка. – *Світова Фауна горіхотворок (Hymenoptera: Cynipidae) налічує 1364 види, що поширені здебільшого у помірних регіонах Голарктики. Переважна більшість видів описані з Неарктики та Західної Палеарктики. Найбільше видове багатство характерне для триби дубових горіхотворок (Cynipini), що є самою великою за кількістю видів групою родини з приблизно 1000 відомими видами світової фауни з 40 родів. З них 158 видів описані із Західної Палеарктики, а для Європи відомі 116 видів. Більшість з них формують гали на дубах (Quercus L. spp.). У даній роботі підсумовано сучасні відомості про поширення дубових горіхотворок (Cynipini) України, та загалом наведено 79 видів для її території. Всі ці види також відомі з території Закарпаття, і лише 18 з них були зафіксовані в інших регіонах країни. Перелічені види Cynipini трофічно пов'язані з такими видами роду Quercus L.: група видів Quercus sensu stricto: Q. boissieri, Q. canariensis, Q. coccifera, Q. dalechampii, Q. faginea, Q. frainetto, Q. hartwissiana, Q. інфекція, Q. lusitanica, Q. macranthera (= iberica), Q. pubescens (= virgiliana), Q. pyrenaica, Q. robur (= longipes, = pedunculiflora); група видів Cerris: Q. brantii, Q. castaneifolia, Q. cerris, Q. ilex, Q. ithaburensis, Q. libani, Q. suber, Q. trojana. В Україні відомі природні місця зростання чотирьох видів дуба: Q. petraea, Q. pubescens, Q. robur і Q. cerris. Види, наведені у даній роботі були зібрані автором протягом багатьох років польових робіт на території Закарпатської області в період з 1992 по 2016 рр. Крім того, детально проаналізовано колекцію Cynipidae (галів та імаго) інституту зоології ім. І.І. Шмалгаузена НАН України, м. Київ. Список видів подано в алфавітному порядку. Для кожного виду наведено валідну назву, рослини-хазяї (кормові), особливості життєвого циклу і фенології, поширення (як в межах Україні, так і загальне). В пункті «Рослини-хазяї» надана інформація щодо кормових рослин в України, які також поширені і є хазяями на решті території Західної Палеарктики. Однак, у випадку наявності в інших частинах регіону Західної Палеарктики ще й інших видів рослин-хазяїв, таку інформацію наведено у підпункті «Elsewhere».*
Ключові слова: *безстатеве покоління, статеве покоління, поширення, життєвий цикл, фенологія, Quercus.*
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Introduction

The higher-level taxonomy of extant Cynipidae has been extensively revised recently and the eight previously recognised tribes are now divided into 12 tribes (Ronquist et al. 2015). Oak gallwasps (Hymenoptera: Cynipidae: Cynipini) are by far the most species-rich group of gallwasps, with about 1,000 known species in approximately 40 genera worldwide (Melika, Abrahamson 2002, Abe et al. 2007, Csóka et al. 2005, Liljeblad et al. 2008, Melika et al. 2010, Pénzes et al. 2018). As their name suggests, the majority of oak gallwasps induce galls on oak trees (*Quercus* L. spp.). The genus *Quercus* comprises 531 described species with two long-established subgenera, the widely distributed subgenus *Quercus* with a Holarctic distribution and the Asian endemic subgenus *Cyclobalanopsis* (Govaerts, Frodin 1998). The subgenus *Quercus* is itself divided into four sections (Lobatae, Protobalanus, Quercus sensu stricto, and Cerris) (Manos, Stanford 2001), which from two sections, Quercus sensu stricto and Cerris, are distributed in Ukraine also.

Most Cynipini show cyclical alternation between sexual (spring) and asexual (fall) generations, which differ markedly in both wasp and gall morphology, and may develop on different host-plant organs or sometimes on different host-plant species (Folliot 1964, Pujade-Villar et al. 2001, Melika, Abrahamson 2002, Melika 2006). Consequently, the association between the sexual and asexual generations of the same species was problematic but currently is resolved with molecular markers (e.g., Stone et al. 2008).

The Western Palaearctic as here defined includes Europe east to the western foothills of the Ural Mountains, the Transcaucasia, Turkey, Iran, Syria, Lebanon, Jordan, Israel and North Africa (Algeria, Morocco, Tunisia). Fauna of Cynipini of the Western Palaearctic and Europe is well known, the distribution, lifecycles, phenology, host associations were summarized in Melika (2006) for those species which were known for the fauna of Ukraine, with a citation of large number of references. The cynipid fauna of Asia Minor, Israel, Iran received limited attention so far, but recently data is available from Iran and Turkey (e.g., Azizkhani et al. 2006, Tavakoli et al. 2008; Melika et al. 2010, 2011, Dinc et al. 2014, Mutun et al. 2014, Azmas, Katilmış 2017), Jordan, Syria and Lebanon (Nieves-Aldrey, Massa 2006, Rizzo, Askew 2009) and a complete list of species from Israel (Shachar et al. 2015, 2018). Species numbers for the Western Palaearctic were taken from Pénzes et al. (2018). Some nomenclatorial acts since 2006 were taken into account also (Melika et al. 2010, Shachar et al. 2018).

Numerous papers were published on the oak gallwasp (Cynipini) fauna of Ukraine and particularly that of the Transcarpathian Region (Diakontschuk 1987, Bochenko 1989, Diakontschuk, Melika 1994, Shevchenko 1955, Zerova, Diakontschuk, Ermolenko 1988, Bahanych 1984, 1989, Csóka, Melika 1993, Melika et al. 1993, Melika, Csóka 1994). A complete gallwasp (Hymenoptera: Cynipoidea, Cynipidae) faunistic review for Ukraine was given for the first time by Melika (2006) where 167 species of Cynipidae were listed.

Materials and Methods

The species listed below were collected by the author during many years of field works in the Transcarpathian Region from 1992 untill 2016. Also the Cynipidae collection (galls and adults) deposited at the I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (Kiev) were analysed in details by the author and currently valid species, found in different parts of Ukraine and were not published yet, are also included into the list. Earlier publications on oak gallwasps of Ukraine are also taken into account (Bahanych 1989, Bochenko 1989, Csóka, Melika 1993, Diakontschuk, Melika 1994, Melika 1993, 2006, Melika, Csóka 1994, Melika et al. 1993, Shevchenko 1955, Zahajkevich 1954, Zerova et al. 1988). Listed species names are currently valid according to the rules of the International Code of Zoological Nomenclature (1999) (ICZN). Because of many recent nomenclatorial changes, some familiar names are no longer used and currently recognised species and generic names are given.

The Cynipini species listed here are associated with the following *Quercus* L. species: *S*ection Quercus sensu stricto: *Q. boissieri*, *Q. canariensis*, *Q. coccifera*, *Q. dalechampii*, *Q. faginea*, *Q. frainetto*, *Q. hartwissiana*, *Q. infectoria*, *Q. lusitanica*, *Q. macranthera* (= *iberica*), *Q. pubescens* (= *virgiliana*), *Q. pyrenaica*, *Q. robur* (= *longipes*, = *pedunculiflora*). Section Cerris: *Q. brantii*, *Q. castaneifolia*, *Q. cerris*, *Q. ilex*, *Q. ithaburensis*, *Q. libani*, *Q. suber*, *Q. trojana*. In Ukraine natural stands of four oak species are known: *Q. petraea*, *Q. pubescens*, *Q. robur* and *Q. cerris*. In the section **Host plants** we give host oaks for Ukraine which are also distributed and serve as hosts in the rest of the Western Palaearctic; under "Elsewhere" those host oak species are given which are not distributed in Ukraine but serve as host plants in other parts of the Western Palaearctic Region. For species, the alternate generations of which develops on the same *Quercus* species, the host oaks in the Host plant section are listed without showing which generation they belong to. If the alternate generations of the same gallwasp species develop on different sections of oaks (section Quercus sensu stricto and section Cerris) than the host plants are given for the both alternate generations.

Results

Following is an annotated list of the Cynipini of Ukraine in alphabetical order. The details for each species include information on host plants in Ukraine and elsewhere in the Western Palaearctic, life history, phenology, distribution in Ukraine and elsewhere. In Melika (2006) species of Cynipini which presumably can be find in the Transcarpathia region were mentioned. However, during numerous field works, taken by the author from 2006 till 2016, those species were never documented and thus in the current list they are not given. Below only those species are listed which were found by the author.

***Andricus amblycerus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens.*
Lifecycle and Phenology. Only an asexual generation is currently known for this species. Bud galls appear in August, mature in autumn and adults emerge next year, in March-June.
Distribution. Ukraine: Transcarpathian Region (Rafajlovo) (Melika 2006). Elsewhere: Eastern and Southern Europe, Turkey.

***Andricus amenti* Giraud, 1859**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Folliot 1964). The gall of the asexual generation develops through the summer, and matures in the autumn and falls from the tree; adults emerge in the following spring. A spring sexual generation gall develops soon after the appearance of the catkins, adults mature in May, emerge immediately.
Distribution. Ukraine: Transcarpathian region (Velyka Dobrony, Kosino, Yulijivski Hory, Rafajlovo) (Melika 2006). Elsewhere: Europe.

***Andricus aries* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur* for asexual galls. Elsewhere: *Q. petraea*, *Q. pubescens* for the asexual galls; *Q. cerris* for the sexual galls.
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Walker 2001). The asexual gall develops through the summer, adults emerge in autumn. The structure of the sexual generation gall which develops within axillary buds of *Q. cerris* has not yet been described.
Distribution. Ukraine: Transcarpathian Region (Kamjanica, Uzhhorod district) (Csóka, Melika 1993). Europe.

***Andricus caliciformis* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur*. Europe: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. dalechampii*, *Q. hartwissiana*, *Q. infectoria*.
Lifecycle and Phenology. Only the asexual generation is known. The galls start their development in early summer, mature in August.
Distribution. Ukraine: Transcarpathian Region, lowland part, rare (Csóka, Melika 1993). Europe, Iran.

***Andricus callidoma* (Hartig, 1841)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. dalechampii*, *Q. hartwissiana*, *Q. faginea*, *Q. lusitanica*, *Q. pyrenaica.*
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Adler 1881). Sexual adults emerge in May-June. The asexual gall appears at the end of May and falls from the tree in July-August. The asexual adults emerge the following spring, or may diapause for a year.
Distribution. Ukraine: Transcarpathian Region (Csóka & Melika 1993). Europe eastwards to Ural Mountains and Ural River (Russia).

***Andricus caputmedusae* (Hartig, 1843)**
Host plants. In Ukraine: *Q. robur*. Europe: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. dalechampii*, *Q. hartwissiana*, *Q. infectoria*, *Q. boissieri.*
Lifecycle and Phenology. Alternating asexual and sexual generations are known. Molecular data suggest that the sexual generation of this species develops in cryptic bud galls (Stone et al. 2008). The developing spines of young asexual galls become visible from May-June. Some of the galls fall in autumn, and mature on the ground. The remainder stay on the tree, and old galls become black. Some adults emerge in late September – early October, while others emerge in February-March. Unlike other *Andricus* species, very few *A. caputmedusae* enter diapause to emerge a year later.
Distribution. Ukraine: Transcarpathian Region (lowland oak forests) (Melika 2006). Europe eastwards to Iran (Shachar et al. 2018).

***Andricus conglomeratus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Europe: *Q. pubescens*, *Q. frainetto*, *Q. dalechampii*, *Q. infectoria.*
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Stone et al. 2008). The asexual gall develops through the summer and matures in late autumn, adults emerge in November-December. The sexual generation galls are small bud galls, hidden under the scales of the bud (of *Q. cerris*) and the structure and phenology of the sexual generation is not described yet.
Distribution. Ukraine: Transcarpathian Region (Zerova et al. 1988, Csóka, Melika 1993). Elsewhere: Europe, Northern Africa, Moldavia, Azerbaijan, Iran.

***Andricus conificus* (Hartig, 1843)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. frainetto*.
Lifecycle and Phenology. This species currently is known only from an asexual generation. However, it has the same DNA sequence as an unpaired sexual generation gall of *Andricus cydoniae* on

Q. cerris and it is probable that these two galls represent the two generations of a single species (Stone et al. 2008). Young asexual galls can be found from mid- to late May. The gall is still soft in September, becoming woody and darker in colour by October. The adults emerge the following March.
Distribution. Ukraine: Transcarpathian Region, rare (Csóka, Melika 1993, Melika 2006). Europe.

***Andricus coriarius* (Hartig, 1843)**
Host plants. In Ukraine: *Q. robur*, *Q. petraea* for the asexual galls. Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. dalechampii*, *Q. hartwissiana*, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*, *Q. macranthera*, *Q. infectoria*, *Q. boissieri* for the asexual galls; *Q. ithaburensis*, *Q. libani*, *Q. cerris* for the sexual galls.
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Stone et al. 2008). The asexual gall develops over the summer, maturing in the late autumn. Most of the adults emerge in the first December. The remainder either emerge in the following summer or remain in diapause for a further year. The sexual generation galls are cryptic bud galls; structure and phenology are not described yet (Stone et al. 2008).
Distribution. Ukraine: Transcarpathian Region, common (Zerova et al. 1988, Melika 2006). Europe, Transcaucasia, Turkey, Iran.

***Andricus coronatus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. dalechampi.*
Lifecycle and Phenology. Currently known only from an asexual generation. The galls develop through the summer, maturing in the autumn. Adults emerge in the following March and April.
Distribution. Ukraine: Transcarpathian Region, rare (Csóka, Melika 1993). Europe, Turkey.

***Andricus corruptrix* (Schlechtendal, 1870)**
Host plants. In Ukraine: *Q. robur* for the asexual galls. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. macranthera*, *Q. canariensis* for the asexual galls; *Q. cerris* for the sexual galls.
Lifecycle and Phenology. Alternate asexual and sexual generations have been recently established (Folliot et al. 2004). The gall of the asexual generation develops in buds in late summer, mature in late September – October, adult wasps overwintering and emerge next year, in May-June. The sexual bud galls develop in the spring, adults emerging in May.
Distribution. Ukraine: Transcarpathian Region (vicinities of Bustino village) (Csóka, Melika 1993). Europe, Northwestern Africa, Turkey, Asia Minor.

***Andricus crispator* Tschek, 1871**
Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. suber*, *Q.castaneifolia.*
Lifecycle and Phenology. Only a sexual generation is known. The gall develops through May, matures in June, and the adults emerge in July and August.
Distribution. Ukraine: Transcarpathian Region (Julijivsky Hory, Kosino and Rafajlovo forest) (Melika 2006). Europe, Azerbaijan, Israel.

***Andricus cryptobius* Wachtl, 1880**
Host plants. *Q. cerris*.
Lifecycle and Phenology. Only a sexual generation of this species is currently known.This gall first appears in April, and the adults emerge in May.
Distribution. Ukraine: Transcarpathian Region (Rafajlovo forest) (author). Austria, Hungary, Romania.

***Andricus curvator* Hartig, 1840**
Host plants. In Ukraine: *Quercus petraea*, *Q. robur*. Elsewhere: *Q. pubescens*, *Q. cerris*, *Q. dalechampii*, *Q. frainetto*, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*. For the sexual generation also *Q. infectoria*, *Q. lusitanica*, *Q. hartwissiana.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881).The galls of the sexual generation appear in April and adults emerge at the end of May – early June. The galls of the asexual generation begin development in June and are mature by October. The asexual adults generally eclose from February to March, though some remain in diapause in the galls for another year.
Distribution. Ukraine: common everywhere (Csóka, Melika 1993, Melika 2006). Europe, Northern Africa, Transcaucasia, Iran.

***Andricus cydoniae* Giraud, 1859**
Host plants. *Q. cerris*.
Lifecycle and Phenology. Only a sexual generation is currently recognised. DNA sequence data for this species are identical to sequences obtained for *Andricus conificus*, and it is likely that these two galls represent the two generations of a single species (Stone et al. 2008).This gall develops in spring, and matures from late May into June. Adults emerge soon afterwards.

Distribution. Ukraine: Transcarpathian Region (Julijivsky Hory, Kosino and Rafajlovo forest) (Melika 2006). Europe, Turkey.

***Andricus dentimitratus* (Rejtö, 1887)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. pubescens*, *Q. petraea.*
Lifecycle and Phenology. Alternate asexual and sexual generations are known (Pujade-Villar 1994). The sexual females and galls are known, however, not described yet (Pujade-Villar 1994). The asexual gall matures and falls in September. Adults emerge in November or in the following spring.
Distribution. Ukraine: Transcarpathian Region (Rafajlovo forest) (Melika 2006). Andorra, Austria, Hungary, Turkey.

***Andricus foecundatrix* (Hartig, 1840)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. pyrenaica*, *Q. faginea*, *Q. lusitanica*, *Q. infectoria*, *Q. boissieri.*
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Adler 1881). A spring gall which begins its development in April and matures in May. The asexual adults emerge in April of the following spring, or may remain in diapause in the leaf litter for a year.
Distribution. Ukraine: Transcarpathian (Csóka, Melika 1993), Poltava and Chernihiv (Shevchenko 1955), Dnipropetrovsk Regions (Bochenko 1989), Crimea (Diakontshuk 1987). Eastern and Central Europe, Transcaucasia, Turkey, Lebanon, Israel, Iran.

***Andricus galeatus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. dalechampii.*
Lifecycle and Phenology. Only an asexual generation of this species is known. Develops through the summer, maturing in the autumn. The adults emerge in June of the following year.
Distribution. Ukraine: Transcarpathian Region (lowland part, rare) (Csóka, Melika 1993). Europe.

***Andricus gallaeurnaeformis* (Boyer de Fonscolombe, 1832)**
Host plants. In Ukraine: *Q. robur.* Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. pyrenaica*, *Q. lusitanica.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Folliot 1964). Both generations induce leaf galls. The sexual generation gall develops very rapidly in the spring. The asexual generation falls with the leaves and adults emerge in April.
Distribution. Ukraine: Transcarpathian Region (vicinities of Velyka Dobrony) (Melika 2006). Europe, Turkey.

***Andricus gemmeus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. petraea* for the asexual galls. Elsewhere: *Q. pubescens*, *Q. robur*, *Q. faginea*, *Q. canariensis*, *Q. infectoria* for the asexual galls; *Q. cerris* probably also *Q. suber*, *Q. brantii*, *Q. libani* for the sexual galls.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Pfützenreiter 1962). A spring gall. The larva of the sexual generation pupates in May-June. Galls of the asexual generation become apparent on the tree by the middle of July. The galls dehisce in the middle of September, and mature in the leaf litter by mid October. The adults eclose in July-August of the following year.
Distribution. Ukraine: Transcarpathian Region (vicinities of Mukachevo, Chervona Hora) (Melika, Csóka 1994). Europe eastwards to Iran.

***Andricus glandulae* (Hartig, 1840)**
Host plants. In Ukraine: *Q. petraea.* Elsewhere: *Q. pubescens*, *Q. robur* for both generations, *Q. pyrenaica* for the asexual galls.
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Docters van Leeuwen 1957). A spring gall, the sexual adults emerging in May-June. The asexual gall develops through the summer, matures in autumn and falls from the tree. At least some of the asexual adults are overwintering and emerge next April.
Distribution. Ukraine: Transcarpathian Region (Chervona Hora in vicinities of Mukachevo, rare) (Melika 2006). Europe.

***Andricus glutinosus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. petraea*. Elsewhere: *Q. robur*, *Q. pubescens*, *Q. dalechampii*, *Q. frainetto*, *Q. hartwissiana*.
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Stone et al. 2008). The asexual gall develops through the summer, and is mature by October; adults emerge next spring. The sexual generation gall is cryptic bud gall, the structure of which and the phenology are not described yet (Stone *et al*. 2008).
Distribution. Ukraine: Transcarpathian Region (Zerova et al. 1988, Csóka, Melika 1993). Austria, Bulgaria, Hungary.

***Andricus grossulariae* Giraud, 1859**

Host plants. In Ukraine: *Q. petraea* for the asexual galls. Elsewhere: *Q. robur*, *Q. pubescens*, *Q. frainetto*, *Q. pyrenaica*, *Q. faginea*, *Q. lusitanica*, *Q. canariensis*, *Q. infectoria*, *Q. macranthera*, *Q. boissieri* for the asexual galls; *Q. cerris*, *Q. suber*, *Q. ithaburensis*, *Q. castaneifolia*, *Q. brantii*, *Q. libani* for the sexual galls.

Lifecycle and Phenology. Alternating asexual and sexual generations are known (Walker 2002). The sexual generation galls develop through May and mature in June, the adult wasps emerging immediately. The asexual generation adult emerges in June. Sometimes the adult remains in diapause for up to two years.

Distribution. Ukraine: Transcarpathian Region (vicinities of Uzhhorod, rare) (Csóka, Melika 1993), Crimea (Diakontshuk 1987). Europe, Northern Africa, Transcaucasia, Asia Minor, Iran.

***Andricus hartigi* (Hartig, 1843)**

Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. dalechampii.*

Lifec ycle and Phenology. Only the asexual generation is known. The gall begins to develop in May, is hard and mature by September, and the adults emerge the following March.

Distribution. Ukraine: Transcarpathian Region (lowland oak forests, rare) (Csóka, Melika 1993). Europe.

***Andricus hungaricus* (Hartig, 1843)**

Host plants. The only known host plant is *Q. robur*.

Lifecycle and Phenology. Only an asexual generation of this species is currently known. The galls mature in October . The adults emerge from February to March, and a proportion diapause within the gall for up to 5 years.

Distribution. Ukraine: Transcarpathian Region (lowland oak forests) (Zerova et al. 1988, Csóka, Melika 1993). Bulgaria, Hungary, Austria, Romania.

***Andricus hystrix* Trotter, 1899**

Host plants. In Ukraine: *Q. robur* for the asexual galls. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. infectoria*, *Q. boissieri* for the asexual galls; *Q. cerris* for the sexual galls.

Lifecycle and Phenology. Alternating sexual and asexual generations are known (Melika et al. 2000, Folliot, Pujade-Villar 2006). Until recently, only the asexual generation of this species was known. The asexual generation gall develops through the summer, matures in late August – early September, and the adult emerges in September. There is no evidence of diapause in this species.

Distribution. Ukraine: Transcarpathian Region (Rafajlivskij forest, Yulijivski Hory) (Melika 2006). Italy, Bulgaria, Hungary, Moldavia, Romania, Asia Minor, Israel.

***Andricus infectorius* (Hartig, 1843)**

Host plants. In Ukraine: *Q. petraea.* Elsewhere: *Q. robur*, *Q. frainetto*, *Q. petraea*, *Q. pubescens*, *Q. dalechampii*, *Q. hartwissiana*, *Q. infectoria*.

Lifecycle and Phenology. Only the asexual generation is known. Galls mature in October and fall from the tree in winter; adults emerge in the next spring.

Distribution. Ukraine: Transcarpathian Region (vicinities of Uzhhorod) (Zerova et al. 1988, Csóka, Melika 1993). Europe, Turkey, Iran.

***Andricus inflator* Hartig, 1840**

Host plants. In Ukraine: *Q. petraea*, *Q. robur.* Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. macranthera.*

Lifecycle and Phenology. Alternating asexual and sexual generations are known. The sexual generation gall first becomes apparent in May and matures by late Summer, when the adults emerge. The asexual galls mature in September-October. Most of the asexual adults eclose following spring, although some continue to emerge over at least two successive years.

Distribution. Ukraine: common everywhere (Zerova et al., 1988; Csóka, Melika 1993). Europe, Transcaucasia, Kazakhstan, Iran.

***Andricus kollari* (Hartig, 1843)**

Host plants. In Ukraine: *Q. petraea*, *Q. robur* for the asexual galls. Elsewhere: *Q. frainetto*, *Q. pubescens*, *Q. faginea*, *Q. pyrenaica*, *Q. canariensis*, *Q. dalechampii*, *Q. hartwissiana* for the asexual galls; *Q. cerris*, *Q. ithaburensis* for the sexual galls.

Lifecycle and Phenology. Alternating sexual and asexual generations are known. Sexual adults emerge in April-May. Asexual galls mature in late Autumn, adults emerge next year, in spring.

Distribution. Ukraine: Transcarpathian Region (Csóka & Melika 1993), Crimea (Diakontshuk 1987, Zerova et al. 1988). Europe, Northern Africa, Azerbaijan, Iran.

***Andricus lignicolus* (Hartig, 1840)**

Host plants. In Ukraine: *Q. petraea*, *Q. robur.* Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. dale-*

champii, *Q. hartwissiana*, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*, *Q. lusitanica.*

Lifecycle and Phenology. Alternating sexual and asexual generations are known. (Docters van Leeuwen, Dekhuijzen-Maasland 1958). The sexual generation galls develop through the early spring and mature in May, and the adults emerge immediately. The asexual generation galls begin their development in late May – early June, and mature from late autumn onwards. The adults of the asexual generation emerge in May of the following year.

Distribution. Ukraine: Transcarpathian (Csóka, Melika 1993), L'viv and Ivano-Frankivsk Regions (Zahajkevich 1958). Southern Europe, Turkey.

***Andricus lucidus* (Hartig, 1843)**

Host plants. In Ukraine: *Q. petraea*, *Q. robur* for the asexual galls. Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. lusitanica*, *Q. pyrenaica*, *Q. infectoria*, *Q. boissieri* for the asexual galls; *Q. cerris*, *Q. ithaburensis*, *Q. libani* for the sexual galls.

Lifecycle and Phenology. Alternating sexual and asexual generations are known (Walker 2002). The sexual generation galls first appear in May, and mature in July-August. The asexual generation gall matures in September, and some wasps emerge in the following spring. Some adults emerge from galls after one or even two years of diapause.

Distribution. Ukraine: Transcarpathian Region (mainly lowland part, also vicinities of Uzhhorod) (Zerova et al. 1988, Csóka, Melika 1993). Europe, Turkey, Asia Minor, Israel, Iran.

***Andricus malpighii* (Adler, 1881)**

Host plants. In Ukraine: *Q. petraea.* Elsewhere: *Q. robur*, *Q. pubescens*, *Q. pyrenaica*, *Q. faginea*, *Q. infectoria.*

Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). A spring gall, developing rapidly after the emergence of the catkins. The adults emerge at the end of May. The asexual generation galls begin their development from late May, mature by late August, galls fall from the tree in October, adults emerge in the following April-May.

Distribution. Ukraine: Transcarpathian Region (Csóka, Melika 1993). Europe.

***Andricus mitratus* (Mayr, 1870)**

Host plants. In Ukraine: *Q. petraea.* Elsewhere: *Q. pubescens*, *Q. robur*, *Q. dalechampii.*

Lifecycle and Phenology. Only an asexual generation of this species is known. The gall develops through the summer and matures in September-October, adults emerge the following spring.

Distribution. Ukraine: Transcarpathian Region (Csóka, Melika 1993). Europe, Asia Minor.

***Andricus multiplicatus* Giraud, 1859**

Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. brantii*, *Q. libani*, *Q. castaneifolia*, *Q. trojana*.

Lifecycle and Phenology. Only a sexual generation of this species is currently known. A spring gall, found from May, maturing in late May-June, adults emerge up until July of the same year.

Distribution. Ukraine: Transcarpathian Region (Beregivskij and Vinohradivskij districts: Yulijivski Hory and Rafajlivskij forest) (Melika 2006). Europe, Turkey, Syria, Israel.

***Andricus paradoxus* (Radoszkowski, 1866)**

Host plants. In Ukraine: *Q. petraea.* Elsewhere: *Q. pubescens*, *Q. robur*, *Q. pyrenaica*, *Q. faginea*.

Lifecycle and Phenology. Alternating asexual and sexual generations are known (Folliot 1964). The sexual generation gall matures from April-May. Some wasps diapause until the spring of at least the third year. The asexual generation gall matures in the autumn, but does not fall from the tree. The wasp emerges the following spring, or may remain in diapause for 1-2 years.

Distribution. Ukraine: Transcarpathian Region (Zerova et al. 1988, Csóka, Melika 1993). Europe eastwards to Ural Mountains and Ural river (Russia), Western Kazakhstan.

***Andricus polycerus* (Giraud, 1859)**

Host plants. In Ukraine: *Q. robur.* Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. frainetto*, *Q. canariensis*, *Q. infectoria.*

Lifecycle and Phenology. Alternating asexual and sexual generations are known (Stone et al. 2008). The asexual galls develop through the summer, maturing in the autumn; adults emerge in spring. The sexual gall is a cryptic bud gall, the structure of which and its phenology are not described yet (Stone et al. 2008).

Distribution. Ukraine: Transcarpathian Region (lowland oak forests) (Diakontschuk, Melika 1994). Southeastern and Central Europe, Northern Africa, Transcaucasia, Turkey, Iran.

***Andricus quadrilineatus* Hartig, 1840**

Host plants. In Ukraine: *Q. robur.* Elsewhere: *Q. petraea*, *Q. pubescens.*

Lifecycle and Phenology. Alternating sexual and asexual generations are known (Folliot 1961, 1964). Two asexual generation galls are known that have different locations on the tree (catkin and leaf)

and different phenologies. The catkin gall form matures in May, the gall falling to the ground, adults overwinter in the fallen gall and emerge in the following April. The leaf gall form matures in June, and falls with the leaves in the autumn, adults emerge in the following May or June.
Distribution. Ukraine: Transcarpathian (lowland part) (Csóka, Melika 1993), L'viv (Zerova et al. 1988) and Kiev Regions (Melika 2006). Central and Northern Europe eastwards to Ural Mountains and Ural river (Russia), Transcaucasia.

***Andricus quercuscalicis* (Burgsdorf, 1783)**
Host plants. Only *Q. cerris* for the sexual generation and *Q. robur* for the asexual generation.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Beyerinck 1897). The sexual generation develops rapidly after catkin budburst, maturing from mid-May and emerging immediately. The asexual galls mature by September-October, and affected acorns typically fall a little before healthy acorns. The insects pass the winter within the gall as pupae, buried in the leaf litter and adults emerge the following February-April.
Distribution. Ukraine: Transcarpathian (lowland part, common, locally very abundant) (Csóka, Melika 1993); Ivano-Frankivsk Region (Zahajkevich 1954). Further north-eastern range expansion by this species is limited by the absence of *Q. cerris* (Melika et al. 1993). Central and Eastern Europe.

***Andricus quercuscorticis* (Linnaeus, 1761)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Elsewhere: *Q. pubescens*, *Q. pyrenaica*, *Q. faginea*, *Q. lusitanica*.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881, Folliot 1964, 1965). Adults of the sexual generation emerge at the end of May. The adults of the asexual generation emerge in the spring of the second year.
Distribution. Ukraine: Transcarpathian Region (Csóka, Melika 1993), Crimea (Melika 2006). Europe.

***Andricus quercusradicis* (Fabricius, 1798)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Elsewhere: *Q. pubescens*, *Q. pyrenaica*, *Q. faginea*, *Q. lusitanica*, *Q. canariensis*, *Q. macranthera*, *Q. ithaburensis.*
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Adler 1881, Folliot 1964, 1965). The sexual adults emerge in August-September, although some adults of this generation may emerge in their second year. The gall of the asexual generation becomes mature in September of the second year. The pale yellow adults overwinter in the galls and lay their eggs on young shoots at the end of February.
Distribution. Ukraine: Transcarpathian Region (Zerova et al. 1988, Csóka, Melika 1993). Europe, Northern Africa, Israel, Iran.

***Andricus quercusramuli* (Linnaeus, 1761)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur* for the sexual galls. Elsewhere: *Q. faginea*, *Q. pyrenaica*, *Q. canariensis*, *Q. lusitanica* for the sexual galls; *Q. petraea*, *Q. pubescens*, *Q. robur*, *Q. frainetto* for the asexual galls.
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Adler 1881). The sexual galls mature in May, and adults emerge in the middle of June. The asexual generation matures in September-October, adults emerge the following spring.
Distribution. Ukraine: Transcarpathian Region (Chorna Hora, Vynohradiv district, common) (Csóka, Melika 1993). Europe, Transcaucasia, Turkey.

***Andricus quercustozae* (Bosc, 1792)**
Host plants. In Ukraine: *Q. robur.* Elsewhere: *Q. pubescens*, *Q. petraea*, *Q. frainetto*, *Q. faginea*, *Q. pyrenaica*, *Q. canariensis*, *Q. infectoria*, *Q. macranthera*, *Q. boissieri.*
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Stone et al. 2008). The asexual gall develops through the summer, maturing in the autumn, adults emerge the following spring, and may diapause for up to 3 years. The sexual generation gall is a cryptic bud gall, structure of which and its phenology are not described yet (Rokas et al. 2003, Stone et al. 2008).
Distribution. Ukraine: Transcarpathian Region (lowland oak forests, rare) (Csóka, Melika 1993), Crimea (Diakontschuk 1987). Europe, Northern Africa, Transcaucasia, Israel, Lebanon, Iran.

***Andricus rhyzomae* (Hartig, 1843)**
Host plants. In Ukraine: *Q. petraea.* Elsewhere: *Q. robur*.
Lifecycle and Phenology. Only an asexual generation is known. The asexual gall matures in the autumn of the following year, and the adults emerge in March-April of the third year through the apex of the gall.
Distribution. Ukraine: Transcarpathian Region (Csóka, Melika 1993). Europe.

***Andricus schroeckingeri* Wachtl, 1876**

Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. libani*.
Lifecycle and Phenology. Only the sexual generation is known to induce leaf galls. Attack by this species can be recognised at the end of May on the basis of the characteristic leaf deformation. Adults emerge in June.
Distribution. Ukraine: Transcarpathian Region (Rafajlovo, Kosino, Julijivski Hory, rare) (Melika 2006). Austria, Hungary, Romania, Turkey.

***Andricus seckendorffi* (Wachtl, 1879)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens*, *Q. infectoria*.
Lifecycle and Phenology. Alternating asexual and sexual generations are known (Stone et al. 2008). The asexual acorn cup gall falls with the acorn when the latter is mature. Development of the wasp continues in the fallen gall; adults emerge in early spring and may emerge after a year's diapause. The sexual generation gall is a cryptic bud gall, structure of which and its phenology are not described yet (Stone et al. 2008).
Distribution. Ukraine: Transcarpathian Region (Yulijivsky Hory) (Melika 2006). Austria, Hungary, Romania, Italy, Turkey, Iran.

***Andricus seminationis* (Giraud, 1859)**
Host plants. *Q. petraea*, *Q. robur*.
Lifecycle and Phenology. Only an asexual generation is known. Galls ripen in May and June and falls from the leaf or catkin. The adults emerge in April of the following year, but may diapause for a further year.
Distribution. Ukraine: Transcarpathian Region (Zerova et al. 1988, Csóka, Melika 1993). Europe eastwards to Ural Mountains and Ural River (Russia).

***Andricus serotinus* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. petraea*, *Q. pubescens.*
Lifecycle and Phenology. Only the asexual generation is known. The gall matures in the autumn. Some adults emerge the following June.
Distribution. Ukraine: Transcarpathian Region (Rafajlivskij forest) (Melika 2006). Austria, Hungary, Poland, Romania, Moldavia.

***Andricus sieboldi* (Hartig, 1843)**
Host plants. In Ukraine: *Q. robur*, *Q. petraea.* Elsewhere: *Q. pubescens*, *Q. macranthera*, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*, *Q. lusitanica*, *Q. coccifera*.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Folliot 1964, Pujade-Villar 1984c). Most of the sexual galls mature in June-August, although late-developing galls may produce adults the following May. The asexual gall takes two years to develop, and the asexual adults emerge in April-May.
Distribution. Ukraine: Transcarpathian Region (Bahanych 1989, Csóka, Melika 1993). Europe, Northern Africa, Transcaucasia.

***Andricus singularis* Mayr, 1870**
Host plants. The only known host plant is *Q. cerris*.
Lifecycle and Phenology. Only the sexual generation is known to induce small bud galls. The adult emerges at the end of June.
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory, Rafajlovo forest) (Melika 2006). Austria, Bulgaria, Hungary, Poland.

***Andricus solitarius* (Boyer de Fonscolombe, 1832)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur.* Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. boissieri.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Docters van Leeuwen 1934). The sexual gall develops before the catkin elongates, and matures in May, adults emerge soon afterwards. The asexual gall becomes visible in June, maturing at the end of the summer, adults emerge in October.
Distribution. Ukraine: Transcarpathian (Zerova et al. 1988, Csóka, Melika 1993) and Kiev Regions (Melika 2006). Europe, Northern Africa, Transcaucasia, Israel, Iran.

***Andricus superfetationis* (Giraud, 1859)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Elsewhere: *Q. pubescens.*
Lifecycle and Phenology. Only the asexual generation is known. Falls in July, but parasitised galls may remain on the tree until acorns fall in autumn, adults emerge in the spring of third year.
Distribution. Ukraine: Transcarpathian Region (lowland oak forests) (author), Crimea (Melika 2006). Austria, Hungary, Romania, Portugal.

***Andricus testaceipes* Hartig, 1840**
Host plants. *Q. petraea*, *Q. robur*.
Lifecycle and Phenology. Only the sexual generation is known. The adults emerge in August.
Distribution. Ukraine: Transcarpathian Region (Melika 2006). Europe.

***Andricus truncicolus* (Giraud, 1859)**

Host plants. In Ukraine: *Q. robur*. Elsewhere: *Q. pubescens*, *Q. petraea*, *Q. dalechampii*, *Q. infectoria*.
Lifecycle and Phenology. Only the asexual generation is known. Adults emerge in the following March, while some remain in diapause until a second or third year.
Distribution. Ukraine: Transcarpathian Region (lowland part) (Csóka, Melika 1993). Europe, Turkey.

***Andricus vindobonensis* Müllner, 1901**
Host plants. *Q. cerris*. Elsewhere: *Q. ithaburensis*.
Lifecycle and Phenology. The sexual generation only is known. The gall matures by the end of May, adults emerge in July.
Distribution. Ukraine: Transcarpathian Region (Yulijivsky Hory, Kosino, Rafajlovo forest) (Melika 2006). Austria, Hungary, Romania, Turkey, Israel.

***Aphelonyx cerricola* (Giraud, 1859)**
Host plants. In Ukraine: *Q. cerris*. Elsewhere: *Q. libani*, *Q. brantii.*
Lifecycle and Phenology. The asexual generation is known. The gall matures in late autumn, adult emerges from early autumn through the winter to late spring.
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory, Rafajlovo) (Melika 2006). Europe, Turkey.

***Biorhiza pallida* (Olivier, 1791)**
Host plants. In Ukraine: *Q. robur*, *Q. petraea*. Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. canariensis*, *Q. lusitanica*, *Q. pyrenaica*, *Q. faginea*, *Q. boissieri*, *Q. infectoria.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881, Folliot 1964). The asexual gall reaches maturity in the winter of the second year. Apterous females emerge in the winter or very early in spring and lay their eggs on shoots. The gall of the sexual generation appears at the time of bud-burst and the sexual adults emerge at the end of May.
Distribution. Ukraine: common everywhere (Zerova et al. 1988). Europe, Northern Africa, Transcaucasia, Turkey, Israel, Iran.

***Callirhytis erythrocephala* (Giraud, 1859)**
Host plants. In Ukraine: *Q. cerris* for the sexual galls. Elsewhere: *Q. robur*, *Q. petraea*, *Q. pubescens* for the asexual galls.
Lifecycle and Phenology. Alternating sexual and asexual generations are known. The larva completes development as the acorn ripens. As with *C. glandium*, it is probable that the asexual females may spend one or more years in diapause.
Distribution. Ukraine: Transcarpathian Region (Rafajlovo forest) (Melika 2006). Central Europe.

***Callirhytis glandium* (Giraud, 1859)**
Host plants. In Ukraine: *Q. robur* for the sexual galls. Elsewhere: *Q. cerris*, *Q. suber*, *Q. ilex* for the asexual galls; *Q. pubescens*, *Q. pyrenaica*, *Q. faginea* for the sexual galls.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Nieves-Aldrey 1992). The sexual galls develop during the summer and the adults emerge during July or more usually in August. The asexual generation adult emerges after the acorn falls, sometimes after up to 6 years of diapauses. Asexual generation adults are ovipositing in March-May.
Distribution. Ukraine: Transcarpathian Region (Csóka, Melika 1993). Europe eastwards to Ural Mountains and Ural River (Russia), Transcaucasia.

***Cerroneuroterus lanuginosus* Giraud, 1859**
Host plants. In Ukraine: *Q. cerris* for the asexual galls. Elsewhere: *Q. ilex*, *Q. libani*, *Q. suber*, *Q. ithaburensis*, *Q. castaneifolia*, *Q. brantii*, *Q. libani* for the asexual galls; *Q. cerris* and *Q. ithaburensis* for the sexual galls.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Shachar et al. 2018). The asexual spangle-like gall usually found in small groups on the underside. The gall develops through the summer, and falls before or with the leaves in the autumn. Larval development continues to pupation while the gall overwinters in the leaf litter, adults emerge in March. Galls of the sexual generation appear in early February, adults emerge in late February.
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory) (Melika 2006). Southern-central Europe eastwards to Transcaucasia, Israel, Lebanon, Syria, Iran.

***Cerroneuroterus minutulus* Giraud, 1859**
Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. libani*.
Lifecycle and Phenology. Only the asexual generation is known.The gall matures in late November, adults emerge early in the following spring.
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory, Rafajlovo) (Melika 2006). Europe, Turkey, Israel, Northern Africa.

***Chilaspis nitida* (Giraud, 1859)**
Host plants. Only *Q. cerris.*

Lifecycle and Phenology. Alternating sexual and asexual generations are known (Schlechtendal 1888). The sexual gall matures at the end of May, adults emerging in June. The asexual galls appear at the end of the summer, mature through autumn, fall in October, asexual adults emerge in the following spring or remain in diapause for a further year.
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory, Rafajlovo forest) (Melika 2006). Austria, Germany, Bulgaria, Hungary, Romania.

***Cynips agama* Hartig, 1840**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. dalechampii.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Folliot 1964). Sexual spring gall develops on the young leaves. Asexual galls appear in June, mature in September, adults emerge in October-November.
Distribution. Ukraine: Transcarpathian Region (Melika 1993), Crimea (Diakontshuk 1987). Europe.

***Cynips cornifex* Hartig, 1843**
Host plants. In Ukraine: *Q. pubescens.* Elsewhere: *Q. petraea*, *Q. infectoria*, *Q. macranthera*, *Q. boissieri.*
Lifecycle and Phenology. Only the asexual generation is known. This gall can be found at early stages of development from June, maturing in September. The galls fall with the leaves, adults emerge in April.
Distribution. Ukraine: Transcarpathian Region (Vinohradiv, Chorna Hora) (Melika 1993). Europe, Asia Minor, Israel, Iran.

***Cynips disticha* Hartig, 1840**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. dalechampii*, *Q. faginea*, *Q. canariensis*, *Q. pyrenaica*, *Q. ilex*, *Q. suber.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Niblett 1948). The sexual generation matures in May. The asexual galls appear in June, adults emerge from September to November.
Distribution. Ukraine: common everywhere (Zerova et al. 1988, Melika 1993), Crimea (Diakontshuk 1987). Europe, Transcaucasia.

***Cynips divisa* Hartig, 1840**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. dalechampii*, *Q. boissieri*, *Q. pyrenaica*, *Q. lusitanica*, *Q. canariensis*, *Q. macranthera*.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual generation develops rapidly after leaf budburst in the spring and emerges in May. The asexual gall is found from June, maturing in September; asexual adults emerge in October-November, or February-March of the following year.
Distribution. Ukraine: common everywhere (Melika 1993, 2006), Crimea (Diakontshuk 1987). Eastern and Central Europe, Transcaucasia, Israel, Syria, Iran.

***Cynips longiventris* Hartig, 1840**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur*. Elsewhere: *Q. frainetto*, *Q. dalechampii*; also *Q. lusitanica* for the asexual galls.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual gall matures in July, emerging earlier in drier spots. The asexual generation matures at the end of the summer, and falls with the leaves; adults emerge in early spring.
Distribution. Ukraine: common everywhere (Zerova et al. 1988). Eastern and Central Europe, Transcaucasia.

***Cynips quercus* (Fourcroy, 1785)**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. dalechampii*, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*, *Q. macranthera*, *Q. iberica*, *Q. infectoria*, *Q. boissieri.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The asexual gall reaches full size in June, but remains green. The gall matures in September and becomes brown. The wasp makes an emergence channel to the epidermis but overwinters in the gall, emerges in April-May.
Distribution. Ukraine: Transcarpathian Region, common, locally abundant (Melika 1993). Europe, Turkey, Transcaucasia, Israel, Lebanon, Iran.

***Cynips quercusfolii* (Linnaeus, 1758)**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. dalechampii*, *Q. infectoria*.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual generation matures in June. The asexual galls appear first in early July and reach full size in August. A small proportion of the asexual adults

emerge in October, with a larger proportion emerging in March-April of the following year.
Distribution. Ukraine: common everywhere (Melika 1993), Crimea (Zerova et al. 1988). Europe, Asia Minor, Iran.

***Dryocosmus cerriphilus* Giraud, 1859**
Host plants. *Q.cerris* is the only known host plant.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Ács et al. 2007). The sexual generation matures in May-June, and adults emerge soon afterwards. In the asexual galls emergence holes can be found from mid-July, although most adults emerge from early winter to late spring.
Distribution. Ukraine: Transcarpathian Region (Yulijivski Hory, Kosino, Rafajlovo forest, rare) (Melika 2006). Central Europe, Turkey, Jordan.

***Dryocosmus mayri* Müllner, 1901**
Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. ithaburensis.*
Lifecycle and Phenology. Only a sexual generation is known. Galls develops by March-May, adults emerge in May in Europe and in February-March in Asia Minor. After the adults emerged, the gall dries out, and the shrivelled remains fall off.
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory, Rafajlovo forest, rare) (Melika 2006). Austria, Hungary, Greece, Turkey, Israel, Jordan.

***Neuroterus albipes* (Schenck, 1863)**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. canariensis*, *Q. faginea*, *Q. lusitanica*, *Q. pyrenaica*, *Q. macranthera*, *Q. boissieri.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual gall matures in May, and the adult emerges in June. The asexual galls mature and falls from the leaves from August, adults emerge in March-April.
Distribution. Ukraine: common everywhere (Zerova et al. 1988, Csóka, Melika 1993), Crimea (Diakontshuk 1987). Europe, Turkey, Transcaucasia, Israel, Northern Africa.

***Neuroterus anthracinus* (Curtis, 1838)**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. pyrenaica*, *Q. faginea*, *Q. infectoria*, *Q. macranthera*, *Q. boissieri*, *Q. ithaburensis*, *Q. dalechampii*, *Q. hartwissiana*, *Q. lusitanica*, *Q. canariensis.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Beyerinck 1883). Adults of the sexual generation emerge in May-June, lay eggs into leaves, galls are mature in September, in October galls can be found with emerging holes of asexual females which are overwintering.
Distribution. Ukraine: common everywhere (Zerova et al. 1988), Crimea (Diakontshuk 1987). Europe, Turkey, Transcaucasia, Israel, Iran.

***Neuroterus numismalis* (Geoffroy in Fourcroy, 1785)**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. pyrenaica*, *Q. faginea*, *Q. dalechampii*, *Q. infectoria*, *Q. lusitanica*, *Q. macranthera*.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual galls mature in May, adults emerge in June. The asexual generation galls mature in autumn, adults emerge in April.
Distribution. Ukraine: common everywhere (Shevchenko 1955, Csóka, Melika 1993), Crimea (Diakontshuk 1987). Europe, eastwards to Iran.

***Neuroterus politus* Hartig, 1840**
Host plants. In Ukraine: *Q. petraea*, *Q. robur*. Elsewhere: *Q. pubescens*, *Q. pyrenaica*, *Q. faginea.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Schlechtendal 1884, Folliot 1964). Development of the gall only requires a few days and the adults emerge by May of the same year. The asexual generation galls mature in the summer, adults emerge in the summer of the following year.
Distribution. Ukraine: everywhere, rare (Zerova et al. 1988, Csóka, Melika 1993). Europe, Transcaucasia, Turkey.

***Neuroterus quercusbaccarum* (Linnaeus, 1758)**
Host plants. In Ukraine: *Q. petraea*, *Q. pubescens*, *Q. robur.* Elsewhere: *Q. frainetto*, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*, *Q. infectoria*, *Q. lusitanica*, *Q. macranthera*, *Q. boissieri.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). Adults of the sexual generation emerge in June. The asexual spangle galls fall in August, adults emerge the following spring.
Distribution. Ukraine: common everywhere (Csóka, Melika 1993, Melika 2006). Europe, eastwards to Ural Mountains and Ural River (Russia), Israel, Iran.

***Neuroterus tricolor* (Hartig, 1841)**
Host plants. In Ukraine: *Q. petraea* for the asexual galls. Elsewhere: *Q. pubescens*, *Q. robur*,

Q. frainetto, *Q. pyrenaica*, *Q. faginea*, *Q. canariensis*; *Q. infectoria*, *Q. lusitanica* for the asexual galls; *Q. ilex*, *Q. suber* for the sexual galls.
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual gall matures in June and the adults emerge in July. The asexual galls fall from the leaves at the end of the summer, adults emerge next year in March-May.
Distribution. Ukraine: Transcarpathian Region (Zerova et al. 1988). Europe, Turkey.

***Plagiotrochus marianii* (Kieffer, 1902)**
Host plants. The only known host plant is *Q. cerris* (Melika et al. 2001).
Lifecycle and Phenology. The asexual generation only is known. Phenology is unknown.
Distribution. Ukraine: Transcarpathian Region (Diakontschuk, Melika 1994). Italy, Hungary, Slovakia (Ambrus 1974).

***Pseudoneuroterus macropterus* (Hartig, 1843)**
Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. castaneifolia*, *Q. ithaburensis.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Shachar et al. 2018). Asexual gall chambers begin to form in mid-summer. Adults eclose August-September. Some of the larvae diapause for a year, producing adults the following summer. The part of the gall containing diapausing insects remains as a living part of the tree while the part from which the adults have emerged dries out and dies. The sexual generation was established recently (Shachar et al. 2018).
Distribution. Ukraine: Transcarpathian Region (Kosino, Yulijivski Hory, Rafajlovo) (Melika 2006). Central Europe, Israel, Iran.

***Pseudoneuroterus saliens* (Kollar, 1857)**
Host plants. In Ukraine: *Q. cerris.* Elsewhere: *Q. suber*, *Q. ithaburensis*, *Q. libani*, *Q. castaneifolia*, *Q. brantii*, *Q. trojana.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Barbotin 1972, Askew 1984). The asexual generation matures in September, and adults emerge in April. Sexual adults emerge in June-August.
Distribution. Ukraine: Transcarpathian Region (Melika 2006). Europe, Israel, Iran.

***Trigonaspis megaptera* (Panzer, 1801)**
Host plants. In Ukraine: *Q. petraea*, *Q. robur.* Elsewhere: *Q. pubescens*, *Q. frainetto*, *Q. pyrenaica*, *Q. infectoria.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Adler 1881). The sexual gall matures in June, and adults emerge immediately. The asexual gall falls with the leaf, and can be collected from fallen leaves in the spring. Adults emerge in May and June, or after a year's diapause.
Distribution. Ukraine: everywhere common (Zerova et al. 1988, Csóka, Melika 1993), Crimea (Diakontshuk 1987). Central and Eastern Europe, Transcaucasia, Iran.

***Trigonaspis synaspis* (Hartig, 1841)**
Host plants. In Ukraine: *Q. robur*, *Q. petraea.* Elsewhere: *Q. pubescens*, *Q. pyrenaica*, *Q. faginea*, *Q. macranthera*, *Q. infectoria.*
Lifecycle and Phenology. Alternating sexual and asexual generations are known (Wriese in Kieffer 1897-1901). Adults of the sexual generation are eclose in May, often in their second year. Galls of the asexual generation mature in September, and falls from the leaves or with them; adults emerge in July.
Distribution. Ukraine: Transcarpathian Region, rare (Csóka, Melika 1993). Europe, Transcaucasia, Iran.

Discussion
The current oak gallwasp (Cynipini) fauna list of Ukraine includes 79 valid species, all of which are known from the Transcarpathian Region also, and only 18 species were recorded from the rest territory of the country (Table).

Distribution of many cynipid species depends on the distribution of their host plants. The rich Cynipini fauna of the Transcarpathian Region is due to its geographic position. The lowland part of the region is the most species rich and contiguous with the rich fauna of neighbouring Hungary (Ambrus 1974, Melika et al. 2000).

Table. Species richness of oak gallwasps (Cynipini) from the Western Palaearctic vs. those from Europe, Ukraine and Transcarpathian Region

Таблиця. Видове багатство дубових галових ос (Cynipini) Західної Палеарктики в порівнянні з Європою, Україною та Закарпаттям

Genus	WP	Europe*	TR	rest of Ukraine	Total Ukraine
Andricus Hartig, 1840	96	67	54	7	54
Aphelonyx Mayr, 1881	3	1	1	0	1
Biorhiza Westwood, 1840	1	1	1	1	1
Callirhytis Foerster, 1869	6	4	2	0	2
Cerroneuroterus Melika & Pujade-Villar, 2010	6	5	2	0	2
Chilaspis Mayr, 1881	2	1	1	0	1
Cynips Linnaeus, 1758	9	7	7	4	7
Dryocosmus Giraud, 1859	6	2	2	0	2
Neuroterus Hartig, 1840	6	6	6	5	6
Plagiotrochus Mayr, 1881	14	14	1	0	1
Pseudoneuroterus Kinsey, 1923	4	2	2	0	2
Trigonaspis Hartig, 1840	5	5	2	1	2
TOTAL	**158**	**116**	**79**	**18**	**79**

TR – Transcarpathian region; ***** - species known exclusively from the Asian part of Turkey are not included into the column "**Europe**"

This is the only region in Ukraine where *Quercus cerris* natural stands can be found (Rafajlovo forest, Beregovo district; Julijivsky Hory, Vynohradiv district) thus, species trophically associated with only *Q. cerris* and species, the sexual generations of which develop exclusively on *Q. cerris* are both restricted in their distribution to this region. Also the Carpathians are a barrier for many species (Csóka, Melika 1993, Diakontschuk, Melika 1994, Melika, Csóka 1994, Melika et al. 1993, Melika 2006).

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