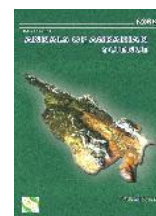




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Sawflies (Hymenoptera: Symphyta) from the high altitudes of Kintrishi National Park, south-west Georgia (Sakartvelo) (part II)

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ABSTRACT

Sixty-four species of 513 specimens were collected in the montane and submontane altitudes of Kintrishi Nature Reserve. Twentythree species are country new records. Zoogeographic analysis and description of the flight periods are provided.

Key words: Caucasus, Hymenoptera, Symphyta, faunistics, ecology

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Introduction

The Kintrishi Protected Areas were established to preserve unique flora and fauna of the local Colchis forest. Additionally, archeological excavations revealed pre-Christian monuments in this areas. About 80% of Kintrishi's protected areas are covered by forest. We must note, the forest covered areas occupy the largest territories among all protected regions of Georgia. [1]. Dominant trees of these protected forests are Beech (*Fagus orientalis*) and Chestnut (*Castanea sativa*), mixed with Ponto Oak (*Quercus pontica*), Birch (*Betula medwedewi*, *B. litwinowii*), Bladdernut (*Staphylea colchica*) and Box (*Buxus colchica*).

Sawflies of lower altitudes of KNP were published by Japoshvili and Haris [2] and 1703 specimens of 42 species were listed including high number of first sawfly records for the country. The present paper is dealing with the high alpine altitudes of KNP. It is included in the CaBOL (Caucasus Barcode of Life) project, to explore the biodiversity of the Caucasus.

Methods and material

The sawfly material was collected by using Malaise traps located at 1 634 (Fig. 1A), 2 280 (Fig. 1B) and 2 465 m (Fig. 1C, D) altitudes above sea level, at coordinates: N 41° 44' 53.5308, E 42° 5' 38.4144 (approximately 7.03 km E of Didvake village); N 41° 45' 19.3680, E 42° 06' 46.6920 (approximately 300 meters West from Kintrishi River and 8.5 km South West from Gomismta village) and N 41.76246, E 42.11571 (approximately 8.65 km NE of Didvake village). These altitudes (1 634, 2 280 and 2 465 m above sea level) are the zones from the higher subalpine Colchis forest belts up to the alpine meadow belt of the Lesser Caucasus vegetation and the 2 465 m is the highest altitude where Malaise trap worked. There is no other data in the sawfly literature to work a Malaise trap in so high altitude ever (only below 1 800 meters asl. see Roller [3] and Savina et al. [4]). The Malaise traps were installed from 20. 04. 2018 and the collecting lasted

until 8th of September 2018. During this time, Malaise traps were checked biweekly.

The traps were installed in the intermediary zone between the sub-alpine forest from 1500 to 2 500 m alt. above the sea level and the alpine meadows generally between 2 400 and 3 000 meters. These altitudes are characterized by moderately humid climate with cold winters and long, cool summers.

At an altitude of 1,000-1,800 m above sea level, the average temperature is 8.5-9°C. The coldest month is January - with an average temperature of 0.5°C. The absolute minimum temperature ranges from -16-17°C. The warmest month is August, with an average temperature of 15-15.5°C. The annual amount of precipitation is 3000 mm.

The beech forest belt is spread at an altitude of 1,000-2,100 m. Common chestnut (*Castanea sativa*), Caucasian hornbeam (*Carpinus caucasica*), Caucasian linden (*Tilia caucasica*), and Kolkhi undergrowth consisting of Pontic rhododendron (*Rhododendron ponticum*), Caucasian whortleberry (*Vaccinium arctostaphylos*), Yellow azalea (*Rhododendron luteum*), *Rhododendron ungueri*, Georgian snow rose (*Rhododendron caucasicum*), and other species. On the upper border, oriental beech and Caucasian fir (*Abies nordmanniana*) may be present together with individual species of oriental spruce (*Picea orientalis*).

At the altitude ranges of 1,800-2,400 m summers are short and winters are long. The vegetation period lasts 3.5-4.5 months. Snow cover is common in late spring. Subalpine temperate forest, shrubland and subalpine meadows are common at an altitude of 1,800-2,400 m. Along with the typical temperate forests of oriental beech (*Fagus orientalis*), there are warty birch, Litvinov's birch (*Betula litwinowii*), as well as endemic and relict species: Medvedev's birch (*Betula medwedewii*), Ponto's oak (*Quercus pontica*), *Rhamnus imeretina* and mountain currant (*Ribes biebersteinii*). The shrubby understory is rich in plant species, including georgian snow rose (*Rhododendron caucasicum*), cherry laurel (*Laurocerasus officinalis*), Colchis holly (*Ilex colchica*), *Daphne elbowviana*, and others.

For identification, and for host-plant data, Zhelochovtsev's work on the sawflies of the European part of the former USSR [5], the handbook of Lacourt on the identification of the European Symphytans [6], the monograph of Robert Benson on the Turkish sawflies fauna [7], and Gussakovskij's monographs on the sawflies of the former USSR [8,9] were used. We also consulted recent revisions [10, 11, 12, 13] to confirm the identifications of particular taxa. The general dis-

tribution of species are reported based on Roller and Haris [14], Taeger et al. [15], Sundukov [16]. Further, reference material was studied in the Budapest collection in the Hungarian Natural History Museum. The nomenclature used in this paper, follows the latest monograph of European sawflies [6] with special concern for the subfamily Nematinae to address the conclusions of Prous et al. [17]. The higher classification of Symphyta, applied in this work, follows the Hymenoptera part of Fauna Europaea [18]. Host plant records are given according to Macek et al. [19].

Results

Family - Pamphiliidae

Genus *Pamphilius* Latreille, 1803

Pamphilius sylvaticus (Linné, 1758)*: 02-06. 06. 2018, 2 280 m, 1 female. Frequent, West Palaearctic species. Larva on *Sorbus aucuparia*, *Prunus* spp. like *Prunus padus* and *Crataegus* spp.

Family - Diprionidae

Genus *Monoctenus* Dahlbom, 1835

Monoctenus juniperi (Linné, 1758)*: 15-29. 06. 2018, 2 465 m, 1 male. Sporadic, West Palaearctic species. Larva on *Juniperus communis*.

Family - Tenthredinidae

Subfamily - Allantinae

Genus *Allantus* Panzer, 1801

Allantus (Emphytus) cinctus (Linné, 1758): 19. 05. - 02. 06. 2018, 2 280 m, 1 female, 16-30. 06. 2018, 2 280 m, 1 male, 30. 06. - 24. 07. 2018, 2 280 m, 2 females, 7 males, 24-28. 07. 2018, 2 280 m, 1 male, 05-20. 05. 2018, 1 634 m, 1 male, 20. 05. - 01. 06. 2018, 1 634 m, 1 female, 1 male, 01-15. 06. 2018, 1 634 m, 1 female, 1 male, 15-29. 06. 2018, 1634 m, 1 male. Common. Host plants: *Rosa* and *Fragaria* spp. Holarctic.

A. (Emphytus) laticinctus (Serville, 1823): 16-30. 06. 2018, 2 280 m, 1 female. Sporadic, West Palaearctic species. Larva on *Rosa* spp.

Genus *Ametastegia* Costa, 1882

Ametastegia (Protemphytus) carpini (Hartig, 1837): 16-30. 06. 2018, 2 280 m, 2 females, 1 male, 30. 06. - 24. 07. 2018, 2 280 m, 2 females, 2 males, 15-29. 06. 2018, 2 465 m, 2 females, 29-06. -13. 07. 2018, 2 465 m, 1 female. Frequent. Holarctic. Host plants: *Geranium* spp.

A. (Protemphytus) perla (Klug, 1818): 02-06. 06. 2018, 2 280 m, 1 female. West-Palaearctic species. Sporadic. Host plants: *Salix* sp., it is also recorded from *Quercus* and *Populus* spp.

A. (Protemphytus) tenera (Fallén, 1808): 15-29. 06. 2018, 2 465 m, 1 female, 3 males, 29-06. -13. 07. 2018, 2 465 m, 1 male. Holarctic. Frequent. Larva on *Rumex* spp.

Genus *Athalia* Leach, 1817

Athalia circularis (Klug, 1815): 02-06. 06. 2018, 2 280 m, 1 female, 30. 06. - 24. 07. 2018, 2 280 m, 1 female, 2 males, 29-06. -13. 07. 2018, 2 465 m, 1 female, 20. 04. - 05. 05. 2018, 1 634 m, 1 male, 01-15. 06. 2018, 1 634 m, 1 female, 1 male, 15-29. 06. 2018, 1634 m, 1 male, 29. 06. - 13. 07. 2018, 1 634 m, 2 males, 13-27. 07. 2018, 1 634 m, 3 males. Frequent. Host plants: *Arctium lappa*, *Ajuga reptans*, *Veronica beccabunga*, *V. longifolia*, *V. officinalis*, *Alliaria petiolata*, *Glechoma hederacea*, *Melampyrum*, *Capsella* and *Lycopus* spp. Palaearctic.

A. cornubiae Benson, 1931*: 05-20. 05. 2018, 1 634 m, 1 female. Sporadic West Palaearctic species. Larva on *Sedum album*.

A. liberta (Klug, 1815): 02-06. 06. 2018, 2 280 m, 1 female, 30. 06. - 24. 07. 2018, 2 280 m, 1 female, 24-28. 07. 2018, 2 280 m, 1 female, 1 male, 01-15. 06. 2018, 1 634 m, 1 female, 15-29. 06. 2018, 1634 m, 1 female, 29. 06. - 13. 07. 2018, 1 634 m, 1 male, 13-27. 07. 2018, 1 634 m, 1 male. Frequent, West Palaearctic species. Feeding on *Alliaria petiolata*, *Arabidopsis thaliana*, *Cardamine hirsuta* and *Sisymbrium officinale*.

A. lugens (Klug, 1815): 20. 05. - 01. 06. 2018, 1 634 m, 1 female, 29. 06. - 13. 07. 2018, 1 634 m, 1 male. Sporadic, Palaearctic species. Feeding on various Cruciferae: *Brassica* spp., *Cardamine* spp., *Raphanus* spp. and *Lepidium sativum*.

Genus *Empria* Lepeletier & Serville, 1828

Empria liturata (Gmelin, 1790)*: 15-29. 06. 2018, 2 465 m, 3 males. Frequent Palaearctic species. Host plants: *Fragaria* and *Geum* spp.

Comment: It's erroneously indicated as distributed in Georgia [20] based on Zhelekhovtsev, Zinovjev [21], page p. 366.

E. longicornis (Thomson, 1871): 19. 05. - 02. 06. 2018, 2 280 m, 1 male, 02-06. 06. 2018, 2 280 m, 2 females, 25 males, 16-30. 06. 2018, 2 280 m, 4 males, 30. 06. - 24. 07. 2018, 2 280 m, 2 females, 3 males, 29-06. -13. 07. 2018, 2 465 m, 1 female, 20. 04. - 05. 05. 2018, 1 634 m, 3 males, 05-20. 05. 2018, 1 634 m, 3 males, 20. 05. - 01. 06. 2018, 1 634 m, 1 male. Frequent, West Palaearctic species. Larva on *Rubus idaeus*.

E. tridens (Konow, 1896): 15-29. 06. 2018, 2 465 m, 1 female, 20. 05. - 01. 06. 2018, 1 634 m, 1 female. Palaearctic. Frequent. Host plants: *Geum* spp. and *Rubus idaeus*.

Subfamily – Blennocampinae

Genus *Claremontia* Rohwer, 1909

Claremontia alternipes (Klug, 1816): 20. 04. - 05. 05. 2018, 1 634 m, 5 males, 05-20. 05. 2018, 1 634 m, 2 males. Sporadic. Hostplant: *Rubus idaeus*. West Palaearctic.

Genus *Eurhadinoceraea* Enslin, 1920

Eurhadinoceraea fulviventris (Scopoli, 1763): 02-06. 06. 2018, 2 280 m, 1 male. Locally common. Hostplant unknown. Southern part of the Palaearctic region.

Genus *Eutomostethus* Enslin, 1914

Eutomostethus ephippium (Konow, 1899): 01-15. 06. 2018, 1 634 m, 1 male. Ponto-Caspian species. Common. Hostplants: Poaceae.

Family - Selandrinae

Genus *Aneugmenus* Hartig, 1837

Aneugmenus coronatus (Klug, 1818): 30. 06. - 24. 07. 2018, 2 280 m, 14 females, 1 male, 16-30. 06. 2018, 5 females, 24-28. 07. 2018, 2 280 m, 3 females, 29-06. -13. 07. 2018, 2 465 m, 2 females, 29. 06. - 13. 07. 2018, 1 634 m, 1 female. Sporadic, Palaearctic species. Larva on *Dryopteris filix-mas*, *Aspidium* sp., *Athyrium filix-femina* and *Pteridium aquilinum*.

Genus *Birka* Malaise, 1944

Birka (Birka) catellata (Konow, 1900): 05-20. 05. 2018, 1 634 m, 1 female, 20. 05. - 01. 06. 2018, 1 634 m, 1 female. Ponto-Caspian and Turanian. Common species. Host plant unknown.

Genus *Strongylogaster* Dahlbom, 1835

Strongylogaster caucasica Schaposchnikov, 1885: 02-06. 06. 2018, 2 280 m, 12 females, 1 male, 16-30. 06. 2018, 2 280 m, 1 male, 19. 05. - 02. 06. 2018, 2 280 m, 1 female, 1 male, 20. 04. - 05. 05. 2018, 1 634 m, 4 females, 2 males, 05-20. 05. 2018, 1 634 m, 2 females, 01-15. 06. 2018, 1 634 m, 1 female, 15-29. 06. 2018, 1634 m, 1 female. Sporadic. Hostplants unknown. Ponto-Caspian.

Subfamily - Heterathrinae

Genus *Caliroa* Costa, 1859

Caliroa cerasi (Linné 1758): 24-28. 07. 2018, 2 280 m, 1 male, 13-27. 07. 2018, 1 634 m, 1 female. Cosmopolitan. Frequent. Host plants: *Pyrus*, *Malus*, *Prunus*, *Crataegus*, *Sorbus*, *Rosa*, *Cydonia*, *Mespilus*, *Rubus*, *Amygdalus*, *Cerasus*, *Amelanchier*, *Pyracantha*, *Cotoneaster* rarely *Quercus*, *Salix* spp.

C. tremulae Chevin, 1974: 16-30. 06. 2018, 2 280 m, 1 female. Sporadic. Hostplant: *Populus tremula*. West Palaearctic.

Genus *Endelomyia* Ashmead, 1898

Endelomyia aethiops (Gmelin, 1790): 15-29. 06. 2018, 2 465 m, 1 female, 29-06. -13. 07. 2018, 2 465 m, 1 male. Frequent, Holarctic species. Larva on *Rosa* spp.

Genus *Metallus* Forbes, 1885

Metallus pumilus (Klug, 1816): 30. 06. - 24. 07. 2018, 2 280 m, 1 male, 24-28. 07. 2018, 2 280 m, 1 male, 15-29. 06. 2018, 2 465 m, 2 males. Common Palaearctic species. Larva inside the leaves of *Rubus caesius* and *Rubus idaeus*.

Subfamily - Nematinae

(The nomenclature of this part follows the proposed changes in nomenclature of the last monograph on sawflies written by Lacourt, 2020)

Genus *Cladius* Illiger, 1807

Cladius pectinicornis (Geoffroy, 1785): 15-29. 06. 2018, 2 465 m, 4 males, 29-06. -13. 07. 2018, 2 465 m, 1 male, 10-24. 08. 2018, 2 465 m, 1 male. Holarctic. Common. Host plants: *Alchemilla*, *Filipendula*, *Fragaria*, *Potentilla*, *Sanguisorba*, *Rosa* and *Rubus* spp.

Genus *Dineura* Dahlbom, 1835

Dineura testaceipes (Klug, 1816)* : 02-06. 06. 2018, 2 280 m, 1 female. Sporadic, West Palaearctic species. Host plants: *Crataegus* spp. and *Sorbus aucuparia*.

Genus *Epicenematus* Lacourt, 1998

Epicenematus montanus (Zaddach, 1883)* : 30. 06. - 24. 07. 2018, 2 280 m, 1 male. Sporadic, West Palaearctic species. Larva on *Picea* spp.

Genus *Hoplocampa* Hartig, 1837

Hoplocampa alpina (Zetterstedt, 1838)* : 29-06. -13. 07. 2018, 2 465 m, 1 female. Sporadic, Palaearctic species. Larva on *Sorbus aucuparia*.

Genus *Priophorus* Dahlbom, 1835

Priophorus compressicornis (Fabricius, 1804): 02-06. 06. 2018, 2 280 m, 2 males, 30. 06. - 24. 07. 2018, 2 280 m, 5 females, 14 males, 16-30. 06. 2018, 2 280 m, 6 females, 12 males, 24-28. 07. 2018, 2 280 m, 1 male, 11-25. 08. 2018, 2 280 m, 1 male, 25. 08 - 08. 09. 2018, 2 280 m, 1 female. Frequent pest. Hostplants: *Betula*, *Cotoneaster*, *Prunus*, *Rubus*, *Sorbus*, *Fragaria*, *Crataegus*, *Corylus* and *Rosa* spp. Holarctic.

Genus *Nematus* Panzer, 1801

Nematus lucidus (Panzer, 1801): 02-06. 06. 2018, 2 280 m, 1 male, 30. 06. - 24. 07. 2018, 2 280 m, 10 males, 24-28. 07. 2018, 2 280 m, 2 males, 16-

30. 06. 2018, 2 280 m, 2 males, 01-15. 06. 2018, 1 634 m, 4 males, 29. 06. - 13. 07. 2018, 1 634 m, 1 male. Frequent. Larva on *Crataegus*, *Rosa* spp. and *Prunus spinosa*. Palaearctic.

N. wahlbergi Thomson, 1871: 16-30. 06. 2018, 2 280 m, 1 male. Sporadic, West-Palaearctic species, larva on *Symphoricarpos albus* and *Lonicera* spp.

Genus *Pachynematus* Konow, 1890

Pachynematus clitellatus (Serville, 1823)*: 01-15. 06. 2018, 1 634 m, 1 male. Palaearctic species introduced to North America. Frequent. Host plants: *Gramineae*, *Carex* and *Juncus* spp.

Genus *Phyllocolpa* Benson, 1960

Phyllocolpa leucapsis (Tischbein, 1846)*: 16-30. 06. 2018, 2 280 m, 1 female, 15-29. 06. 2018, 1 634 m, 1 female. Frequent, Holarctic species. Larvae make galls on leaves of *Salix cinerea*, *S. aurita* and *S. silesiaca*.

Ph. leucosticta (Hartig, 1837): 02-06. 06. 2018, 2 280 m, 1 female. Frequent, West Palaearctic species. Larva makes gall on leaves of *Salix caprea*, *S. aurita* and *S. cinerea*.

Genus *Polynematus* Zhelochovtsev, 1988

Polynematus annulatus (Gimmerthal, 1834)*: 15-29. 06. 2018, 2 465 m, 1 female, 1 male. Larva on *Rumex* spp. Frequent, Holarctic species.

P. punctifrons (Malaise, 1921)*: 02-06. 06. 2018, 2 280 m, 1 male. Sporadic, West Palaearctic species. Hostplant unknown.

Genus *Pristiphora* Latreille, 1810

Pristiphora acutidens Lindqvist, 1977*: 02-06. 06. 2018, 2 280 m, 1 female, 16-30. 06. 2018, 2 280 m, 1 female, 24-28. 07. 2018, 2 280 m, 1 female, 11-25. 08. 2018, 2 280 m, 1 female. Sporadic, Ponto-Caspian-Siberian. Hostplant unknown.

P. aphantoneura (Förster, 1854)*: 02-06. 06. 2018, 2 280 m, 1 female. Sporadic, Palaearctic species. Parthenogenetic. Larva on *Lathyrus pratensis*.

P. appendiculata (Hartig, 1837)*: 16-30. 06. 2018, 2 280 m, 1 male, 30. 06. - 24. 07. 2018, 2 280 m, 1 female. Sporadic, Holarctic species. Host plants: *Ribes* spp. like *Ribes alpinum*, *R. aureum*, *R. nigrum*, *R. rubrum* and *R. uva-crispa*.

P. armata (Thomson, 1863): 02-06. 06. 2018, 2 280 m, 2 males, 30. 06. - 24. 07. 2018, 2 280 m, 13 males, 16-30. 06. 2018, 2 280 m, 4 males, 24-28. 07. 2018, 2 280 m, 2 males, 25. 08 - 08. 09. 2018, 2 280 m, 1 male, 15-29. 06. 2018, 2 465 m, 1 male, 29-06. -13. 07. 2018, 2 465 m, 1 female, 1 male. Frequent, Palaearctic species. Larva on *Crataegus* spp.

P. cincta Newman, 1837*: 30. 06. - 24. 07. 2018, 2 280 m, 5 males, 24-28. 07. 2018, 2 280 m, 1 female, 1 male, 6-30. 06. 2018, 1 male, 13-27. 07. 2018, 1 634 m, 1 male. Larva on *Betula* spp. and *Vaccinium myrtillus*. Sporadic, Holarctic species.

P. leucopus (Hellén, 1948): 19. 05. - 02. 06. 2018, 2 280 m, 1 female, 02-06. 06. 2018, 2 280 m, 1 female, 30. 06. - 24. 07. 2018, 2 280 m, 3 females, 10 males, 16-30. 06. 2018, 2 280 m, 1 female, 12 males, 24-28. 07. 2018, 2 280 m, 9 males, 28. 07.-11. 08. 2018, 2 280 m, 1 male, 11-25. 08. 2018, 2 280 m, 1 male, 25. 08 - 08. 09. 2018, 1 male, 15-29. 06. 2018, 2 465 m, 1 male, 29-06. -13. 07. 2018, 2 465 m, 1 female, 20. 05. - 01. 06. 2018, 1 634 m, 2 males, 01-15. 06. 2018, 1 634 m, 3 males, 15-29. 06. 2018, 1634 m, 1 male, 29. 06. - 13. 07. 2018, 1 634 m, 1 male, 13-27. 07. 2018, 1 634 m, 1 female, 1 male, 27. 07. - 10. 08. 2018, 1 634 m, 1 male. Frequent, West-Palaeartic species. Larva on *Tilia* spp.

P. pallidiventris (Fallén, 1808): 24-28. 07. 2018, 2 280 m, 1 female, 29. 06. - 13. 07. 2018, 1 634 m, 1 female. Frequent. Larva on *Geum*, *Potentilla*, *Rubus* and *Filipendula* spp. Holarctic.

P. thalictri (Kriechbaumer, 1884)*: 20. 04. - 05. 05. 2018, 1 634 m, 1 male. Host plants: *Thalictrum aquilegifolium* and *T. minus*. Sporadic, Palaeartic species.

Genus *Pteronidea* Rohwer, 1911

Pteronidea glutinosae (Cameron, 1882)*: 01-15. 06. 2018, 1 634 m, 1 male. Sporadic, West Palaeartic species. Hostplant: *Alnus* spp.

P. miliaris (Panzer, 1797): 02-06. 06. 2018, 2 280 m, 1 female, 30. 06. - 24. 07. 2018, 2 280 m, 3 males, 16-30. 06. 2018, 2 280 m, 2 males, 24-28. 07. 2018, 8 males, 15-29. 06. 2018, 2 465 m, 1 male. Larva on *Salix aurita* and *S. capreae*. Sporadic, West Palaeartic species.

P. myosotidis (Fabricius, 1804): 24-28. 07. 2018, 2 280 m, 1 male. Common. Larval hosts: *Onobrychis*, *Vicia* and *Trifolium* spp. also *Lathyrus pratensis*. Palaeartic.

P. oligospila (Förster, 1854): 30. 06. - 24. 07. 2018, 2 280 m, 2 females, 1 male, 24-28. 07. 2018, 2 280 m, 1 female, 16-30. 06. 2018, 2 280 m, 1 female. Originally Palaeartic species, introduced globally, now cosmopolitan. Frequent. Host plants: *Salix* spp. It is also reported from *Populus* spp.

P. pavidus (Serville, 1823)*: 15-29. 06. 2018, 2 465 m, 1 male. Larva on *Salix* spp. and *Populus tremula*. Sporadic, West Palaeartic species. Larva on *Salix* spp: *S. cinerea*, *S. caprea* and *Populus* spp: *Populus tremula* and *P. nigra*.

P. ribesii (Scopoli, 1763)* : 02-06. 06. 2018, 2 280 m, 1 male, 16-30. 06. 2018, 2 280 m, 1 male. Host plants: *Ribes rubrum* and *Ribes uva-crispa*. Larvae are gregarious and in last instar stadium change to solitary life way. Frequent, Palaeartic species.

P. sylvestris (Cameron, 1884)* : 13-27. 07. 2018, 1 634 m, 1 female. Sporadic, Palaeartic species. Larva on *Salix caprea*, *S. pentandra* and *S. phylicifolia*.

Genus *Sharliphora* Wong, 1969

Sharliphora nigella (Förster, 1854): 20. 04. - 05. 05. 2018, 1 634 m, 5 females, 8 males. Frequent, West Palaeartic species. Larva on *Picea* spp.

Subfamily - Tenthredininae

Genus *Macrophya* Dahlbom, 1835

Macrophya (Macrophya) hamata ssp. *caucasicola* Muehe, 1969: 01-15. 06. 2018, 1 634 m, 1 male. Frequent, Ponto-Caspian subspecies. Host plant unknown.

Genus *Pachyprotasis* Hartig, 1837

Pachyprotasis rapae (Linné, 1767): 16-30. 06. 2018, 2 280 m, 1 male, 15-29. 06. 2018, 2 465 m, 2 females, 8 males, 29-06. -13. 07. 2018, 2 465 m, 3 females, 2 males. Common. Holarctic species. Host-plants: *Solanum tuberosum*, *Pedicularis palustris*, *Angelica sylvestris*, *Veronica beccabunga*, *Betonica officinalis*, *Corylus avellana*, *Salix caprea*, *Fraxinus excelsior*, *Tussilago farfara*, *Symphoricarpos albus*, *Scrophularia*, *Solanum*, *Solidago virgaurea*, *Verbascum*, *Origanum vulgare*, *Atropa belladonna*, *Sarothamnus*, *Senecio*, *Polygonum*, *Lamium*, *Aspidium*, *Epilobium*, *Hypericum*, *Galeopsis*, *Glechoma*, *Mentha*, *Polystichum*, *Plantago*, *Misopates*, *Veronica*, *Quercus* and *Stachys* spp.

Genus *Tenthredo* Linnaeus, 1758

Tenthredo (Tenthredella) atra Linné, 1758*: 16-30. 06. 2018, 2 280 m, 1 female. Frequent, Palaeartic species. Host plants: *Alchemilla* spp., *Betula* spp., *Cirsium* spp., *Gentiana asclepiadea*, *Lamium* spp., *Silene* spp., *Stachys* spp., *Solanum* spp., *Plantago* spp., *Mentha* spp., *Scabiosa* spp., *Succisa pratensis* and *Rubus idaeus*.

T. (Tenthredella) ferruginea Schrank, 1776: 02-06. 06. 2018, 2 280 m, 1 female, 15-29. 06. 2018, 1634 m, 1 male. Sporadic, Palaeartic species. Host plants: *Alnus glutinosa*, *Atropa belladonna*, *Filipendula* spp., *Geranium* spp., *Ranunculus* spp., *Pteridium aquilinum*, *Rubus* spp., *Salix* spp., *Senecio* spp., *Sorbus aucuparia*, *Spiraea* spp. and *Vaccinium myrtillus*.

T. (Tenthredo) liturata (Mocsáry, 1886): 16-30.

06. 2018, 2 280 m, 1 female, 24-28. 07. 2018, 2 280 m, 1 female; 01-15. 06. 2018, 1 634 m, 1 female. Sporadic, Ponto-Caspian-Anatolian species. Host-plant unknown.

T. (Tenthredella) livida Linné, 1758: 02-06. 06. 2018, 2 280 m, 1 female, 30. 06. - 24. 07. 2018, 2 280 m, 1 male, 16-30. 06. 2018, 2 280 m, 1 female, 15-29. 06. 2018, 2 465 m, 1 female, 1 male. Frequent, Palaearctic species. Host plants: *Aruncus dioicus*, *Athyrium* spp., *Corylus avellana*, *Epilobium* spp., *Lamium* spp., *Melampyrum* spp., *Melissa* spp., *Pteridium aquilinum*, *Rosa* spp., *Rubus idaeus*, *Salix* spp., *Sorbus aucuparia*, *Symphoricarpos albus*, *Tilia* spp., *Vaccinium myrtillus* and *Viburnum lantana*. The male specimen belongs to the color variation formerly called var. *clara* Enslin.

T. (Eurogaster) mesomela Linné, 1758: 30. 06. - 24. 07. 2018, 2 280 m, 1 female, 15-29. 06. 2018, 2 465 m, 1 male. Frequent, Palaearctic species. Host plants: *Ranunculus repens*, *Plantago media*, *Aruncus sylvestris*, *Senecio* spp., *Persicaria* spp. *Arctium lappa*, *Rubus idaeus*, *Salix caprea*, *Epilobium* and *Rumex* spp.

T. (Elinora) radoszkowskii (André, 1881)* : 24-28. 07. 2018, 1 female; 20. 05. - 01. 06. 2018, 1 634 m, 1 female, 13-27. 07. 2018, 1 634 m, 1 male. Sporadic, Ponto-Caspian-Persian species. Hostplant unknown.

T. (Temuledo) temula Scopoli, 1763: 02-06. 06. 2018, 2 280 m, 2 females. Frequent, Palaearctic species. Host plants: *Melampyrum*, *Ligustrum*, *Rosa*, *Sorbus* spp. and *Prunus spinosa*. In the Caucasus, a special colour form lives (the former var. *xanthaspis* Enslin).

Genus *Tenthredopsis* Costa, 1859

Tenthredopsis ornatrix Konow, 1890: 30. 06. - 24. 07. 2018, 2 280 m, 1 male, 15-29. 06. 2018, 2 465 m, 3 males, 29-06. -13. 07. 2018, 2 465 m, 1 female. Ponto-Caspian species. Host plant unknown.

T. tessellata (Klug, 1817)*: 15-29. 06. 2018, 2 465 m, 1 female, 1 male. Frequent, West Palaearctic species. Sporadic. Larva on *Deschampsia*, *Dactylis*, *Aira* and *Lolium* spp.

T. viridis Zhelochovtsev, 1941: 02-06. 06. 2018, 2 280 m, 1 male, 20. 05. - 01. 06. 2018, 1 634 m, 1 male. Ponto-Caspian species. Sporadic. Host plant unknown.

Discussion

Species richness

Sixty-four sawfly species were identified from a total of 513 specimens collected in Kintrishi National Park at three different altitudes using Malaise traps. Twenty three species were recorded from Georgia (Sakartvelo) for the first time. This brings the number of Symphyta species recorded in Georgia to 230 [22, 23, 24]. We believe that this number will be double in our future studies at least.

Sawfly density and species richness in correlation with altitudes

In our previous study [2], abundance of sawflies and their species richness were measured at 3 different altitudes, namely 404 meters, 1,020 meters and 1,284 meters. The highest diversity and abundance, 83.1% of sawflies (1,416 specimens), were collected at the altitude of 404 meters (Zeraboseli: Kintrishi River). 172 specimens (10.1%) were collected at 1,020 meters and only 115 specimens (6.8%) in 1,264 meters. In the present study, 140 specimens were captured at 1 640 m, 311 specimens at 2 280 m and 62 specimens at 2 465 m altitude above sea level. Unfortunately, the present study cannot be comparable with the other altitudes, since in this high altitude, we were succeeding to investigate, the whole flight period, while in the lower altitude the period with the highest population density was missing. It is also true for the species richness either.

Frequent species

The most frequent species is *Pristiphora leucopus* (Hellén, 1948) with 54 collected specimens. Other frequent species are *Empria longicornis* (Thomson, 1871) with 47, *Priophorus compressicornis* (Fabricius, 1804) with 42, *Strongylogaster caucasica* Schaposchnikov, 1885 with 26, *Pristiphora armata* (Thomson, 1863) with 25, *Aneugmenus coronatus* (Klug, 1818) with 18, *Allantus cinctus* (Linné, 1758) with 18 and *Nematus lucidus* (Panzer, 1801) with 17 collected specimens. These 8 species make 48% of the total collected material.

Zoogeographical area	Number of species	%
Ponto-Caspian-Persian	1	1.6%
Ponto-Caspian	6	9.3%
Ponto-Caspian-Anatolian	1	1.6%
Ponto-Caspian-Siberian	1	1.6%
West-Palaearctic	17	26.5%

Palearctic	24	37.5%
Southern Palearctic	1	1.6%
Holarctic	12	18.7%
Cosmopolitan	1	1.6%

The zoogeographic distribution of the collected sawflies was evaluated (Table 1). Most of the species have wide geographic distribution, i.e. Holarctic, Palearctic, West Palearctic, South Palearctic, Ponto-Caspian-Siberian and Cosmopolitan; their proportion is 87%. The so called characteristic components are the species with limited distribution areas: Ponto-Caspian, Ponto-Caspian-Anatolian and Ponto-Caspian-Persian. These species are: *Strongylogaster caucasica* Schaposchnikov, 1885, *Birka catellata* (Konow, 1900), *Eutomostethus ephippium* ssp. *vopiscus* (Konow, 1899), *Macrophya hamata* ssp. *caucasicola* Muche, 1969, *Tenthredo liturata* (Mocsáry, 1886), *Tenthredo radoszkowskii* (André, 1881), *Tenthredopsis ornatrix* Konow, 1890 and *Tenthredopsis viridis* Zhelochovtsev, 1941. Their proportion is 13%. Similar proportions (12-13%) were experienced during our investigations in the different regions of Caucasus (Japoshvili and Haris, 2022 b, c and d). Some species, like: *Epicenematus montanus* (Zaddach, 1883), *Polynematus punctifrons* (Malaise, 1921), *Tenthredopsis viridis* Zhelochovtsev, 1941, *Nematus wahlbergi* Thomson, 1871 reaching the Southern border of their distribution in this area.

Flight period of sawflies

In the highest altitudes, flight period starts at last decade of May or first decade of June. Soon after, with sudden and strong eruption, the flight period is culminated in the second decade of June. In the sub-alpine region of the Caucasus, it erupts in the last decade of April, similarly to lower altitudes, and probably starts in early March. It collapsed for the last decade of August or first decade of September in the alpine region (above 2 000 m alt.asl.) and for the first decade of August in the sub-alpine region (this data shall be confirmed or refined with further researches). Opposite of the lower altitude [2], in the 2 high altitudes (2 280 and 2 465 m), the annual flight activity consists of only one curve instead of 2 curves model as it figured in Japoshvili and Haris [2]. The culmination point is not emerged, the shape of activity curve flat.

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Fig. 1. Habitats of trap locations in KNP: A – Trap location at 1634 m altitude; B - Trap location at 2280 m altitude; C,D – Trap location at 2465 m altitude.