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Faunistic review of the genus *Ichneumon* LINNAEUS, 1758 in Byelorussia
(Hymenoptera, Ichneumonidae, Ichneumoninae)

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Abstract

Faunistic and ecological data (abundance, seasonal dynamics, hibernating, biotopical distribution) of 53 *Ichneumon* species from Byelorussia are given. Most species are new to the fauna of Byelorussia.

Zusammenfassung

Es werden faunistische und ökologische Daten von 53 *Ichneumon*-Arten aus Weissrussland präsentiert. Die meisten Arten sind neu für das Gebiet.

Introduction

The genus *Ichneumon* is the largest genus of the subfamily Ichneumoninae with hundreds of species in the Holarctic region, and is widely distributed in Europe, Asia and North America. Species of the genus are mainly parasites of pupae of Lepidoptera, especially of Noctuidae, less often of those of Heterocera and Rhopalocera. In all species the females hibernate as adults (HEINRICH 1961).

Many Ichneumon species show a rather uniform colour pattern and morphological monotony which makes them difficult to identify (Fig. 1 shows a typical female specimen). Ichneumon species show a very strong sexual dimorphism and the color pattern of the males is even more uniform than the femal pattern. Even with HILPERT's review (1992) it is often impossible to identify a male specimen. So in this project most male specimens have not been identified.

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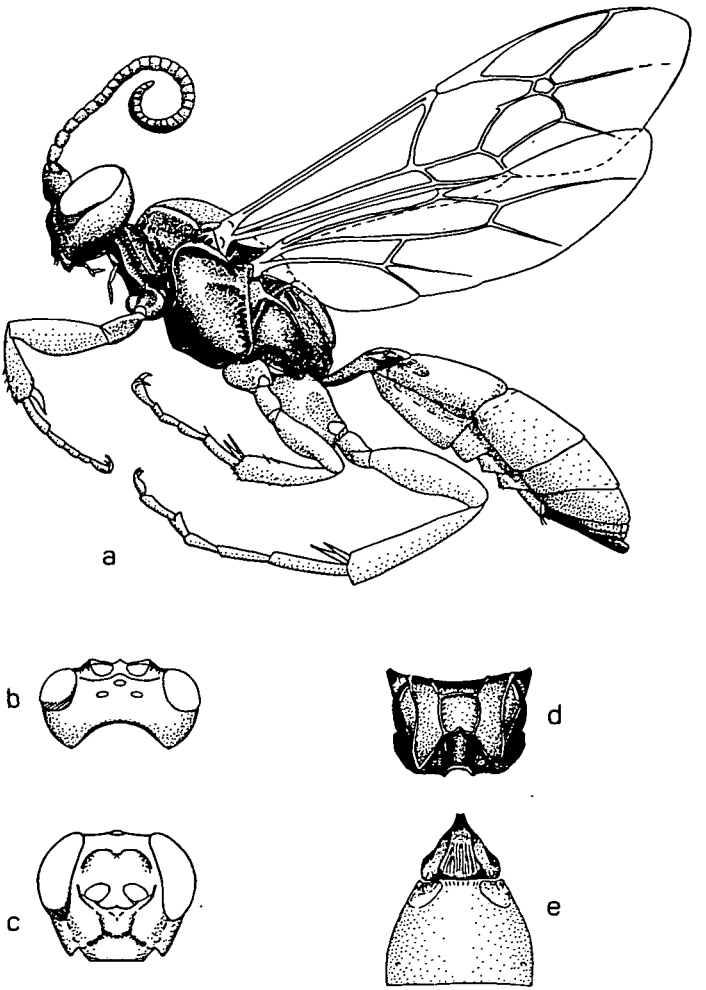

Fig. 1: *Ichneumon extensorius* LINNAEUS, 1758, female - a) whole, b) head in dorsal view, c) head in front view, d) propodeum, e) segments 1-2 of abdomen.

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The faunistic data about *Ichneumon* species from Byelorussia are fragmentary (MEYER 1924, 1927). At the same time, the investigation of the regional fauna is of considerable interest, because Byelorussia is situated at the conjunction of two large geobotanical zones, the European coniferous forests (boreal coniferous forest zone) and the European broad-leaved forests (broad-leaved forest zone). Byelorussia is divided into three subzones (Fig. 2). In the northern part of the country a subzone of oak - dark coniferous forests with an appreciable amount of boreal flora is present. In the southern part there is a subzone of broad-leaved - pine forests with a considerable number of West-European flora elements. The central part of the country is occupied by a subzone of hornbeam-oak - dark coniferous forests, with an equal mixture of boreal and West-European flora elements (YURKEVICH, GOLOD & ADERIKHO 1979). From such a geographical position one would expect to find *Ichneumon* flies in Byelorussia from both boreal and West European origin. This makes the exact knowledge of the distribution of the various species of great faunistic interest.

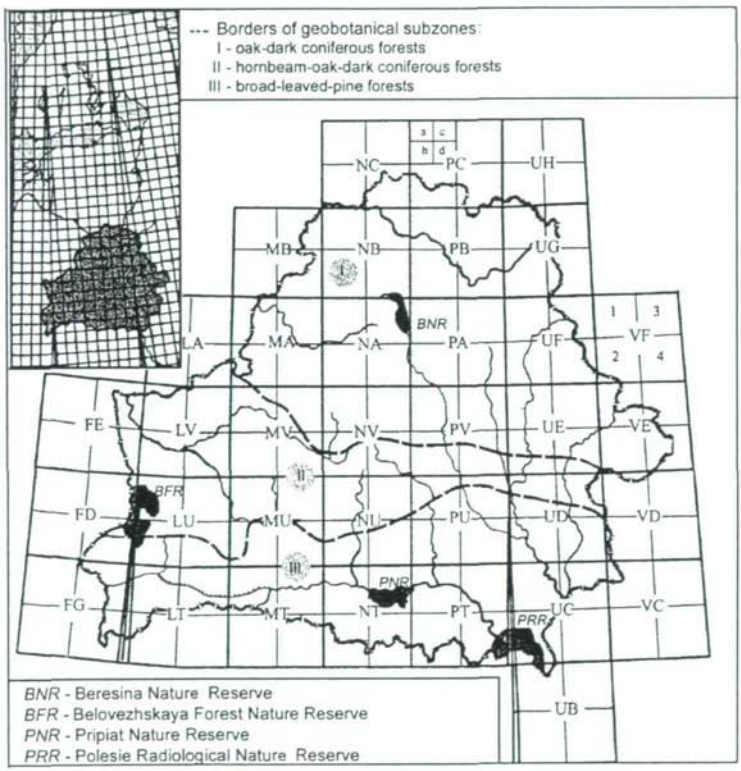

Fig. 2: Byelorussia in Universal Transverse Mercator grid.

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Material and methods

The material presented in this work was collected by the author in the period 1978-1999. It consists of 3437 individuals: 1009 ♀♀ and 2428 ♂♂.

Sampling was carried out with three basic methods: sweeping with a net, collecting of hibernating females and using Malaise traps. The greatest part of the material was collected with Malaise traps, which were in operation during the whole flying season of the Ichneumonidae (TERESHKIN & SHLYAKHTYONOK 1989). The research with Malaise traps started in 1985 and proceeds untill the present time. During this period all basic types of forest and meadow communities were investigated. The investigations were concentrated in: Beresina Biosphere Nature Reserve, Belovezhskaya Forest Nature Reserve, Pripiat Nature Reserve, Polesie Radiological Nature Reserve and at three points in the province of Minsk (Fig. 2). The use of traps made it possible to study the Ichneumonid species composition, their biotopical preference and their seasonal dynamics.

Review of the species composition

I. latrator (1), *I. simulans* (3), *I. minutorius* (4) and *I. gracilentus* (2) were the most numerous species (Fig. 3). Altogether 53 Ichneumon species were found, but these four together made up 60 % of the collected material. The first 3 species were captured mainly with Malaise traps, and the last species was mainly found as hibernating females. The following 11 species, *I. formosus* (5), *I. melanobatus* (6), *I. albiger* (7), *I. extensorius* (8), *I. confusor* (9), *I. melanotis* (10), *I. connectens* (11), *I. delator* (12), *I. gracilicornis* (13), *I. molitorius* (14), *I. amphibolus* (15), together made up 28.1 % of the total number of collected specimens. The relative abundance of the other species varied between 1.3 and 5.1 %. In most cases the number of specimens of a species was less than 1 % of the total number and from 8 species only a single specimen was found.

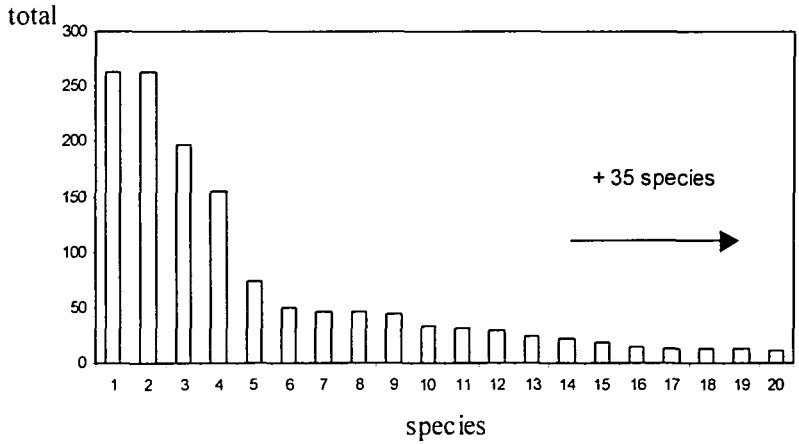

Fig. 3: Abundance of *Ichneumon* species in the samples.

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Seasonal activity

The generalized data about the seasonal activity of *Ichneumon* species is presented in Figure 4. The maximum number of overwintering females and the maximum number of species are registered in May - June. In this period 38 of all the 53 registered species were collected. In May-June 68 % of the total number of female specimens were collected. Their numbers decline to the end of the summer season. In the majority of species also the males occur in June but the greatest number of male specimens is found in August.

In the common species the peak of female numbers is in June for most species. One species, *I. albiger*, has its peak of activity in May, *I. latrator* in August and one, *I. simulans*, has no clearly expressed peak in the abundance curve (Fig. 5).

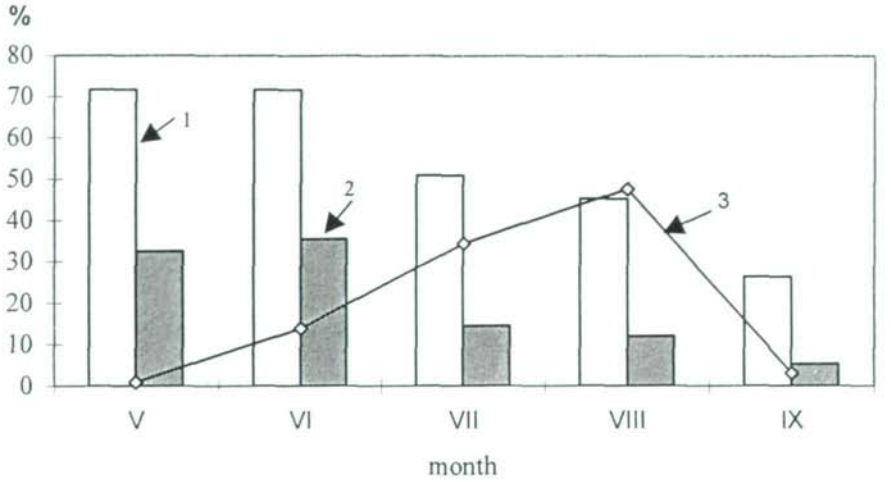

Fig. 4: Seasonal dynamics of the genus *Ichneumon* - 1) species. 2) female specimens, 3) male specimens.

Hibernating

From the total of 53 species 20 were found in the winter season. The greatest number of hibernating species was found in old spruce forests, mainly haircap-moss spruce forests and wood sorrel spruce forests. The basic places of hibernating female concentrations are in decreasing order: fallen rotten trees with wet wood, stumps and forest floor moss at the base of trees. Most *Ichneumon* flies are found in fallen trees, both under bark, and in dust of rotten wood. In coniferous stands (spruce forests) *Ichneumon* females preferred laying trunks of leaf-bearing trees, for example poplar or birch. An appreciable number of *Ichneumon* flies was found under the bark of old stumps and in moss at their base and on their top surface. The most common hibernating species found was *I. gracilentus*. Also *I. confusor*, *I. melanotis*, *I. extensorius*, *I. minutorius* and *I. albiger* were found in great

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numbers. One species, *I. vorax*, was found only in winter season.

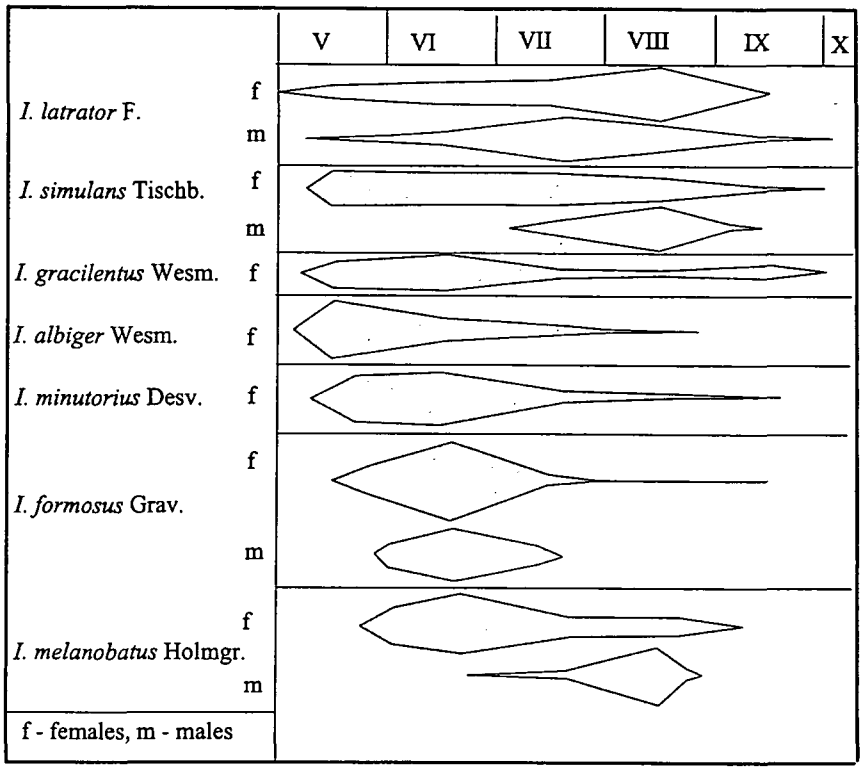

Fig. 5: Seasonal dynamics of common *Ichneumon* species.

Biotopical preference

In the course of the project, the following groups of forest and meadow biotopes were studied: pine forests (bog moss, bilberry, polytric), spruce forests (haircap-moss, wood sorrel), birch forests, alder forests, oak forests (flood plain, dry), wet and dry meadows and personal plots. The greatest number of species is found in pine forests (bog moss), the smallest number in meadows, personal plots, and in the birch and oak forests (Fig.6). Only one species, i.e. *I. albiger* was registered in all investigated biotopes.

Pine forests. The greatest number of species and specimens are registered in raised bogs (bog moss pine forest - *Pinetum sphagnosum*) = 37 species. Four species, *I. latrator*, *I. simulans*, *I. minutorius* and *I. formosus* together represented 59.9 % of the total number of specimens in this type of forest. Their partial share varied between 10 and 28 % *I. latrator* dominated the samples with 28 %. For *I. minutorius*, *I. latrator*, and *I. formosus* the

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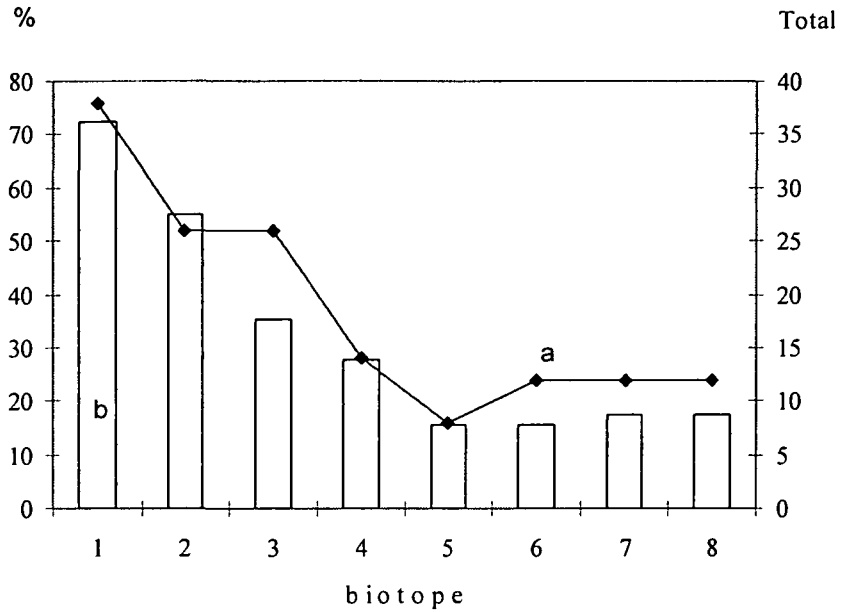

Fig. 6: Number of species (a) and individuals in % (b) of *Ichneumon* species in different biotops - 1) bog moss pine forests, 2) polytric pine forests, 3) spruse forests, 4) alder forests (*urticosum*), 5) oak forests (bottom land), 6) dry meadows, 7) wet meadows, 8) personal plots.

bog moss pine forests is the favorite biotope of all investigated biotopes. 12 species are present with a single specimen. *Ichneumon* species with a red metanotum, *I. connectens*, *I. ?alpestriops* and *I. emancipatops* are characteristic for this type of northern biotope. They were not found in any others ecosystems. All of them have an arctic or arcto-alpine distribution (HEINRICH 1951, HILPERT 1992). The bog moss pine forest obviously constitutes favourable hibernating conditions for overwintering Ichneumons and that explains the great number of hibernating species that was found in this biotope.

In polytric pine forests (*Pinetum polytrichosum*) 28 *Ichneumon* species are registered. Three species, *I. gracilentus* (40,8 %), *I. simulans* (23,7 %) and *I. minutorius* (13,9 %), strongly dominate the number of specimens. So, about 80 % of all specimens in this type of forest belong to one of these three species. The other species contributed 0,3 - 4,5 % each and 10 species are present with a single specimen. For *I. simulans* and *I. gracilentus* the polytric pine forest is the favourite type of biotope.

Spruce forests. Collecting of *Ichneumon* flies was done mainly in old spruce forests, predominantly in the wood sorrel spruce forests (*Piceetum oxalidosum*) and partially in the haircap-moss spruce forests (*Piceetum polytrichosum*). Hibernating females made up a considerable part of the collected material. In total 18 species = 35,3 % of all collected species, representing 10 % of all specimens were collected in this type of forest. With

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30% of all collected specimens in this biotope, *I. gracilentus* strongly dominated the samples. Three species, *I. simulans*, *I. extensorius* and *I. confusor* together made up 34,7 % of all specimens in this biotope. For *I. confusor* and *I. extensorius* the spruce forests delivered the greatest number of specimens of all the studied biotopes.

Alder forests. In total, in alder forests, 14 species, representing 4 % of the total number of specimens of all biotopes, were found. The samples were not dominated by a single species: *I. minutorius* (17 %), *I. gracilentus* (16 %), *I. simulans* (14 %) and *I. extensorius* (12 %) were the most common species.

Birch forests (*Betuletum pteridiosum*). The birch forests delivered only three species, each one in a single specimen.

Oak forests. Sampling was done in three types of oak forests: riverside, dry oak forests and oak forest-plantations, concentrated in the southern part of the republic. The oak forests delivered only 8 species, representing 4 % of the total number of collected specimens. *I. simulans* is the most common species in this type of forest.

Meadows. 12 species representing 6,1 % of all collected specimens were found in these communities. On dry meadows *I. latrator* strongly dominates. On wet meadows, especially along riversides, *I. confusor*, *I. extensorius* and *I. gracilentus* are the most common species.

Personal plots. To this category we attribute garden and kitchen-garden plots in inhabited settlements and in settlements in the zone of Chernobyl left by people. This type of biotope is poor both in number of species (9) and in specimens: 2,8 % of the total number. *I. albiger* sharply dominates the samples in these biotopes.

In conclusion *Ichneumon* species prefer forest biotopes. The greatest species variety is found in coniferous stands and first of all in raised bogs (*Pinetum sphagnosum*).

Faunistic data

In the listing of the material the following abbreviations are used: **BNR** = Beresina Biosphere Nature Reserve, **PNR** = Pripiat Nature Reserve, **BFR** = Belovezhskaya Forest Nature Reserve, **PRR** = Polesie Radiological Nature Reserve, **M** = Minsk -, **V** = Vitebsk -, **G** = Gomel -, **B** = Brest province. M.t. = Malaise trap.

The surname of the collector is added in case when the material was not collected by the author. UTM coordinates are indicated.

Ichneumon albicollis **WESMAEL, 1857**

BNR: Postrejie, polytric pine forest, 01.07.96, 1♀, M.t.; Kraytsi v., pine forest, 11.07.76, 1♀, R. MOLCHANOVA leg. (NA-3d). **PRR:** Dronky, personal plot, 25.05.93, 1♀, M.t.; Orevitchy, personal plot, 04.08.92, 1♀, M.t.(PT-4c).

Ichneumon albiger **WESMAEL, 1844**

Material: 42♀♀ and 4♂♂ of which 9♀♀ were found hibernating. The species is found in all investigated biotopes without a clear preference for one particular biotope. So, both spruce forests (wood sorrel and haircap-moss) and polytric pine forests accounted for 20,5% and 29,5 % was collected in personal plots. Females are active from May to July (Fig. 5), with the peak of activity in May (66,7 % from total number). UTM: NA-1,3; NV-1,3; PA-3; PT-4.

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Ichneumon ?alpestriops HEINRICH, 1951
BNR: Postrejie, bog moss pine forest, 15.06.90, 1♀, M.t.; 29.06.90, 2♀♀, M.t.; 13.07.90, 5♀♀, M.t.; 05.06.92, 1♀, M.t. (NA-3d).

Ichneumon altaicola HEINRICH, 1978
BNR: Postrejie, bilberry pine forest, 26.06.91, 1♀, M.t. (NA-3d).

Ichneumon amphibolus KRIECHBAUMER, 1888
BNR: Postrejie, bog moss pine forest, 28.05.86, 1♀, M.t.; 15.10.86, 1♀, M.t.; 29.06.90, 2♀♀, M.t.; 02.10.90, 1♀, M.t.; 15.05.90, 1♀, M.t.; 05.06.92, 4♀♀, M.t.; 01.07. 92, 1♀, M.t.; 30.07.92, 1♀, M.t.; Bilberry pine forest, 30.05.91, 1♀, M.t.; polytric pine forest, 12.10.95, 1♀, M.t. (NA-3d). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 26.11.83, 1♀; 07.04.84, 2♀♀, (NV-3a). **M:** Stolbzy, Kolosovo, spruce forest, 06.10.86, 1♀ (NV-4c).

Ichneumon analis GRAVENHORST, 1829
BNR: Postrejie, bog moss pine forest, 07.05.87, 1♀, M.t.; 15.08.90, 1♀, M.t.; 30.05.91, 2♀♀, M.t. (NA-3d).

Ichneumon analisorius HEINRICH, 1952
BNR: Postrejie, bog moss pine forest, 05.06.92, 2♀♀, M.t.; 25.05.93, 1♀, M.t.; 23.07.93, 1♀, M.t.; 30.08.93, 1♀, M.t.; 27.05.96, 1♀, M.t.; 26.05.97, 1♀, M.t. (NA-3d).

Ichneumon bellipes WESMAEL, 1844
BNR: Postrejie, bog moss pine forest, 15.08.90, 1♂, M.t.; 31.05.90, 2♀♀, M.t.; 25.05.93, 1♀, M.t.; 25.06.93, 1♀, M.t.; polytric pine forest, 25.05.89, 1♀ (NA-3d). **M:** Kolodischy, 29.06.31, 1♀, SERGEEVA leg. (NV-3a). **V:** Verhnedvinsk, Popovka v., meadow wet, 01.07. 87, 1♀, A. SHLAHTYONOK leg. (NC-4b).

Ichneumon cessator MÜLLER, 1776
BNR: Postrejie, polytric pine forest, 04.11.87, 1♀, M.t. (NA-3d). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 02.04.92, 3♀♀ (NV-3a).

Ichneumon computatorius MÜLLER, 1776
PRR: Dronky, oak forest, 05.10.94, 1♀, M.t. (PT-4c).

Ichneumon confusor GRAVENHORST, 1820
Material: 44♀♀ of which 21 hibernating. Mostly it can be found in wood sorrel spruce forests, pine forests each accounting 30 % and wet meadows 16 %. It has been registered in oak forests, nettle alder forests and personal plots. Females are flying during all seasons with the maximum of activity in May-June. UTM: NA-3; NV-1,3; PA-3; PT-4; NT-3.

Ichneumon connectens ROMAN, 1904
BNR: Postrejie, bog moss pine forest, 29.06.89, 1♀, M.t.; 16.08.89, 1♀, M.t.; 15.05.90, 4♀♀, M.t.; 30.05.90, 1♀, M.t.; 29.06.90, 8♀♀, M.t.; 13.07.90, 3♀♀, M.t.; 26.07.90, 4♀♀, M.t.; 15.08. 90, 3♀♀, M.t.; 30.07.92, 2♀♀, M.t.; 05.06.92, 1♀, M.t.; 01.07.92, 2♀♀, M.t.; 05.06.92, 1♀, M.t. (NA-3d).

Ichneumon crassifemur THOMSON, 1886
M: Smolevitchy, Goncharovka v., wood sorrel spruce forest, 08.04.84, hibernating under bark, 1♀ (NV-3a).

Ichneumon cynthiae KRIECHBAUMER, 1888
BNR: Postrejie, bog moss pine forest, 25.05.93, 1♀, M.t. (NA-3d).

Ichneumon delator WESMAEL, 1844
BNR: Postrejie, bog moss pine forest, 09.07.86, 2♂♂, M.t.; 23.07.86, 4♂♂, M.t.; 06.08.

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86, 3♂♂, M.t.; 20.08.86, 3♂♂, M.t.; 03.09.86, 1♂, M.t.; 02.08.87, 4♂♂, M.t.; 03.09.87, 4♂♂, M.t.; 15.07.89, 3♂♂, M.t.; 26.07.89, 2♂♂, M.t.; 15.08.90, 4♂♂, M.t. (NA-3d).

Ichneumon didymus **GRAVENHORST, 1829**

BNR: Postrejie, bog moss pine forest, 04.09.90, 2♀♀, M.t.; 23.07.91, 2♀♀, M.t.; 25.05. 93, 1♀, M.t.; 29.06.95, 1♀, M.t.; 01.07.96, 1♀, M.t.; 01.08.96, 1♀, M.t. (NA-3d).

Ichneumon emancipatops **HEINRICH, 1978**

BNR: Postrejie, bog moss pine forest, 03.06.87, 1♀, M.t. (NA-3d). **PRR:** Dronky, nettle alder forest, 10.10.89, 1♀, M.t. (PT-4c).

Ichneumon emancipatus **WESMAEL, 1844**

BNR: Postrejie, polytric pine forest, 15.05.90, 1♀, M.t.; 26.06.91, 1♀, M.t. (NA-3d). **G:** Loev, Dimomery v., oak forest (plantations), 11.07.89, 2♀♀ (UC-1d). **B:** Pruzhany, Mihalky v., polytric pine forest, 16.05.89, 2♀♀ (LU-4b).

Ichneumon ?erythromerus **WESMAEL, 1857**

BNR: Domzheritsy v., 03.06.87, 1♀ (NA-3c).

Ichneumon exilicornis **WESMAEL, 1857**

BNR: Postrejie, bog moss pine forest, 30.07.92, 1♀, M.t.; 26.08.92, 1♀, M.t.; 01.07.92, 2♀♀, M.t.; 25.05.93, 1♀, M.t.; 19.07.94, 1♀, M.t.; polytric pine forest, 29.08.95, 1♀, M.t. (NA-3d).

Ichneumon extensorius **LINNAEUS, 1758**

Material: 35♀♀ and 11♂♂, of which 8♀♀ hibernating. The species is common in wood sorrel spruce forests (36,4 %), polytric pine forests (20,5 %) and nettle alder forests (15,9 %). It has been registered in oak forests, wet and dry meadows. Females are active from May to October, without a sharply expressed peak of activity. UTM: NA-3; NV-1,3,4; PA-3;PB-1; PT-4.

Ichneumon formosus **GRAVENHORST, 1829**

Material: 29♀♀ and 45♂♂. Most specimens have been collected with traps. More than 90 % were collected in bog moss pine forests. A few specimens have been registered in polytric pine forests, spruce forests, alder forests and personal plots. Active flaying of females from May to October with the peak in June (67,9 %) (Fig. 5). Active flaying of males from May to July with the peak in June (55 %). UTM: NA-3; NV-4; PT-4.

Ichneumon fulvicornis **GRAVENHORST, 1829**

BNR: Postrejie, bog moss pine forest, 15.05.90, 2♀♀, M.t.; 31.05.90, 2♀♀, M.t.; 30.05. 91, 1♀, M.t.; 05.06.92, 1♀, M.t.; 01.07.92, 4♀♀, M.t.; 30.07.92, 1♀, M.t.; 03.06.95, 1♀, M.t. (NA-3d).

Ichneumon gracilentus **WESMAEL, 1844**

It is one of the most numerous species in the collections. Altogether 263 specimens (201♀♀ and 62♂♂) were collected. 224 of them were collected by Malaise traps. Many were found hibernating. This species prefers pine forests (59,3 %) (predominantly polytric and bilberry), bog moss pine forests (11,7 %) and spruce forests (16,8 %). It is registered in small numbers in other biotopes: oak forests (*Querceetum pteridiosum*) (3,5 %), nettle alder forests (3,5 %), birch forests (0,4 %), mixed forests (1,2 %), wet meadows (1,6 %) and personal plots (2,0 %). Peak of females activity is in June (Fig. 5). UTM: FD-4; LU-1; NA-3; NV-2,3,4; NT-1,3; PA-3; PT-3,4.

Ichneumon gracilicornis **GRAVENHORST, 1829**

BNR: Postrejie, bog moss pine forest, 28.05.86, 1♀, M.t.; 11.06.86, 1♀, M.t.; 15.05.90,

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2♀♀, M.t.; 15.08.90, 1♀, M.t.; 30.07.92, 1♀, M.t.; 25.05.93, 1♀, M.t.; polytric pine forest, 15.05.90, 1♀, M.t.; 30.05.90, 1♀, M.t.; 02.06.89, 2♀♀, M.t.; bilberry pine forest, 26.06. 91, 1♀, M.t.; Kraytsi v., 12.10.78, 1♀ (NA-3d). **PRR:** Dronky, nettle alder forest, 22.05. 90, 4♀♀, M.t.; 25.05.92, 1♀, M.t.; personal plot: 18.06.91, 1♀, M.t.; 09.07.92, 1♀, M.t.; 29.06.94, 1♀, M.t.; Orevitchy, personal plot, 25.05.93, 1♀, M.t. (PT-4c). **M:** Krasnoye Zna-mia, Centralny v., mixed forest, 26.05.85, 1♀ (NV-3c). **G:** Loev, Dimomery v., oak forest (plantations) 10.06. 88, 1♀ (UC-1d).

Ichneumon hinzi **HEINRICH, 1972**

BNR: Postrejie, bog moss pine forest, 05.06.92, 2♀♀, M.t. (NA-3d).

Ichneumon hypolius **THOMSON, 1888**

BNR: Postrejie, bog moss pine forest, 11.06.86, 1♀, M.t.; birch forest (*pteridiosum*), 30.05.91, 1♀, M.t. (NA-3d). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 24.08.82, 1♀. (NV-3a).

Ichneumon ingratus **(HELLEN, 1951)**

BNR: Postrejie, bog moss pine forest, 16.06.89, 1♀, M.t.; polytric pine forest, 04.09.90, 1♀, M.t. (NA-3d). **I:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 22.04.84, hibernating, 1♀ (NV-3a).

Ichneumon insidiosus **WESMAEL, 1844**

BNR: Postrejie, bog moss pine forest, 04.07.87, 1♀, M.t.; 15.06.90, 1♀, M.t.; 05.06.92, 1♀, M.t.; 01.07.92, 1♀, M.t.; 25.06.93, 2♀♀, M.t.; 25.06.93, 2♀♀, M.t.; 05.07.86, 1♀ (NA-3d). **PRR:** Orevitchy, personal plot, 18.06.91, 4♀♀, M.t. (PT-4c). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 19.06.85, 1♀ (NV-3a). 9 females have no elongate area superomedia (see HILPERT 1992).

Ichneumon languidus **WESMAEL, 1844**

BNR: Postrejie, bog moss pine forest, 03.06.95, 1♂, M.t. (NA-3d). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 22.04.84, hibernating, 1♀ (NV-3a).

Ichneumon latrator **FABRICIUS, 1781**

It is the most common species in the region. Altogether 93♀♀ and 171♂♂ were found. 87♀♀ and 167♂♂ from them have been collected with Malaise traps, 2♀♀ were found hibernating. It is distributed everywhere. The largest number is in bog moss pine forests (73%), dry meadows (18%) and polytric pine forests (5%). In others biotopes, spruce forests, nettle alder forests, oak forests, wet and dry meadows, it has been found occasionally (less than 1 %). Females are active from May to October. Peak of females activity is in August (Fig.5). Males are active from June to September. Peak of males activity is in July. UTM: NU-1; NV-1,2,3; FE-3; PA-3; PB-1; PT-4.

Ichneumon ligatorius **THUNBERG, 1822**

BNR: Postrejie, bog moss pine forest, 15.06.90, 1♀, M.t.; 26.06.91, 1♀, M.t.; Kraytsi v., 14.09.83, 1♂ (NV-3d).

Ichneumon melanobatus **GRAVENHORST, 1829**

Material: 24♀♀ and 25♂♂ predominantly collected with traps. It has been found exclusively in pine forests, bog moss pine forests (93,3 %), polytric and bilberry pine forests (6,6 %). Females are active from May to September with a peak in June, males are active from June to August with a peak in August (91,3 %). UTM: NA-3b,d. The colour pattern of males from the raised bogs do not completely correspond to HILPERT's description. In particular, tergite 5 (not only 2-4) is almost always red-yellow. But HILPERT's description

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is based on two samples. The colour pattern of males partially corresponds with the description of *I. nebulosae* HINZ, 1975.

Ichneumon melanotis **HOLMGREN, 1864**

Material: 26♀♀ and 7♂♂; 16♀♀ hibernating. This species prefers spruce forests, where conditions for hibernating are most favorable (46 %). It has been registered also on bog moss pine forests and in the polytric pine forests, alder forests, wet meadows. Flying of females in May-August, of males in August-September. UTM: FD-4; NA-3; NV-3,4.

Ichneumon memorator **WESMAEL, 1844**

BNR: Postrejie, mixed forest: 15.05.90, 1♀, M.t.; 25.05.93, 1♀, M.t. (NA-3d).

Ichneumon minutorius **DESVIGNES, 1856**

Material: 155♀♀. The overwhelming majority of the material has been collected with Malaise traps and 12 specimens hibernating. This species prefers coniferous forests, bog moss pine forests (47,7 %), polytric and bilberry pine forests (33,5 %), wood sorrel and polytric spruce forests (8,4 %). It is registered also in few specimens in mixed forests, nettle alder forests, on wet and dry meadows and personal plots. Active flying of females May-September, with the peak in June (Fig. 5). UTM: NA-3; NT-3; NV-1,3; PA-2; PT-4.

Ichneumon molitorius **LINNAEUS, 1761**

BNR: Gurba, meadow wet, 11.06.86, 1♀, M.t.; Domzheritsy v., dry meadow, 03.09.87, 1♀ 1♂, M.t.; nettle alder forest, 25.09.85, 1♀; hibernating, 14.04.84, 1♀; Postrejie, bog moss pine forest, 02.06.89, 1♀, M.t.; 15.05.90, 1♀, M.t.; 26.06.91, 1♀, M.t.; bilberry pine forest, 26.06.91, 3♀♀, M.t.; polytric pine forest, 23.07.91, 1♀, M.t. (NA-3c,d). **PRR:** Dronky, nettle alder forest, 09.07.92, 1♀, M.t.; Orevitchy, personal plot, 25.05.93, 1♀, M.t. (PT-4c). **PNR:** Rychov v., 26.06.84, 1♂; 26.06.84, 1♂ (NT-1c). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 16.07.83, 1♂; 03.12.84, hibernating, 2♀♀; 07.04.84, hibernating in a fallen spruce, 1♀; 09.03.84, hibernating under bark, 1♀; 16.07.83, 1♂ (NV-3a).

Ichneumon multipictus **GRAVENHORST, 1820**

BNR: Postrejie, polytric pine forest, 26.06.91, 1♀, M.t. (NA-3d).

Ichneumon nebulosae **HINZ, 1975**

BNR: Postrejie, bog moss pine forest, 06.08.86, 1♀, M.t.; 26.08.92,1♂, M.t. (NA-3d).

Ichneumon nereni **THOMSON, 1887**

BNR: Postrejie, bog moss pine forest, 04.07.87, 1♀, M.t.; 15.05.90, 1♀, M.t.; 15.06.90, 1♀, M.t.; 26.08.92, 1♂, M.t.; 30.07.92, 1♀, M.t. (NA-3d).

Ichneumon nigroscutellatus **KRIECHBAUMER, 1897**

BNR: Postrejie, bog moss pine forest, 09.07.98, 1♂, M.t. (NA-3d).

Ichneumon novemalbatus **KRIECHBAUMER, 1875**

PRR: Orevitchy, personal plot, 21.05.91, 1♀, M.t.; Dronky, personal plot, 25.06.93, 1♀, M.t. (PT-4c).

Ichneumon observandus **HEINRICH, 1951**

BNR: Domzheritsy v., dry meadow, 03.07.87, 1♀, M.t.; Postrejie, bog moss pine forest, 25.05.93, 1♀, M.t. (NA-3c,d).

Ichneumon polyxanthus **(KRIECHBAUMER, 1869)**

PRR: Dronky, personal plot, 20.06.97, 2♀♀, M.t. (PT-4c).

Ichneumon primatorius **FÖRSTER, 1771**

BNR: Postrejie, bog moss pine forest, 23.07.91, 1♀, M.t.; 29.06.95, 1♀, M.t.; Uviasok,

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pine forest, 05.06.84, 1♀ (NA-3d). **M:** Aseevka, alder forest, 28.04.85, hibernating, 2♀♀, A. PISANENKO leg. (NV-1d); Smolevitchy, Goncharovka v., wood sorrel spruce forest, 07.04.84, hibernating, 3♀♀; 27.08.82, 1♀ (NV-3a).

Ichneumon sarcitorius **LINNAEUS, 1758**

BNR: Postrejie, bog moss pine forest, 30.07.92, 1♀, M.t.; dry meadow, 03.08.80, 1♀; Domzheritsy v., nettle alder forest, 11.07.85, 1♂ (NA-3c,d). **M:** Krupki, Osetchino, meadow wet, 01.08.89, 1♀, M.t. (PA-3b); Kryzovka, 09.05.80, 1♀, A. PISANENKO leg. (NV-1a); Priluky, 26.07.19, 1♀, M. DOBROTVORSKY leg.; 26.07.19, 28.07.28, 3♂♂, M. DOBROTVORSKY leg.; 06.07.19, 1♀, M. DOBROTVORSKY leg. (NV-1d). **G:** Petrikov, Kopatkevichy, pine forest (plantations), 21.06.84, 1♀. (PU-2b).

Ichneumon sculpturatus **HOLMGREN, 1864**

BNR: Postrejie, polytric pine forest, 26.06.91, 2♀♀, M.t.; 30.07.92, 1♀, M.t.; 05.06.92, 2♀♀, M.t.; 01.07.92, 1♀, M.t. (NA-3d). **PRR:** Orevitchy, personal plot, 21.05.91, 1♀, M.t. (PT-4c).

Ichneumon silaceus **GRAVENHORST, 1829**

BNR: Postrejie, bog moss pine forest, 29.06.90, 1♀, M.t.; 05.06.92, 2♀♀, M.t.; 01.07.92, 2♀♀, M.t.; 25.05.93, 7♀♀, M.t. (NA-3d).

Ichneumon simulans **TISCHBEIN, 1873**

Material: 90♀♀ and 107♂♂. 84♀♀ and 98♂♂ from them have been collected by Malaise traps, 4 females hibernating on bog moss pine forests and in wood sorrel spruce forests. It is most abundant in bog moss pine forests (45,8 %), polytric pine forests (37,5 %) and wood sorrel spruce forests (9,9 %). It has been registered in oak forests (*Querceetum pteridiosum*), nettle alder forests, mixed forests and dry meadows. Active flying of females is in May-September, without a sharply expressed peak of activity (Fig. 5). Males fly from July to September, and reach their peak of activity in August, when 69,4 % of males are collected. UTM: FD-4; NA-3; NT-3; NV-3,4; PT-4.

Ichneumon spurius **WESMAEL, 1848**

BNR: Postrejie, bog moss pine forest, 15.08.90, 1♀, M.t.; polytric pine forest, 27.05.96, 2♀♀, M.t. (NA-3d).

Ichneumon stramentarius **GRAVENHORST, 1820**

BNR: Domzheritsy v., dry meadow, 05.08.85, 1♀, M.t. (NA-3c). **M:** Krupki, Osechyno, meadow wet, 04.06.89, 1♀, M.t.; 04.06.94, 2♀♀, M.t. (PA-3b); Smolevitchy, Goncharovka v., wood sorrel spruce forest, 27.02.83, hibernating, 1♀; 20.11.83, hibernating under bark, 1♀; 03.12.83, hibernating under bark of fallen spruce, 1♀; 09.03.84, hibernating under bark, 1♀; 22.04.84, hibernating in a rotten wood, 1♀; 30.09.84, 1♀. (NV-3a); Volchkovichy, 13.03.82, hibernating under bark, 1♀, A. KOZUTCHIZ leg.; Shemyslitza, 10.04.81, hibernating in a stump under bark, 1♀, A. KOZUTCHIZ leg. (NV-1c).

Ichneumon terminatorius **GRAVENHORST, 1820**

BNR: Domzheritsy v., 03.08.78, 1♂; 31.05.85, 1♀; dry meadow, 01.08.87,1♂, M.t. (NA-3c). **M:** Smolevitchy, Goncharovka v., wood sorrel spruce forest, 27.08.82, 1♀; 31.08.82, 1♀; 15.06.85, 1♀ (NV-3a).

Ichneumon vorax **GEOFFROY, 1785**

M: Smolevitchy, Goncharovka v., wood sorrel spruce forest, hibernating in the rotten wood of a fallen spruce, 02.04.92, 1♀ (NV-3).

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Literaturbesprechung

KLAUSNITZER, B. (1999): Die Larven der Käfer Mitteleuropas, 5. Band Polyphaga, 4. Teil und: (2001): Die Larven der Käfer Mitteleuropas, 6. Band Polyphaga, 5. Teil. - Spektrum Akademischer Verlag, Heidelberg - Berlin, 336 S. (5. Band), 309 S. (6. Band), zahlr. s/w-Zeichnungen.

Begründet von FREUDE/HARDE/LOHSE, fortgeführt von LUCHT und unter Mitwirkung zahlreicher, hier aus Platzgründen namentlich nicht genannter Entomologen haben die Bände zur Imaginaltaxonomie der Käfer Mitteleuropas weiteste Verbreitung gefunden. KLAUSNITZER führt den taxonomischen Part dieses Standardwerkes mit den Bänden zur Larvalsystematik fort. Nach den Bänden 1. Adephaga, 2. Myxophaga/Polyphaga Teil 1, 3. Polyphaga Teil 2 und 4. Polyphaga Teil 3 liegen nun der fünfte und sechste Larvenband des coleopterologischen Standardwerkes für Mitteleuropa vor. Der 5. Band behandelt 17 Familien aus den Hydrophiloidea, Derodontoidea, Dermestoidea, Cucujoidea und Tenebrionoidea, der 6. Band 22 Familien aus den Dermestoidea, Cucujoidea und Chrysomeloidea. Hierbei handelt es sich zum Teil um Korrekturen zu den vorausgegangenen Bänden. Die letzten Seiten des 6. Bandes enthalten übrigens noch einen Nachtrag zur Gattung Atomaria der 78. Familie Cryptophagidae. Zu Beginn jedes Bandes äußert sich der Autor zu speziellen Fragen der behandelten Überfamilien und der stets im Fluß befindlichen systematischen Einordnung verschiedener Taxa. Weiterhin bietet eine Tabelle einen Überblick über den prozentualen Anteil an der Gesamtfauna der bisher bekannten Larven aus den bearbeiteten Familien. Grundlage hierfür sind die Artenzahlen der in den Imaginalbänden erfaßten Arten. Anschließend werden Familien, Unterfamilien, Triben, Gattungen und die bekannten Arten in Wort und Bild vorgestellt. Bei den Habitus- und Detailzeichnungen handelt es sich überwiegend um Originalabbildungen der reichlich zitierten Arbeiten. Die dichotomen Bestimmungstabellen erweisen sich als verständlich und nachvollziehbar. Die Hinweise zur Lebensweise der Larven sind eher stichwortartig gehalten, können aber mit Hilfe der angeführten Literaturlisten vertieft werden. Das umfassende Register der Namen (höhere Taxa in Fettdruck) schließen jeden Band ab. Zwei weitere wichtige Bausteine zur Larvaltaxonomie der Käfer! M. CARL

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