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Mycetophilidae s.l. (Diptera) of linden-oak-hornbeam woods in the Białowieża National Park

Abstract: Fungus gnats were studied in linden-oak-hornbeam woods, the most representative plant associations in the Białowieża National Park. The species composition, abundance and frequency of *Mycetophilidae* s. l. at three selected sites were compared. 257 species were recorded. Most of the material was collected by netting, some by light and by odour baits.

Key words: *Diptera*, *Mycetophilidae* s.l., linden-oak-hornbeam woods (*Tilio-Carpinetum*), Białowieża National Park, Poland.

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INTRODUCTION

The Białowieża National Park lies within Puszcza Białowieska (Białowieża Forest), the only, in Europe, remnants of primeval forests preserved in an almost natural condition. Their wealth, diversity and state of preservation which meet the requirements for biosphere reserves, account for the scientific value of these forest (SOKOŁOWSKI 1979, 1980). Linden-oak-hornbeam woods are the most commonly plant associations in the Park. They are characterized by considerable diversity, depending on the edaphic and humidity conditions (ADAMCZEWSKI 1950, MATUSZKIEWICZ 1952, SOKOŁOWSKI 1970, 1993). Information about fungus gnats in the Białowieża Forest covered merely a dozen species (SACK 1925, VÄISÄNEN 1984, MIKOŁAJCZYK 1970, 1988; GUTOWSKI 1988, KALLWEIT 1990). The present state of knowledge of the fungus gnats of the BNP and a list of the species, based mainly on the material discussed in this paper, are presented by MIKOŁAJCZYK 1999 and MIKOŁAJCZYK 2001.

STUDY AREA AND METHODS

The studies were carried out from April to November, and mainly from 1962 to 1966. The selected sites had been phytosociologically worked out by MATUSZKIEWICZ (1952). The decision to select this particular area was also influenced by earlier mycological investigations conducted there (NESPIAK 1959, ORŁOŚ 1961).

The studies covered sites situated in forest divisions 283, 340 and 399 (study site 340 was intersected by the boundary between divisions 340 and 369, hence some material is labelled BPN, 369). The linden-oak-hornbeam woods at sites 283 and 340 were floristically rich. The area was low and wet, especially in division 283 situated near the border of the forest, at the edge of riverine brushwood. The linden-oak-hornbeam wood in division 399 was the driest and poorest

The material was collected by the following methods:

1. netting – 30-minute quantitative samples and qualitative samples with no time limit,
2. light-trapping. The bait was a 500W lamp (also used to catch lepidopterans for simultaneous studies), fixed at about 1.6 m, and shedding light on a white screen,
3. odour bait: natural (sap flowing from injured trees) or made from fruit preserves with honey and ale, used to attract lepidopterans, smeared on tree trunks at about 1.6 m.

The material is in the collection of the Museum and Institute of Zoology of the Polish Academy of Sciences in Warsaw.

While collecting the fungus gnat material I could always rely on the help and kindness of the late Professor Stanisław F. ADAMCZEWSKI and of Kazimierz WINNIK. I would like to express my gratitude to them here.

RESULTS

The fungus gnats of the linden-oak-hornbeam woods in the BNP were represented by 257 species (Table I). Most of the material came from 30-minute sweep-net samples. Particular sites differed both in respect of the number of species recorded and the number of individuals caught (Table II); the similarity index of the communities studied has been calculated after Sørensen's formula and is given in Table III.

Table I. Fungus gnats of linden-oak-hornbeam woods in Białowieża National Park. N – number of specimens, F – frequency: number of samples with a given species to total number of samples (%). The numbers in the columns denote data from 30-minute sweep-net samples, "+" = non quantitative data.

| L.p. | Species | Sites | | 283 | | 340 | | 399 | |
|------|---------------------------------------|-------|----|-----|----|-----|---|-----|----|
| | | | | N | F | N | F | N | F |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| | <i>Bolitophilidae</i> | | | | | | | | |
| 1 | <i>Bolitophila basicornis</i> (MAYER) | 1 | 12 | + | | | | | |
| 2 | <i>Bolitophila cinerea</i> (MEIG.) | 9 | 50 | 3 | 12 | | | | |
| 3 | <i>Bolitophila dubia</i> SIEBKE | | | | | | | 4 | 29 |
| 4 | <i>Bolitophila hybrida</i> (MEIG.) | 4 | 37 | 4 | 37 | + | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------|--------------------------------------------|----|----|----|----|----|----|
| 5 | <i>Bolitophila maculipennis</i> WALK. | 5 | 25 | + | | | |
| 6 | <i>Bolitophila oclusa</i> EDW. | | | 2 | 25 | | |
| 7 | <i>Bolitophila rectangularata</i> LUNDSTR. | 1 | 12 | + | | 2 | 14 |
| <i>Ditomyiidae</i> | | | | | | | |
| 8 | <i>Ditomyia fasciata</i> (MEIG.) | | | | | 2 | 29 |
| <i>Keroplastidae</i> | | | | | | | |
| 9 | <i>Keroplastus testaceus</i> (DALM.) | 5 | 50 | | | | |
| 10 | <i>Macrocera angulata</i> MEIG. | 5 | 37 | | | | |
| 11 | <i>Macrocera centralis</i> MEIG. | 1 | 12 | 1 | 12 | 1 | 14 |
| 12 | <i>Macrocera lutea</i> MEIG. | 2 | 25 | 2 | 25 | 1 | 14 |
| 13 | <i>Macrocera maculata</i> MEIG. | 2 | 25 | 2 | 25 | | |
| 14 | <i>Macrocera phalerata</i> MEIG. | 2 | 25 | 5 | 12 | 5 | 29 |
| 15 | <i>Macrocera pilosa</i> LANDR. | 6 | 25 | 8 | 37 | 15 | 29 |
| 16 | <i>Macrocera stigma</i> CURT. | 18 | 50 | 29 | 12 | 15 | 29 |
| 17 | <i>Macrocera stigmoides</i> EDW. | 3 | 12 | 2 | 12 | 8 | 29 |
| 18 | <i>Macrocera vittata</i> MEIG. | 1 | 12 | | | 1 | 14 |
| 19 | <i>Orfelia discoloria</i> (MEIG.) | 4 | 37 | 3 | 12 | 1 | 14 |
| 20 | <i>Orfelia fasciata</i> (MEIG.) | 8 | 50 | 2 | 12 | 8 | 43 |
| 21 | <i>Rocetelion humerale</i> (Zett.) | 2 | 25 | | | | |
| 22 | <i>Urytalpa atriceps</i> (EDW.) | | | | | 1 | 14 |
| 23 | <i>Urytalpa ochracea</i> (MEIG.) | | | 1 | 12 | | |
| <i>Diadocidiidae</i> | | | | | | | |
| 24 | <i>Diadocidia ferruginosa</i> (MEIG.) | 7 | 50 | 5 | 37 | 7 | 43 |
| 25 | <i>Diadocidia spinosula</i> TOLL. | 1 | 12 | + | | | |
| 26 | <i>Diadocidia valida</i> MIK | | | 2 | 25 | + | |
| <i>Mycetophilidae</i> | | | | | | | |
| 27 | <i>Mycomya cinerascens</i> MACQ. | 4 | 50 | 3 | 37 | 4 | 57 |
| 28 | <i>Mycomya egregia</i> (DZIEDZ.) | 1 | 12 | 1 | 12 | | |
| 29 | <i>Mycomya fimbriata</i> (MEIG.) | 1 | 12 | | | + | |
| 30 | <i>Mycomya karelica</i> VÄIS. | 2 | 12 | | | | |
| 31 | <i>Mycomya levis</i> (DZIEDZ.) | + | | | | | |
| 32 | <i>Mycomya maculata</i> (MEIG.) | 1 | 12 | 2 | 25 | | |
| 33 | <i>Mycomya marginata</i> (MEIG.) | + | | 1 | 12 | 1 | 14 |
| 34 | <i>Mycomya ornata</i> (MEIG.) | 3 | 37 | | | | |
| 35 | <i>Mycomya neohyalinata</i> VÄIS. | 1 | 12 | | | | |
| 36 | <i>Mycomya occultans</i> (WINN.) | 1 | 12 | | | | |
| 37 | <i>Mycomya parva</i> (DZIEDZ.) | | | 1 | 12 | | |
| 38 | <i>Mycomya permixta</i> VÄIS. | | | + | | + | |
| 39 | <i>Mycomya prominens</i> (LUNDSTR.) | | | + | | 1 | 14 |
| 40 | <i>Mycomya ruficollis</i> (ZETT.) | 7 | 25 | 9 | 25 | 5 | 29 |
| 41 | <i>Mycomya siebecki</i> (LANDR.) | 1 | 12 | | | + | |
| 42 | <i>Mycomya sigma</i> JOH. | + | | | | + | |
| 43 | <i>Mycomya tenuis</i> (WALK.) | 1 | 12 | | | | |
| 44 | <i>Mycomya tridens</i> (LUNDSTR.) | | | 3 | 12 | | |
| 45 | <i>Mycomya tumida</i> (WINN.) | | | 2 | 25 | | |
| 46 | <i>Mycomya wankowiczii</i> (DZIEDZ.) | | | | | + | |
| 47 | <i>Mycomya winnerti</i> (DZIEDZ.) | 1 | 12 | | | 2 | 29 |
| 48 | <i>Neoempheria lineola</i> (MEIG.) | | | 1 | 12 | | |
| 49 | <i>Neoempheria pictipennis</i> (HAL.) | + | | 1 | 12 | | |
| 50 | <i>Neoempheria striata</i> (MEIG.) | | | | | + | |
| 51 | <i>Acnemia longipes</i> WINN. | 1 | 12 | | | | |
| 52 | <i>Acnemia nitidicollis</i> (MEIG.) | | | 1 | 12 | 1 | 14 |
| 53 | <i>Allocotocera pulchella</i> (CURT.) | 1 | 12 | | | | |
| 54 | <i>Monoclona rufilatera</i> (Walk.) | 1 | 12 | 2 | 25 | 1 | 14 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|-------------------------------------------|----|----|----|----|----|----|
| 55 | <i>Monoclona silvatica</i> ZAITZ. | 1 | 12 | | | | |
| 56 | <i>Neuratelia nemoralis</i> (MEIG.) | 5 | 37 | 2 | 12 | | |
| 57 | <i>Phthinia humilis</i> WINN. | 1 | 12 | 2 | 25 | | |
| 58 | <i>Phthinia winnertzi</i> MIK | | | + | | | |
| 59 | <i>Polylepta guttiventris</i> (ZETT.) | 5 | 50 | 1 | 12 | | |
| 60 | <i>Sciophila cliftoni</i> EDW. | | | 1 | 12 | | |
| 61 | <i>Sciophila hirta</i> MEIG. | 3 | 25 | 1 | 12 | | |
| 62 | <i>Sytemna nitidula</i> EDW. | + | | | | | |
| 63 | <i>Sytemna relictata</i> (LUNDSTR.) | | | + | | | |
| 64 | <i>Apolephthisa subincana</i> (CURT.) | 5 | 25 | 10 | 50 | 4 | 43 |
| 65 | <i>Boletina basalis</i> (MEIG.) | 18 | 37 | 18 | 37 | 13 | 29 |
| 66 | <i>Boletina cincticornis</i> (WALK.) | | | 1 | 12 | | |
| 67 | <i>Boletina dispecta</i> DZIEDZ. | | | 1 | 12 | | |
| 68 | <i>Boletina gripha</i> DZIEDZ. | | | 1 | 12 | | |
| 69 | <i>Boletina nigricoxa</i> STAEG. | + | | | | | |
| 70 | <i>Boletina plana</i> (WALK.) | 1 | 12 | | | | |
| 71 | <i>Boletina sciarina</i> STAEG. | | | 1 | 12 | + | |
| 72 | <i>Boletina trispinosa</i> EDW. | | | 1 | 12 | | |
| 73 | <i>Boletina trivittata</i> (MEIG.) | 51 | 25 | 2 | 12 | | |
| 74 | <i>Coelosia flava</i> (STAEG.) | 1 | 12 | 1 | 12 | 6 | 29 |
| 75 | <i>Coelosia silvatica</i> LANDR. | | | | | + | |
| 76 | <i>Gnoriste bilineata</i> (ZETT.) | 4 | 12 | | | 5 | 14 |
| 77 | <i>Grzegorzekia collaris</i> (MEIG.) | | | 1 | 12 | | |
| 78 | <i>Impleta consorta</i> PLASSM. | 2 | 25 | | | | |
| 79 | <i>Palaeodocosia alpicola</i> (STROBL) | | | | | 1 | 14 |
| 80 | <i>Palaeodocosia janickii</i> (DZIEDZ.) | | | 1 | 12 | | |
| 81 | <i>Saigusaia flaviventris</i> (STROBL) | 1 | 12 | | | | |
| 82 | <i>Docosia fuscipes</i> (V.ROS.) | | | 1 | 12 | | |
| 83 | <i>Docosia pallipes</i> EDW. | 1 | 12 | 1 | 12 | + | |
| 84 | <i>Docosia sciarina</i> (MEIG.) | 3 | 25 | 1 | 12 | 1 | 14 |
| 85 | <i>Leia crucigera</i> ZETT. | 1 | 12 | | | | |
| 86 | <i>Leia cylindrica</i> (WINN.) | | | | | + | |
| 87 | <i>Leia fascipennis</i> MEIG. | | | | | 1 | 14 |
| 88 | <i>Leia picta</i> MEIG. | 1 | 12 | 4 | 25 | | |
| 89 | <i>Leia winthemi</i> LEHM. | 1 | 12 | + | | + | |
| 90 | <i>Rondaniella dimidiata</i> (MEIG.) | 4 | 25 | 1 | 12 | 1 | 14 |
| 91 | <i>Dynatosoma cochleare</i> STROBL | 1 | 12 | | | 1 | 14 |
| 92 | <i>Dynatosoma fuscicorne</i> (MEIG.) | | | + | | 1 | 14 |
| 93 | <i>Dynatosoma nigromaculatum</i> LUNDSTR. | | | 2 | 12 | 1 | 14 |
| 94 | <i>Dynatosoma reciprocum</i> (WALK.) | 2 | 25 | + | | 2 | 29 |
| 95 | <i>Dynatosoma thoracicum</i> (ZETT.) | 1 | 12 | | | | |
| 96 | <i>Epicypta aterrima</i> (ZETT.) | 3 | 25 | 3 | 12 | | |
| 97 | <i>Mycetophila abiecta</i> (LAŠT.) | 1 | 12 | 1 | 12 | 1 | 14 |
| 98 | <i>Mycetophila adumbrata</i> MIK | 2 | 12 | 4 | 37 | | |
| 99 | <i>Mycetophila alea</i> LAFF. | | | 1 | 12 | 1 | 14 |
| 100 | <i>Mycetophila autumnalis</i> LUNDSTR. | 2 | 25 | | | | |
| 101 | <i>Mycetophila blanda</i> WINN. | + | | + | | | |
| 102 | <i>Mycetophila bohémica</i> (LAŠT.) | 2 | 25 | + | | 1 | 14 |
| 103 | <i>Mycetophila caudata</i> STAEG. | 1 | 12 | | | 2 | 29 |
| 104 | <i>Mycetophila confluens</i> DZIEDZ. | 1 | 12 | | | | |
| 105 | <i>Mycetophila confusa</i> DZIEDZ. | 1 | 12 | + | | + | |
| 106 | <i>Mycetophila curviseta</i> LUNDSTR. | 9 | 50 | 10 | 50 | 7 | 57 |
| 107 | <i>Mycetophila distigma</i> MEIG. | + | | 3 | 25 | 2 | 14 |
| 108 | <i>Mycetophila dziedzickii</i> CHANDL. | + | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|------------------------------------------|----|----|----|----|----|----|
| 109 | <i>Mycetophila edwardsi</i> LUNDSTR. | 2 | 25 | 1 | 12 | | |
| 110 | <i>Mycetophila evanida</i> LAŠT. | | | | | + | |
| 111 | <i>Mycetophila finlandica</i> EDW. | + | | | | | |
| 112 | <i>Mycetophila forcipata</i> LUNDSTR. | 1 | 12 | | | | |
| 113 | <i>Mycetophila formosa</i> LUNDSTR. | | | 2 | 12 | | |
| 114 | <i>Mycetophila fungorum</i> (DEG.) | 2 | 25 | 4 | 37 | 12 | 62 |
| 115 | <i>Mycetophila gibbula</i> EDW. | 2 | 25 | 5 | 25 | 4 | 57 |
| 116 | <i>Mycetophila ichneumonea</i> SAY | 5 | 25 | | | 2 | 29 |
| 117 | <i>Mycetophila idonea</i> LAST. | 11 | 25 | 2 | 12 | 1 | 14 |
| 118 | <i>Mycetophila laeta</i> WALK. | + | | + | | 2 | 29 |
| 119 | <i>Mycetophila lapponica</i> LUNDSTR. | 1 | 12 | | | | |
| 120 | <i>Mycetophila luctuosa</i> MEIG. | 2 | 25 | 3 | 37 | + | |
| 121 | <i>Mycetophila magnicauda</i> STROBL | + | | + | | | |
| 122 | <i>Mycetophila marginata</i> WINN. | 1 | 12 | 1 | 12 | 1 | 14 |
| 123 | <i>Mycetophila nigrofusca</i> DZIEDZ. | + | | | | | |
| 124 | <i>Mycetophila ocellus</i> WALK. | 1 | 12 | + | | + | |
| 125 | <i>Mycetophila ornata</i> STEPH. | 4 | 50 | + | | + | |
| 126 | <i>Mycetophila osten-sackeni</i> DZIEDZ. | | | | | 2 | 29 |
| 127 | <i>Mycetophila rudis</i> WINN. | 1 | 12 | + | | 1 | 14 |
| 128 | <i>Mycetophila ruficollis</i> MEIG. | 4 | 25 | | | | |
| 129 | <i>Mycetophila schmabli</i> (DZIEDZ.) | 1 | 12 | 2 | 25 | 1 | 14 |
| 130 | <i>Mycetophila sigillata</i> DZIEDZ. | 1 | 12 | | | 2 | 14 |
| 131 | <i>Mycetophila signatoides</i> DZIEDZ. | | | 1 | 12 | 2 | 14 |
| 132 | <i>Mycetophila sordida</i> V.D.W. | 1 | 12 | | | 1 | 14 |
| 133 | <i>Mycetophila spectabilis</i> WINN. | + | | | | | |
| 134 | <i>Mycetophila stylata</i> (DZIEDZ.) | 3 | 37 | 10 | 62 | 3 | 43 |
| 135 | <i>Mycetophila sumavica</i> (LAŠT.) | 1 | 12 | + | | + | |
| 136 | <i>Mycetophila triangulata</i> DZIEDZ. | + | | + | | | |
| 137 | <i>Mycetophila trinotata</i> STAEG. | 1 | 12 | 5 | 37 | 3 | 29 |
| 138 | <i>Mycetophila tuberosa</i> LUNDSTR. | 1 | 12 | | | | |
| 139 | <i>Mycetophila unipunctata</i> MEIG. | + | | | | | |
| 140 | <i>Mycetophila v-nigrum</i> LUNDSTR. | 1 | 12 | + | | 1 | 14 |
| 141 | <i>Mycetophila xanthopyga</i> WINN. | 1 | 12 | | | | |
| 142 | <i>Mycetophila zetterstedti</i> LUNDSTR. | + | | + | | + | |
| 143 | <i>Phronia biarcuata</i> (BECK.) | + | | + | | 2 | 29 |
| 144 | <i>Phronia braueri</i> DZIEDZ. | 1 | 12 | + | | + | |
| 145 | <i>Phronia cinerascens</i> WINN. | | | 1 | 12 | + | |
| 146 | <i>Phronia conformis</i> (WALK.) | + | | | | 1 | 14 |
| 147 | <i>Phronia egregia</i> DZIEDZ. | 1 | 12 | + | | + | |
| 148 | <i>Phronia exiqua</i> (ZETT.) | + | | | | + | |
| 149 | <i>Phronia flavicollis</i> WINN. | 2 | 25 | + | | | |
| 150 | <i>Phronia forcipata</i> WINN. | 1 | 12 | | | 2 | 14 |
| 151 | <i>Phronia forcipula</i> WINN. | 2 | 25 | 1 | 12 | + | |
| 152 | <i>Phronia interstinella</i> DZIEDZ. | + | | | | | |
| 153 | <i>Phronia longelamellata</i> STROBL | + | | 1 | 12 | | |
| 154 | <i>Phronia maculata</i> DZIEDZ. | + | | | | | |
| 155 | <i>Phronia nigricornis</i> (ZETT.) | 1 | 12 | | | | |
| 156 | <i>Phronia nitidiventris</i> (V.D.W.) | + | | + | | | |
| 157 | <i>Phronia notata</i> DZIEDZ. | 1 | 12 | 1 | 12 | + | |
| 158 | <i>Phronia peculiaris</i> DZIEDZ. | 1 | 12 | | | | |
| 159 | <i>Phronia persimilis</i> HACKM. | + | | | | | |
| 160 | <i>Phronia petulans</i> DZIEDZ. | + | | + | | | |
| 161 | <i>Phronia portschynskyi</i> DZIEDZ. | + | | | | | |
| 162 | <i>Phronia sudetica</i> DZIEDZ. | 1 | 12 | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|-----------------------------------------|----|----|---|----|----|----|
| 163 | <i>Phronia sylvatica</i> DZIEDZ. | 1 | 12 | + | | | |
| 164 | <i>Phronia tenuis</i> WINN. | + | | + | | 1 | 14 |
| 165 | <i>Platurocypta punctum</i> (STANN.) | | | + | | 2 | 29 |
| 166 | <i>Platurocypta testata</i> (EDW.) | 2 | 12 | | | | |
| 167 | <i>Sceptonia costata</i> (V.D.W.) | | | + | | | |
| 168 | <i>Sceptonia fuscipalpis</i> EDW. | | | 1 | 12 | 1 | 14 |
| 169 | <i>Sceptonia nigra</i> (MEIG.) | 2 | 12 | 3 | 25 | | |
| 170 | <i>Trichonta atricauda</i> (ZETT.) | 1 | 12 | | | | |
| 171 | <i>Trichonta brevicauda</i> LUNDSTR. | 1 | 12 | | | | |
| 172 | <i>Trichonta conjungens</i> LUNDSTR. | | | | | 2 | 14 |
| 173 | <i>Trichonta falcata</i> LUNDSTR. | | | | | 1 | 14 |
| 174 | <i>Trichonta girscheri</i> LANDR. | | | + | | | |
| 175 | <i>Trichonta hamata</i> MIK | 8 | 50 | 1 | 12 | | |
| 176 | <i>Trichonta melanura</i> (STAEG.) | 3 | 12 | 1 | 12 | | |
| 177 | <i>Trichonta perspicua</i> V.D.W. | | | + | | | |
| 178 | <i>Trichonta terminalis</i> (WALK.) | 1 | 12 | 2 | 12 | 1 | 14 |
| 179 | <i>Trichonta venosa</i> (STAEG.) | 3 | 12 | 2 | 12 | | |
| 180 | <i>Trichonta vitta</i> (MEIG.) | + | | 1 | 12 | 1 | 14 |
| 181 | <i>Zygomia humeralis</i> (WIED.) | | | | | 1 | 14 |
| 182 | <i>Zygomia pictipennis</i> (STAEG.) | + | | 1 | 12 | 1 | 14 |
| 183 | <i>Zygomia valida</i> WINN. | 1 | 12 | | | 1 | 14 |
| 184 | <i>Zygomia vara</i> (STAEG.) | 1 | 12 | + | | 2 | 29 |
| 185 | <i>Allodia alternans</i> (ZETT.) | + | | + | | | |
| 186 | <i>Allodia anglofennica</i> EDW. | 1 | 12 | + | | 1 | 14 |
| 187 | <i>Allodia barbata</i> (LUNDSTR.) | + | | + | | | |
| 188 | <i>Allodia czernyi</i> (LANDR.) | + | | | | + | |
| 189 | <i>Allodia grata</i> (MEIG.) | + | | | | | |
| 190 | <i>Allodia lugens</i> (WIED.) | 1 | 12 | 1 | 12 | 45 | 14 |
| 191 | <i>Allodia lundstroemi</i> EDW. | + | | + | | + | |
| 192 | <i>Allodia ornatocollis</i> (MEIG.) | + | | + | | 4 | 14 |
| 193 | <i>Allodia triangularis</i> (STROBL) | | | + | | | |
| 194 | <i>Allodia truncata</i> EDW. | + | | + | | + | |
| 195 | <i>Allodiopsis cristata</i> (STAEG.) | 23 | 62 | 6 | 50 | 3 | 29 |
| 196 | <i>Allodiopsis domestica</i> (MEIG.) | 2 | 25 | | | | |
| 197 | <i>Allodiopsis rustica</i> (EDW.) | | | 5 | 37 | 1 | 14 |
| 198 | <i>Synplasta excogitata</i> (DZIEDZ.) | 1 | 12 | | | 1 | 14 |
| 199 | <i>Synplasta sintenisi</i> (LACKSCH.) | 1 | 12 | + | | | |
| 200 | <i>Anatella gibba</i> WINN. | + | | | | | |
| 201 | <i>Anatella minuta</i> (STAEG.) | + | | + | | + | |
| 202 | <i>Anatella simpatica</i> DZIEDZ. | + | | | | + | |
| 203 | <i>Anatella turi</i> DZIEDZ. | + | | | | | |
| 204 | <i>Brachypeza obscura</i> WINN. | | | + | | 1 | 14 |
| 205 | <i>Brevicornu auriculatum</i> (EDW.) | | | 1 | 12 | | |
| 206 | <i>Brevicornu crassicornu</i> (STANN.) | 2 | 25 | + | | 1 | 14 |
| 207 | <i>Brevicornu fissicauda</i> (LUNDSTR.) | | | + | | | |
| 208 | <i>Brevicornu fuscipenne</i> (STAEG.) | + | | 1 | 12 | 3 | 29 |
| 209 | <i>Brevicornu griseicolle</i> (STAEG.) | 8 | 12 | + | | 4 | 14 |
| 210 | <i>Brevicornu proximum</i> (STAEG.) | 1 | 12 | | | | |
| 211 | <i>Brevicornu serenum</i> (WINN.) | 1 | 12 | | | | |
| 212 | <i>Brevicornu sericoma</i> (MEIG.) | | | 1 | 12 | 2 | 14 |
| 213 | <i>Cordyla fissa</i> EDW. | | | | | + | |
| 214 | <i>Cordyla flaviceps</i> (STAEG.) | | | + | | | |
| 215 | <i>Cordyla fusca</i> MEIG. | | | + | | | |
| 216 | <i>Cordyla murina</i> WINN. | | | | | + | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|-----------------------------------------------|-----|----|-----|----|-----|----|
| 217 | <i>Exechia bicincta</i> (STAEG.) | 2 | 12 | | | | |
| 218 | <i>Exechia cincta</i> WINN. | | | + | | | |
| 219 | <i>Exechia confinis</i> WINN. | | | + | | | |
| 220 | <i>Exechia contaminata</i> WINN. | 5 | 37 | | | | |
| 221 | <i>Exechia dizona</i> EDW. | 1 | 12 | 3 | 12 | | |
| 222 | <i>Exechia dorsalis</i> (STAEG.) | 2 | 25 | 2 | 25 | 3 | 43 |
| 223 | <i>Exechia exiqua</i> LUNDSTR. | 2 | 12 | + | | 1 | 14 |
| 224 | <i>Exechia festiva</i> WINN. | | | + | | | |
| 225 | <i>Exechia fusca</i> (MEIG.) | 1 | 12 | 6 | 50 | 6 | 43 |
| 226 | <i>Exechia lucidula</i> (ZETT.) | + | | | | | |
| 227 | <i>Exechia lundstroemi</i> LANDR. | + | | | | | |
| 228 | <i>Exechia nigrofusca</i> LUNDSTR. | 3 | 12 | | | 1 | 14 |
| 229 | <i>Exechia nigroscutellata</i> LANDR. | + | | | | | |
| 230 | <i>Exechia papyracea</i> STACK. | + | | | | | |
| 231 | <i>Exechia parva</i> LUNDSTR. | + | | + | | | |
| 232 | <i>Exechia parvula</i> (ZETT.) | | | | | + | |
| 233 | <i>Exechia pseudocincta</i> STROBL | 3 | 12 | | | | |
| 234 | <i>Exechia repanda</i> JOH. | + | | | | | |
| 235 | <i>Exechia separata</i> LUNDSTR. | + | | | | | |
| 236 | <i>Exechia seriata</i> (MEIG.) | 3 | 12 | 1 | 12 | 2 | 14 |
| 237 | <i>Exechia spinuligera</i> LUNDSTR. | + | | + | | + | |
| 238 | <i>Exechia unifasciata</i> LACKSCH. | 2 | 12 | 1 | 12 | | |
| 239 | <i>Exechiopsis clypeata</i> (LUNDSTR.) | | | + | | | |
| 240 | <i>Exechiopsis distendens</i> (LACKSCH.) | + | | | | | |
| 241 | <i>Exechiopsis fimbriata</i> (LUNDSTR.) | + | | | | + | |
| 242 | <i>Exechiopsis indecisa</i> (WALK.) | + | | | | + | |
| 243 | <i>Exechiopsis ingrca</i> (STACK.) | + | | | | + | |
| 244 | <i>Exechiopsis januari</i> (LUNDSTR.) | | | | | + | |
| 245 | <i>Exechiopsis lackschewitziana</i> (STACK.) | + | | | | | |
| 246 | <i>Exechiopsis pseudopulchella</i> (LUNDSTR.) | + | | | | | |
| 247 | <i>Exechiopsis subulata</i> (WINN.) | + | | | | + | |
| 248 | <i>Pseudexechia trisignata</i> (EDW.) | + | | | | + | |
| 249 | <i>Pseudexechia trivittata</i> (STAEG.) | + | | | | + | |
| 250 | <i>Pseudobrachypeza helvetica</i> (WALK.) | + | | 4 | 50 | 1 | 14 |
| 251 | <i>Pseudorymosia fovea</i> (DZIEDZ.) | + | | + | | 2 | 14 |
| 252 | <i>Rymosia bifida</i> EDW. | | | | | + | |
| 253 | <i>Rymosia britteni</i> EDW. | + | | | | | |
| 254 | <i>Rymosia fasciata</i> (MEIG.) | + | | + | | | |
| 255 | <i>Rymosia placida</i> WINN. | + | | + | | | |
| 256 | <i>Rymosia signatipes</i> (V.D.W.) | + | | | | | |
| 257 | <i>Tarnania tarnanii</i> (DZIEDZ.) | + | | + | | 1 | 14 |
| | Total | 397 | | 259 | | 269 | |

Light-trapping (37 species were caught by this method) made it possible to distinguish a group of species highly sensitive to light (*Mycetophila fungorum*, *M. ornata*, *M. confusa*), and to collect species never caught in the Park by other methods (*Phthinia winnertzi*, *Allodia barbata*, *Exechiopsis fimbriata*, *E. januari*, *E. pseudopulchella*).

Among the 40 species collected by odour bait *Mycomya cinerascens* was the most numerous; the other abundant species were: *Allodia ornaticollis*, *A. anglofennica*, *A. lugens*, *Trichonta terminalis* and *Mycetophila fungorum*. *Mycomya wankowiczii*, *Neoemphe-ria striata*, *Coelosia fusca*, *Leia cylindrica*, *Cordyla fissa* and *Exechia parvula* were caught only in this way.

Table II. List of numerical data from 30-minute sweep-net samples

| Site | Number | | | | Mean per sample | |
|-------|-----------|------|---------|------|-----------------|---------|
| | Specimens | | Species | | Specimens | Species |
| | N | % | N | % | | |
| 283 | 397 | 42.9 | 125 | 68.7 | 49.6 | 15.6 |
| 340 | 259 | 28.0 | 91 | 50.0 | 32.4 | 11.4 |
| 399 | 269 | 29.1 | 88 | 48.3 | 38.4 | 12.6 |
| Total | 925 | 100 | <182> | - | 40.1 | 13.2 |

There were certain regularities in the distribution of fungus gnats in the Park. In respect of *Mycetophilidae* the linden-oak-hornbeam woods studied were similar to one another in an order according to the decreasing humidity and floristic diversity: linden-oak-hornbeam wood in divisions 283, 340, 399. The number of species occurring there decreased in the same order (Table II).

Table III. Similarity index and number of common species

| Similarity index | | 283 | 340 | 399 | | Number of common species |
|------------------|-----|-----|-----|-----|-----|--------------------------|
| | 283 | × | 107 | 95 | 283 | |
| | 340 | 62 | × | 86 | 340 | |
| | 399 | 59 | 61 | × | 399 | |

The Białowieża linden-oak-hornbeam woods may be considered rich communities. Evidence of their wealth, in comparison with other forest associations within the Park and with linden-oak-hornbeam woods in other national parks, is also reflected in data on the abundance and diversity of fungus gnats occurring there (MIKOŁAJCZYK 1999).

DISCUSSION

The 30-minute sweep-net samples used during the studies of fungus gnats in the BNP were not fully quantitative, but semiquantitative ones. The fact that many females cannot be determined precisely has an impact on the estimate of the abundance of species. However, this method makes it possible to roughly establish mycetophilid communities at different sites, to determine dominance and frequency and to make comparisons. The wide dispersal of *Mycetophilidae* renders a more precise determination of communities and of characteristic species difficult; with the exception of a few species fungus gnats are neither frequent nor numerous anywhere. Last but not least is the fact that particular plant associations in the Park occupy neither large nor homogeneous areas, and this makes fairly free dispersal of the *Mycetophilidae* likely.

The method of light trapping has rarely been used to collect fungus gnats; one of the earliest mentions was in a paper by EDWARDS (1938). This method has been more widely used since the 1970s, mainly by PLASSMANN (PLASSMANN 1971a, b, 1973, 1978, 1980) and by PENG *et al.* (1992). During the studies in the Białowieża National Park,

species usually rare or very rare in sweep-net samples were frequently and abundantly collected by light-trapping. It was observed that more fungus gnats flew to the screen when sporadic big drops of water (rain, liquefying fogg) or twigs and bits of bark (during soft gusts of wind) fell to the forest floor. It seems that these insects are driven away from their hiding-places and that they do not lead an active life at night, although there are data on their increased activity, at least at dusk (VÄISÄNEN 1984).

Table IV. Results of different sampling methods (S – sweep-net, L – light, E – bait at site 399) for species collected in the greater number.

| Species | Methods | Sites | | | | | |
|-----------------------------|---------|-------|----|-----|----|-----|----|
| | | 283 | | 340 | | 399 | |
| | | N | F | N | F | N | F |
| <i>Macrocera stigma</i> | S | 18 | 50 | 29 | 12 | 15 | 29 |
| | L | 1 | 11 | | | | |
| | E | | | | | | |
| <i>Mycomya cinerascens</i> | S | 4 | 50 | 3 | 37 | 4 | 57 |
| | L | | | 1 | 14 | 2 | 17 |
| | E | | | | | 106 | 14 |
| <i>Boletina basalis</i> | S | 18 | 37 | 18 | 37 | 13 | 29 |
| | L | | | | | | |
| | E | | | | | | |
| <i>Boletina trivittata</i> | S | 51 | 25 | 2 | 12 | | |
| | L | 4 | 22 | 1 | 14 | | |
| | E | | | | | | |
| <i>Mycetophila confusa</i> | S | 1 | 12 | | | | |
| | L | 1 | 11 | 15 | 43 | 4 | 17 |
| | E | | | | | 3 | 14 |
| <i>Mycetophila fungorum</i> | S | 2 | 25 | 4 | 37 | 12 | 62 |
| | L | 95 | 67 | 43 | 85 | 54 | 83 |
| | E | | | | | 21 | 57 |
| <i>Mycetophila ornata</i> | S | 4 | 50 | | | | |
| | L | 36 | 44 | 5 | 28 | 5 | 17 |
| | E | | | | | | |
| <i>Trichonta terminalis</i> | S | 1 | 12 | 2 | 12 | 1 | 14 |
| | L | | | | | | |
| | E | | | | | 18 | 14 |
| <i>Allodia anglofennica</i> | S | 1 | 12 | | | 1 | 14 |
| | L | | | | | | |
| | E | | | | | 18 | 28 |
| <i>Allodia lugens</i> | S | 1 | 12 | 1 | 12 | 45 | 14 |
| | L | | | 2 | 14 | | |
| | E | | | | | | |
| <i>Allodia ornaticollis</i> | S | | | | | 4 | 14 |
| | L | | | | | 5 | 17 |
| | E | | | | | | |

Odour-bait catches yielded the best results in spring and autumn. This type of bait was visited in great numbers by species of the genera *Mycomya* ROND. and *Allodia* WINN. Fungus gnats occurred at such bait during the day and at dusk, occasionally at night. Similar results were obtained by WATERHOUSE (1998) who collected fungus

gnats attracted to sapping sycamore at the Coombe Valley Reserve (Staffordshire). His material differed from mine in species composition, but in Coombe Valley and in the BNP fungus gnats were active at bait mainly during the day. *Allodia ornaticollis* and *A. lugens* were the dominants.

Although light-trapping and odour-baiting were treated as supplementary methods, they made it possible to obtain additional and interesting data. There were clear differences in the abundance and frequency of *Mycetophilidae* collected by particular methods (Table IV), and, occasionally, the composition of species collected at the same time and site was different.

It follows from a recently published phytosociological characteristics of the Białowieża National Park (SOKOŁOWSKI 1993) that the sites I selected belong to the subassociation *Tilio-Carpinetum typicum* (high linden-oak-hornbeam wood). According to MATUSZKIEWICZ (1952) the subassociation "typicum" occurred at the site in division 399, whereas the subassociation "*stachyetosum silvaticae*" (low linden-oak-hornbeam wood) in divisions 283 and 340. However, as far as the fungus gnats are concerned, the similarity of the linden-oak-hornbeam woods studied (Table III) proved generally consistent with the hypothesis of MATUSZKIEWICZ (1952) on the system of these associations and the interrelations between them. Of course, this may also mean that even in a plant association of one type the conditions for mycetophilids may be so different that the picture of their fauna at particular sites is affected.

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STRESZCZENIE

[Tytuł: *Mycetophilidae* s.l. (*Diptera*) grądów Białowieskiego Parku Narodowego]

Grądy (*Tilio-Carpinetum*) w Białowieskim Parku Narodowym są najliczniej reprezentowanymi zbiorowiskami roślinnymi. Materiały bedliszkowatych zbierano w trzech wybranych stanowiskach, w oddziałach 283, 340 i 399, głównie czerpakiem entomologicznym. Stosowano 30-minutowe próby (dane liczbowe w rubrykach tabeli I) i próby bez określenia czasu. Prowadzono również połowy na światło i przynętę zapachową.

Mycetophilidae w grądach BPN są reprezentowane przez 257 gatunków (Tab. I). Dane semiilościowe (samice wielu gatunków nie da się oznaczyć) wskazują, że poszczególne stanowiska różnią się pomiędzy sobą zarówno pod względem liczby wykazanych gatunków, jak i złowionych osobników (Tab. II). Wskaźnik podobieństwa obliczony wzorem Sørensen'a i liczbę gatunków wspólnych podaje Tabela III.

Na światło złowiono 37 gatunków; silnie nań reagowały *Mycetophila fungorum*, *M. ornata* i *M. confusa*.

Wśród 40 gatunków złowionych na przynętę zapachową dominowały: *Mycomya cinerascens*, *Allodia ornaticollis*, *A. anglofennica*, *A. lugens*, *Trichonta terminalis* i *Mycetophila fungorum*.

Gatunki najliczniej łowione różnymi metodami przedstawia Tabela IV.

Ze względu na *Mycetophilidae*, badane stanowiska grądowe podobne są do siebie w kolejności zgodnej ze zmniejszającą się wilgotnością i zubożeniem florystycznym.

Bedliszkowate BPN nie były dotychczas badane, a informacje o nich do niedawna dotyczyły kilkunastu zaledwie gatunków. Aktualny stan poznania *Mycetophilidae* Puszczy Białowieskiej przedstawia MIKOŁAJCZYK (1999) a ich pełny wykaz obejmuje 263 gatunki (MIKOŁAJCZYK 2001). Dane te w znacznym stopniu opierały się na materiałach będących przedmiotem niniejszego opracowania.