FRAGMENTA FAUNISTICA 50 (1): 1–18, 2007
PL ISSN 0015-9301 © MUSEUM AND INSTITUTE OF ZOOLOGY PAS

Notes on bees (Hymenoptera: Apoidea: Apiformes) of central Poland

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Abstract: A list of 233 species of bees (Apiformes) in central Poland is presented. The lowland, largely deforested part of the study area (Łódź Hills), was dominated by *Heriades truncorum* (4.3% of total catch) and *Hylaeus communis* (2.7%), while the wooded Świętokrzyskie Mountains were dominated by bumblebees, particularly by *Bombus lucorum* (4.2%) with its cleptoparasite *Psithyrus bohemicus* (6.8%), as well as *Bombus pascuorum* (3.7%), *Bombus lapidarius* (2.4%) and *Psithyrus campestris* (2.4%).

Key words: Hymenoptera, Apoidea, Apiformes, central Poland, occurrence of species

INTRODUCTION

This work is a contribution to the knowledge about the occurrence of bees (Apiformes) of central Poland and the Świętokrzyskie Mountains. We assumed that central Poland is the area within a 100-km radius of the Łódź city. It lies at the borders between three geographic regions: Małopolska (Little Poland), Wielkopolska (Great Poland), and Mazovia. This area is intermediate between the uplands of southern Poland and the lowlands of northern Poland. The middle part of the study area is occupied by the Łódź Hills. Until the early 20th century, they were covered by the Łódź Forest, with a large share of beech and fir in the tree layer and of montane plant species in the herb layer (Zaręba 1981). At present anthropogenic landscapes dominate there, and the Łódź agglomeration extends at the western part of the hills. Remnants of the primeval forest are now protected within nature reserves and some urban parks, but woodlands cover only 16% of the study area. It is noteworthy that Łódź lies at the watershed between catchments of the rivers Vistula and Odra (Oder), so there are only small springs, streams and small rivers. Although the history of research on the Apoidea started nearly 200 years ago, paradoxically the central part of our country is relatively poorly studied. Among older publications on this subject, Drogoszewski's (1932, 1934) studies are noteworthy. He listed 178 species of Apidae from Łowicz (in the Mazovian Lowland) and 98 species from the Świętokrzyskie Mts.

Over the last 30 years, the Łódź city and the Łódź Hills were systematically studied by J. K. Kowalczyk, but bees until recently were mentioned in only several of his publications (Kowalczyk & Watała 1987, 1990; Kowalczyk 1996; Kowalczyk et al. 1998; Szczepko et al. 2004). A list of 127 species of Apiformes from the Botanical Garden in Łódź was presented by Kowalczyk et al. (2004) and Kowalczyk & Kurzac (2005). In the part of the Mazovian Lowland located within the borders of our study area, 54 species of Apoidea have been recorded recently in the Brudzeń Landscape Park (=Brudzeński LP) by Abraszewska-Kowalczyk et al. (2002) and 77 taxa of this family near Bromierzyk in the Kampinos National Park (=Kampinoski NP) by Szczepko et al. (2002). From the Załęcze Landscape Park (=Załęczański LP), located in the southwestern part of the Łódź Province, Kowalczyk &

Kurzac (2002) reported 90 species of Apidae. All those published data are not taken into account in the present report.

Scanty data on rare bees in central Poland can be found also in other works. Kowalczyk (1997) found *Melecta luctuosa* in Grzegorzowice in the Świętokrzyskie Mts. and *Trachusa byssina* in Gorzewo near Płock. Pesenko et al. (2000) reported on *Evylaeus minutulus* in Łódź, whereas W. Banaszak (2003) recorded *Anthophora plagiata* in Grzegorzowice.

The entomofauna of the Świętokrzyskie Mts. is relatively well studied thanks to the recent research conducted by Dylewska & Bąk (2005), who listed 126 species of Apoidea, and by Kowalczyk & Śliwiński (1988), who identified 16 bumblebee species in the Świętokrzyski NP. There are also several reports on the species composition of bumblebees and cuckoo bees of that area (Ćmak & Szczypciak-Bąk 1987; Ruszkowski et al. 1989; Dylewska et al. 1998; Bąk 1998, 1999 a, b, 2003).

MATERIAL AND METHODS

This work is based mainly on material composed of 3887 bees caught in 1975–1992 by J. K. Kowalczyk and identified by J. Banaszak. Some specimens were kindly provided by other researchers. Their names are given in the list of localities and in Acknowledgements. We also used a small collection made during the 2nd World War by E. Koeppen and F. Parrē. The bees come from the 125 localities listed below, lying mainly in central Poland (the northwestern part of the Małopolska Upland, the Łódź city and its environs, as well as the borderland of the Mazovian Lowland and the Wielkopolska–Kujawy Lowland), but some are situated in the Świętokrzyskie Mts. (Fig. 1).

Bees were collected systematically only in several localities throughout the growing season, i.e. from late March till early October (localities 4, 15, 47, 49, 64, 77, 101, 102, and 123). Data from other localities come mainly from summer months and are rather accidental.

Material was collected with a sweep net; no quantitative samples were taken. Bees were caught on flowers or near nests, in various, mainly open habitats. In the varied sites in the suburban zone of Łódź, these were mainly sand pits, mid-field ravines, afforested former farmland, birch woods, sides of unsurfaced roads between fields, ruderal habitats along railway tracks, neglected orchards, green areas around apartment blocks, and gardens near houses. Within the city, material was collected mainly in larger parks and in the Botanical Garden. Also the Łagiewniki Forest (Las Łagiewnicki), covering 1200 ha, was taken into account.

In rural areas, bees were caught mainly on wooden buildings and in former manor parks, on meadows, roadside willow trees, and wastelands. Less frequently samples were taken from grasslands on sand and limestone, xerothermic thickets, clayey river banks, quarries, loess ravines, and ruins of castles. In woodlands, open patches were preferred: openings, clearings, roadsides, forester's lodges, and forest edges.

Numbered localities were divided according to zoogeographic units. Description of each locality includes the UTM code, biotope type, collection year, and season (with the use of 3-letter abbreviations of months). Some localities are situated in protected areas: (1) national parks: Kampinos NP, Świętokrzyski NP; (2) nature reserves: 'Babsk', 'Konewka', 'Łaznów', 'Molenda', 'Popień', 'Spała', 'Wały', 'Wolbórka', 'Żądłowice', 'Winnica', 'Kadzielnia', 'Wąwóz w Skałach'; or (3) landscape parks: Bolimów LP (=Bolimowski LP), Spała LP (=Spalski LP), Suchedniów–Oblęgorek LP (=Suchedniowsko-Oblęgorski LP), Sulejów LP (=Sulejowski LP), LP 'Międzyrzecza Warty i Widawki', and Łódź Hills LP (=LP 'Wzniesień Łódzkich').

Relatively small numbers of data on bumblebees of the subgenus *Terrestribombus* Vogt are presented here because most of the material on this subgenus has already been published (Banaszak & Rasmont 1994).

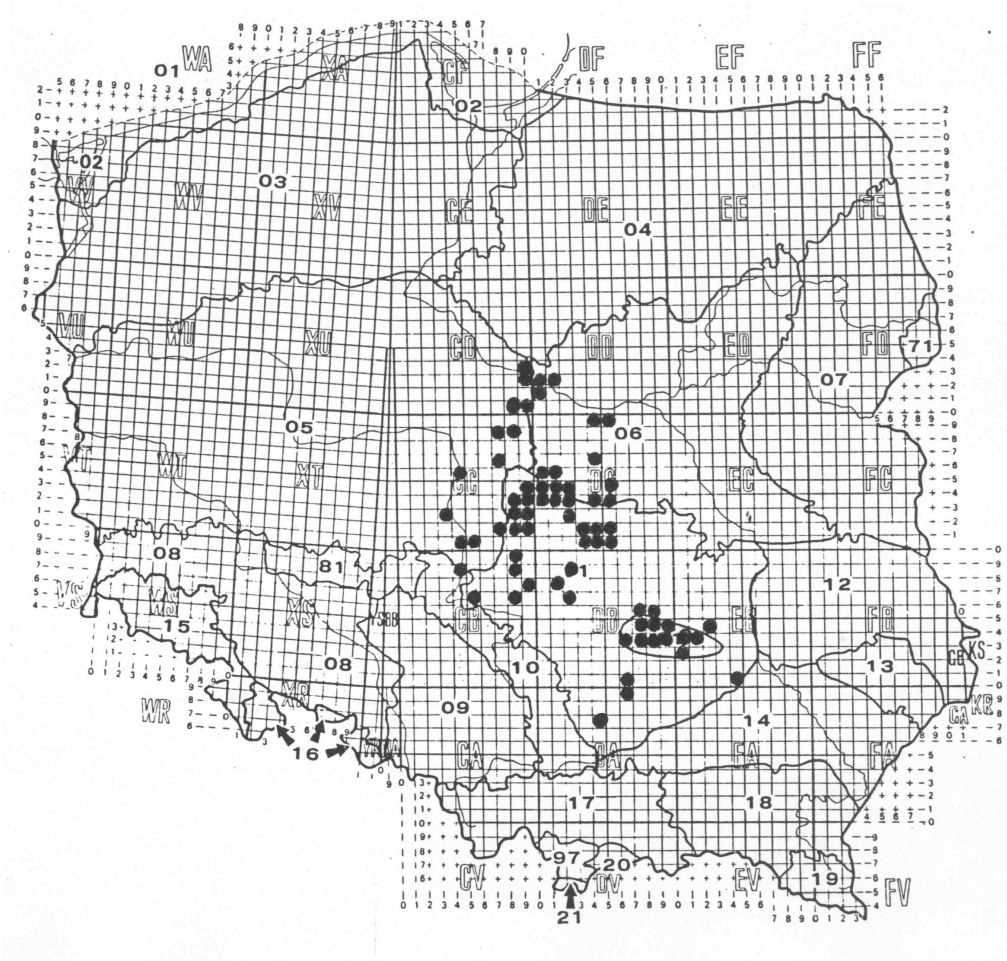

Fig. 1. Distribution of research sites.

List of localities

Mazovian Lowland (1–17)

1. 'Babsk' reserve (DC 54), typical oak-hornbeam forest with linden, 1988, leg. E. Szczepańska; (Jun–Sep).

2. Biskupice (DD 02), landing stage for yachts, old orchard, xerothermic thicket at oak forest edge, 1988; (Jun–Sep).

3. Bolimów (DC 49), meadows on the river Rawka, 1992; (May–Aug).

4. Bromierzyk, Kampinos NP (DC 59), former farmland, meadows on the river Łasica, 1987–1992; (May, Jul–Aug).

5. Budy Grabskie, Bolimów LP (DC 46), sandy grassland, 1995; (May).

6. Gorzewo (DD 01), sandy grassland, 1993; (Jul).

7. Grabie, Bolimów LP (DC 46), wooden forester's lodge, sandy grassland, 1993–1994; (Jun–Jul).

8. Marianów (CD 90), wooden buildings, pasture, 1988–1990, leg. J. Mańkowska (May–Sep).

9. Murzynowo (CD 92), old orchard and wooden building near the Vistula, 1988; (Jun, Aug–Sep).

10. Osiny (CD 80), roadsides with rotten willow trees, 1990, leg. J. Mańkowska; (Aug).

11. Płock–Tum (DD 12), park, slope of the Vistula valley, 1987; 1994; (May–Jun).

12. Rawa Mazowiecka (DC 53), urban park, 1988, leg. E. Szczepańska; (Aug–Oct).

13. Sierakówek (CD 90), wooden buildings, sandy grassland, village park, 1990, leg. J. Mańkowska; (Jul–Aug).

14. Skierniewice–Rawka (DC 46), sandy grassland, 1993; (May).

15. Uniejewo (CD 93), slope of the Vistula valley, xerothermic grassland, 1988–1989, 1991, leg. M. Kobalczyk; (Jun–Sep).

16. Uroczysko Rawski Las (DC 43), old oak-pine forest, 1988, leg. E. Szczepańska; (Jul–Aug).

17. Ziemiary, Bolimów LP (DC 46), sandy grassland around forester's lodge, 1992–1993; (May, Aug).

Małopolska Upland (18–88)

18. Aleksandrów Łódzki (CC 82), 1990; (May).

19. Barycz on the Grabia (CC 71), dunes, sandy grassland, 1942, leg. E. Koeppen; 1943–1944, leg. F. Parrē; (May–Aug).

20. Bąkowa Góra, Sulejów LP (DB 26), tall herbs near ruins of a castle, 1992; (May).

21. Bełchatów (CB 89), slag heap near an opencast mine, 1986, leg. Z. Myślicka; (Jul).

22. Brzeziny (DC 14), sand pit, 1987; (Jul).

23. Budziszewice (DC 22), garden plots in oak-pine forest, 1994, leg. M. Mastalerz; (May).

24. Bukowiec, Łódź Hills LP (DC 04), moor, 1986; (Aug).

25. Chęciny (DB 63), xerothermic grassland near a castle, 1980; (Jul).

26. Dąbrowa, Łódź Hills LP (DC 04), sandy grassland, slopes of a ravine, 1986; (Jun–Sep).

27. Dąbrowa near Tomaszów Mazowiecki (DC 31), 1989, leg. J. Sobczak; (Aug).

28. Dąbrówka Duża, Łódź Hills LP (DC 14), rural habitats, 1976; (Jul).

29. Dobieszków, Łódź Hills LP (DC 04), roadsides with old poplars, side of a forest road, forest edge, 1986–1991; (Jun–Aug).

30. Dobryszyce (CB 86), rural habitats, 1988, leg. A. Zborowska; (Jul–Aug).

31. Gacki near Busk (DA 69), xerothermic grassland, 1977; (Jul).

32. Gałków (DC 13), mixed deciduous forest, 1987; 1990; (May–Jun).

33. Giełzów, Spała LP (DC 50), 1983; (Jul).

34. Glinnik (DC 05), 1984–1985, leg. J. Nadolski; (May–Jun).

35. Glinnik near Tomaszów Mazowiecki (DC 31), 1989, leg. J. Sobczak; (Sep).

36. Grocholice (CB 88), 1983, leg. Z. Myślicka; (Jul).

37. Grudzeń (DC 30), 1988, leg. E. Kwiatkowska; (Jul).

38. Inowłódz (DC 40), wooden cottage partly covered with clay, xerothermic grassland, 1983; (Jun).

39. Janinów, Łódź Hills LP (DC 14), beech forest, mixed deciduous forest, 1986–1991; (May–Sep).

40. Justynów (DC 03), sandy grassland, 1944, leg. F. Parrē; 1990; (May–Jul).

41. Kalonka, Łódź Hills LP (DC 04), rural habitats, 1986; (May–Aug).

42. Kolumna (CC 71), 1942, leg. E. Koeppen; (Jul).

43. 'Konewka' reserve, Spała LP (DC 41), xerothermic oak forest, 1980, leg. J. Kurzawa; 1988, leg. E. Kwiatkowska; (Apr, Jun–Aug).

44. Koprzywnica (EB 40), 1981; (May).

45. Ludwików (DC 30), wooden buildings, 1988, leg. E. Kwiatkowska; (Jul–Aug).

46. 'Łaznów' reserve (DC 30), natural fir forest, 1991; (May).

47. Łódź (CC 83, CC 92, CC 94, DC 03), parks, ruderal habitats, 1976–1992; (Mar–Sep).

48. Łódź – Łagiewniki Forest, Łódź Hills LP (CC 94), mixed deciduous forest, 1984–1989; (Apr–Sep).

49. Łódź–Stoki (CC 93), green areas around apartment blocks, former manor park, rural habitats, sand pit, 1976–1992; (Apr–Sep).

50. Michałów (DC 24), sandy grassland on a hill on the river Mroga, 1974–1976; (Jul–Aug).

51. Modlica (CC 92), 1940, leg. E. Koeppen; 1943–1944, leg. F. Parrē; 1947, leg. Z. Śliwiński; 1980; (May–Aug).

52. Mogilno (CC 81), limestone quarry, 1990; (Jul).

53. 'Molenda' reserve (CC 91), beech-fir forest, 1980; (Jul).

54. Nagórzyce, Sulejów LP (DC 30), caves in chalk sandstone, 1983; (May).

55. Niecki, Łódź Hills LP (DC 04), rural habitats, 1986; (Jun, Aug).

56. Niesułków Kolonia, Łódź Hills LP (DC 15), pasture overgrown with broom (*Cytisus scoparius*) on a hill on the river Moszczenica, 1993–1994; (Jul–Aug).

57. Pińczów (DA 69), 1976, leg. M. Wanat; (Aug).

58. Podoba (DC 31), wooden building, 1988, leg. E. Kwiatkowska; (Aug).

59. Polichno (DA 69), xerothermic grassland, 1972, leg. A. Liana; (Jun).

60. 'Popień' reserve (DC 23), old pine forest on a fertile site, 1976–1977; 1991; (May–Jul).

61. Pytowice (CB 97), mixed deciduous forest, 1987, leg. Z. Myślicka; (May, Aug).

62. Racławice (DA 47), xerothermic grassland, 1985; (May).

63. Ręczno, Sulejów LP (DB 17), limestone quarry, 1985; (Jun).

64. Rogów (DC 24), wooden buildings, arboretum, 1975–1977; (Apr–Sep).

65. Rzgów (CC 92), old barn, 1980; (Jul).

66. Skowronno (DB 60), xerothermic grassland, 1972, leg. A. Liana; (Jun).

67. Słotwiny (DC 23), wooden buildings of a railway station and near railway tracks, 1992, leg. E. Ambrozik; (Jun–Jul).

68. Smardzew (CC 94), rural habitats, 1990; (May, Aug).

69 'Spała' reserve, Spała LP (DC 40), old oak-pine stand in oak-hornbeam forest, 1976, leg. B. Soszyński; (Jun).

70. Suchedniów (DB 85), mixed deciduous forest, 1986; (May).

71. Sulejów–Podklasztorze (DB 28), xerothermic grasslands and thickets, 1976, leg. B. Soszyński; (Jul).

72. Suchedniów–Oblęgorek LP (DB 75), meadow on the river Krasna, mixed deciduous forest, 1981; (Jul).

73. Szewna (EB 24), loess ravines, 1979; (Sep).

74. Szymaniszki, Łódź Hills LP (DC 14), pine-oak forest on slopes of the Moszczenica valley, 1987; (Jul).

75. Szynkielów, LP 'Międzyrzecza Warty i Widawki' (CB 48), dune and mire, 1992; (Jun–Jul).

76. Tomaszów Mazowiecki – Białobrzegi (DC 31), stone barn, 1988–1989, leg. E. Kwiatkowska; (Jul–Sep).

77. Tomaszów Mazowiecki – Księża Góra, Spała LP (DC 31), sandy grassland, 1988–1989, leg. E. Kwiatkowska; (Jun–Sep).

78. Tuszyn–Poddębina (CC 91), mixed deciduous forest, 1947, leg. Z. Śliwiński; 1980; (Jul–Aug).

79. ‘Wały’ reserve (DA 47), xerothermic grassland, 1985; (May).

80. Wągry (DC 23), rural habitats on the river Mroga, 1975–1976; (Jul–Sep).

81. Wiączyń (DC 03), wooden buildings and forest roads, 1982–1986; (May–Jul).

82. Wiśniowa Góra (DC 03), mixed deciduous forest, 1990; (Jun).

83. ‘Wolbórka’ reserve (CC 91), alder swamp forest, alluvial forest, 1980; (May, Jul).

84. Woźniki (CB 86), wooden buildings, 1989, leg. A. Zborowska; (Jul–Aug).

85. Wykno (DC 22), railway station, wooden building, 1992; (May).

86. Wymysłów (CC 82), 1984–1986, leg. C. Watała; (May).

87. Zalesiczki (CB 86), wooden building, 1989, leg. A. Zborowska; (May–Aug).

88. ‘Żądłowice’ reserve, Spała LP (DC 51), alder forest, oak-hornbeam forest, pine forest, 1983; (Jul).

Wielkopolska–Kujawy Lowland (89–95)

89. Burzenin, LP ‘Międzyrzecza Warty i Widawki’ (CC 50), xerothermic grasslands and thickets on the Vistula, 1973, 1977, leg. B. Soszyński; 1987; (Jul–Sep).

90. Byszew (CC 88), oak-hornbeam forest, 1988; (May).

91. Daszyna (CC 78), historical village park, wooden manor house, 1988; (May).

92. Łęczyca–Tum (CC 76), 1990; (Jun).

93. Małków on the Warta (CC 32), ravines on the left bank of the river, 1984, leg. M. Wanat; (Jun).

94. Uniejów (CC 45), historical park around a castle, 1988; (Jun).

95. ‘Winnica’ reserve, LP ‘Międzyrzecza Warty i Widawki’ (CC 40), xerothermic thickets and gradually overgrown xerothermic grassland, 1992; (Jul).

Wieluń-Kraków Upland (96)

96. Działoszyn (CB 56), xerothermic thickets and grasslands, 1976, leg. B. Soszyński; (Aug).

Świętokrzyskie Mountains (97–125)

97. Bartoszowiny (EB 03), 1983; (Jul).

98. Belno (DB 85), oak forest edge, 1980; (Jul).

99. Bodzentyn (DB 94), wooden buildings, ruins of a castle, 1982; (Aug).

100. Celiny, Świętokrzyski NP (DB 93), 1982–1984; (Mar, Aug).

101. Chełmowa Góra, Świętokrzyski NP (EB 03), wooden buildings, meadows at forest edge, 1978–1985; (May–Aug).

102. Cząstków–Zapusty (EB 03), xerothermic thickets and grasslands, 1979, 1984; (Apr, Jul–Aug).

103. Dąbrowa (DB 93), 1980, leg. J. Szczypciak; (Jul).

104. Dębno (DB 93), roadsides, 1983; (Jul).

105. Drogosiowe (EB 02), wooden cottages, 1983; (Jul).

106. Góra Łysica, Świętokrzyski NP (DB 93), 1982; (Aug).

107. Góra Radostowa (DB 84), 1981, leg. A. Liana; (Jul).

108. Grzegorzowice (EB 13), mainly geological reserve ‘Wąwóz w Skałach’, 1979–1984; (May, Jul–Aug).

109. Huta Podłysica (DB 93), forest edge at the border of Świętokrzyski NP, 1983–1984; (Apr, Aug).

110. Jaworze (DB 74), old wooden cottages, 1981; (May).

111. ‘Kadzielnia’ reserve (DB 73), geological reserve in Kielce, former quarry, 1980; (May).

112. Kakonin (DB 93), forest edge at the border of Świętokrzyski NP, 1982–1983; (Jul–Aug).

113. Kaniów (DB 75), 1980, leg. B. Gałczyńska; (Jul).

114. Krajno–Pogorzele (DB 83), rural habitats, 1982; (Jun, Aug).

115. Kobyla Góra (EB 03), 1983; 1987; (Jul–Aug).

116. Leszczyny (DB 83), water-gap of the river Lubrzanka, 1978; (May).

117. Nowa Słupia (EB 03), open-air ethnographic museum, grassland, thickets at the border of Świętokrzyski NP, 1979–1980; 1987; (Jun–Aug).

118. Pasmo Klonowskie (DB 84), 1982; (Apr).

119. Podlesie (DB 93), forest edge at the border of Świętokrzyski NP, 1982; (Sep).

120. Rudki (EB 03), ruderal vegetation of a former mine, 1984; (Aug).

121. Szklana Huta (EB 03), meadows at forest edge near the border of the Świętokrzyski NP, 1979–1984; (Jul–Aug).

122. Święta Katarzyna, Świętokrzyski NP (DB 93), near narrow-gauge railway tracks, 1982; 1985; (May–Jun, Aug–Sep).

123. Święty Krzyż, Świętokrzyski NP (EB 03), mainly the glade Bielnik with meadow dominated by *Arrhenatherum elatioris*, 1978–1992; (Mar–May, Jul–Sep).

124. Zachełmie (DB 84), 1980, leg. B. Gałczyńska; (Jul).

125. Zagnańsk (DB 74), 1980; (May, Jul).

RESULTS

The 3887 collected bees are members of 233 bee species (Table 1), which account for 49.1% of all species of Apiformes in Poland (Banaszak 2004). It is noteworthy that a large group of species was recorded on the Łódź Hills, lying at the border between the uplands of southern Poland and lowlands of northern Poland. For this reason it was rarely penetrated by entomologists in the old days. The study area (except the Świętokrzyskie Mts. in the eastern Małopolska Upland) is characterized by a relatively low geomorphological variation. In this study, 218 bee species were recorded in the northwestern part of the Małopolska Upland (mainly on the Łódź Hills), 89 in the Świętokrzyskie Mts., and 49 in the Vistula valley near Płock. These values are relatively low in comparison with earlier published data: 327 bee species in the Wielkopolska–Kujawy Lowland (Banaszak 1982), 274 in the Małopolska Upland (Łoziński 1920), and 254 in the Mazovian Lowland (Banaszak & Plewka 1981). From the Świętokrzyskie Mts., 126 species have been reported recently (Dylewska & Bąk 2005). Contributions of individual subfamilies to the bee fauna of central Poland were similar to their contributions to the whole Polish bee fauna: Colletinae 9.4% (in Poland 9.0%), Andreninae 20.6% (20.9%); Halictinae 20.2% (22.4%), Melittinae 2.6% (2.3%), Megachlinae 20.6% (18.8%), Anthophorinae 15.0% (18.1%) and Apinae 11.6% (8.5%).

The most abundant species were *Bombus lucorum* (4.2% of the total catch) and its cleptoparasite *Psithyrus bohemicus* (6.8%). They were found mainly in the Świętokrzyskie Mts., where also other bumblebees and cuckoo bees are common: *Bombus pascuorum* (3.7% of bees caught there), *B. lapidarius* (2.4%) and *Psithyrus campestris* (2.4%). In the area of Łódź Hills, the dominant species were *Heriades truncorum* (4.3%) and *Hylaeus communis* (2.7%). It is noteworthy that those species were not only most abundant, but also their localities were the most numerous. For example, *Heriades truncorum* was recorded in 31 localities, *Hylaeus communis* in 37, while *Psithyrus bohemicus* in 21 localities. Thus their largest contribution to the total catch is not a matter of chance or selective catching, but those species were truly common in the study area. It must be noted that in the Wielkopolska–Kujawy Lowland,

Hylaeus communis and *Heriades truncorum* accounted for less than 1% each of the bee community. Both species were less numerous also in the Mazovian Lowland.

Rare species, represented in the analysed material by 1–3 individuals, accounted for 30.5% of the total number (71 out of 233 species). Their list, presented below, includes information on their localities, collection dates, and sex. Many of the rare species are found infrequently also in other parts of Poland. However, some are very rare, known only from single localities. The most interesting among them include:

Hylaeus gredleri – 6 individuals caught in Łódź or its vicinity; recorded in Poland only in the Kraków–Częstochowa Upland.

Andrena lapponica – species associated with forests, especially with *Vaccinium* species, so it is rare in the largely deforested study area.

A. mitis – very rare, found in Silesia, Kraków, and near Tarnów.

A. suerinensis – rare, sub-Mediterranean, scattered throughout Poland.

A. synadelpha – found mainly in West Europe, reaching to Poland and Turkey, rare in the Czech Republic and eastern Germany (Dylewska 2000, Osytshnjuk et al. 2005). In Poland reported from Opole (Dylewska 2000), but this needs to be confirmed.

Lasioglossum prasinum – known from single localities.

L. subfasciatum – known from several dozen localities in northwestern Poland.

Evylaeus limbellus – very rare, known in Poland from single localities, only one of them confirmed: Kazimierz Dolny.

E. semilucens – solitary, known in Poland from about a dozen localities.

E. tarsatus – rare throughout Poland, associated with steppes and sandy sites.

Osmia mustelina – poorly studied in Poland, rarely observed but in various regions.

O. uncinata – in Poland rather rare, although reported from various regions.

Megachile pilidens – known from some localities in the Sandomierz Lowland and Lower Silesia.

Anthophora plagiata – now very rare, although it was very common on clay walls of buildings in the 1970s in Polish lowlands. W. Banaszak (2005) found only one small local population of this species in the Wielkopolska–Kujawy Lowland, in Dziekanowice near Gniezno.

Table 1. List of species of *Apiformes* from Central Poland.

No	Species	Number of specimens N/♀♀	Mazovian Lowland	Małopolska Upland	Świętokrzyskie Mountains
1	2	3	4	5	6
	Colletidae				
1	*Hylaeus annularis* (Kirby, 1802)	7/5	4, 5, 15	26, 30	-
2	*Hylaeus bisinuatus* Förster, 1871	4/3	15	30, 47	-
3	*Hylaeus brevicornis* Nylander, 1852	14/12	8, 12, 13	26, 47, 64, 75	102, 108
4	*Hylaeus communis* Nylander, 1852	104/77	1, 2, 6, 8, 9, 11-13, 15	26, 29, 30, 39, 43, 47–49, 53, 55, 57, 58, 60, 64, 69, 72, 76–78, 81, 83, 87	101, 102, 108, 112, 120, 123
5	*Hylaeus confusus* Nylander, 1852	9/7	6, 8, 9, 13	43, 56	-
6	*Hylaeus difformis* (Eversmann, 1852)	10/8	8, 9	43, 64, 77	102, 114
7	*Hylaeus gibbus* Saunders, 1850	1/0	-	56	-
8	*Hylaeus gracilicornis* (F. Morawitz, 1867)	1/1	-	-	102
9	*Hylaeus gredleri* Förster, 1871	6/4	-	47, 49, 57, 64	-

1	2	3	4	5	6
10	*Hylaeus hyalinatus* Smith 1842	15/11	7, 8	47, 49, 60, 77	-
11	*Hylaeus nigritus* (Fabricius, 1758)	4/0	-	47, 75	123
12	*Hylaeus pictipes* Nylander, 1852	3/2	8	49, 83	-
13	*Hylaeus punctatus* (Brullē, 1832)	1/1	-	47	-
14	*Hylaeus punctulatissimus* Smith, 1842	1/1	-	64	-
15	*Hylaeus rinki* (Gorski, 1852)	1/1	-	77	-
16	*Hylaeus signatus* (Panzer, 1798)	20/16	-	47, 75, 76	123
17	*Hyaleus sinuatus* (Schenck, 1853)	33/21	7, 13	30, 60, 64, 71, 76–78, 87	101, 102, 108, 112, 114
18	*Colletes cunicularius* (Linnaeus, 1761)	10/6	4	47, 49, 83	-
19	*Colletes daviesanus* Smith, 1846	40/30	8, 9, 15	37, 45, 47, 49, 76, 77	108, 112, 120
20	*Colletes fodiens* (Fourcroy, 1785)	1/0	-	49	-
21	*Colletes similis* Schenck, 1853	4/4	1, 4	40, 48	-
22	*Colletes succinctus* (Linnaeus, 1785)	3/3	-	24, 49	-
	Andrenidae				
23	*Andrena alfkenella* Perkins, 1914	1/0	-	49	-
24	*Andrena apicata* Smith, 1847	2/2	-	61, 83	-
25	*Andrena barbilabris* (Kirby, 1802)	4/2	-	48, 49, 125	
26	*Andrena bicolor* Fabricius, 1775	11/8	-	47	123
27	*Andrena bimaculata* (Kirby, 1802)	11/4	-	47, 49	-
28	*Andrena chrysopyga* Schenck, 1853	5/3	-	26, 49	-
29	*Andrena chrysosceles* (Kirby, 1802)	2/2	-	47	-
30	*Andrena cineraria* (Linnaeus, 1758)	8/6	-	41, 47–49, 60, 83	-
31	*Andrena clarkella* (Kirby, 1802)	26/16	-	43, 47–49, 70	100, 109, 118, 123
32	*Andrena denticulata* (Kirby, 1802)	10/4	-	48, 49	101, 108
33	*Andrena dorsata* (Kirby, 1802)	32/20	8	30, 36, 47, 49, 81, 83	101, 123
34	*Andrena flavipes* Panzer, 1799	35/12	10, 15	21, 47, 49, 76, 77	111
35	*Andrena fucata* Smith, 1847	3/2	-	48, 53	-
36	*Andrena fulva* (Müller, 1766)	48/40	11	41, 47–49, 81	-
37	*Andrena fuscipes* (Kirby, 1802)	5/4	17	24, 41	-
38	*Andrena gelriae* Van der Vecht, 1927	4/1	-	26, 32, 47	-
39	*Andrena gravida* Imhoff, 1832	9/9	-	47, 62, 76	-
40	*Andrena haemorrhoa* (Fabricius, 1781)	55/18	8	47–49, 51, 62, 64, 68, 83	109, 122, 123
41	*Andrena hattorfiana* (Fabricius, 1775)	16/14	-	19, 41, 47, 52, 77	108, 113, 117
42	*Andrena helvola* (Linnaeus, 1758)	3/2	-	48, 49, 81	-
43	*Andrena humilis* Imhoff, 1832	3/3	-	41, 51	101
44	*Andrena jakobi* Perkins, 1931	35/31	5	41, 47, 49, 68	123
45	*Andrena labialis* (Kirby, 1802)	1/0	15	-	-
46	*Andrena labiata* Fabricius, 1781	11/4	4, 14, 17	32, 47, 48	-
47	*Andrena lapponica* Zetterstedt, 1838	1/1	-	46	-
48	*Andrena marginata* Fabricius, 1776	2/2	-	57	-
49	*Andrena minutula* (Kirby, 1802)	6/6	-	47, 49, 83	123
50	*Andrena minutuloides* Perkins, 1914	12/12	-	47, 49	108
51	*Andrena mitis* Schmiedeknecht, 1883	1/1	-	47	-
52	*Andrena nigroaenea* (Kirby, 1802)	16/8	4, 5, 11	39, 47, 49, 83	108
53	*Andrena nitida* (Müller, 1776)	26/16	11	47, 49, 61	101, 102, 123
54	*Andrena nitidiuscula* Schenck, 1853	1/1	-	-	102
55	*Andrena ovatula* (Kirby, 1802)	3/2	-	48, 49	117
56	*Andrena pilipes* (Fabricius, 1871)	36/12	8	29, 39-41, 47, 49, 64, 88	-
57	*Andrena praecox* (Scopoli, 1763)	19/17	-	23, 47–49	123
58	*Andrena proxima* (Kirby, 1802)	5/5	2	47	101, 123
59	*Andrena rosae* Panzer, 1801	2/1	-	-	102
60	*Andrena ruficrus* Nylander, 1848	2/2	-	51	-
61	*Andrena schencki* F. Morawitz, 1866	1/0	-	51	-

1	2	3	4	5	6
62	*Andrena subopaca* Nylander, 1848	12/1	-	47, 49,78	102, 123
63	*Andrena suerinensis* Friese, 1884	1/0	-	49	-
64	*Andrena synadelpha* Perkins, 1914	2/2	-	49, 68	-
65	*Andrena tibialis* (Kirby, 1802)	10/7	11	47, 49	-
66	*Andrena varians* (Rossi, 1791)	11/11	-	41, 47, 49	125
67	*Andrena vaga* Panzer, 1799	1/0	4	-	-
68	*Andrena ventralis* Imhoff, 1832	3/3	-	47, 48	-
69	*Andrena wilkella* (Kirby, 1802)	2/2	8	26	-
70	*Panurgus calcaratus* (Scopoli, 1763)	14/5	-	19, 47–49, 53, 64	-
	Halictidae				
71	*Halictus maculatus* Smith, 1848	11/9	-	48, 49, 55, 62, 77	102, 120
72	*Halictus quadricinctus* (Fabricius, 1775)	10/5	-	28, 47, 49–51	-
73	*Halictus rubicundus* (Christ, 1791)	24/18	1, 16	26, 39, 41, 47–49, 62, 83	-
74	*Halictus sexcinctus* (Fabricius, 1775)	18/6	4, 8, 10, 13	30, 47, 49–51, 68, 75	-
75	*Seladonia confusa* (Smith, 1853)	3/1	-	19, 30	-
76	*Seladonia leucahenea* (Ebmer, 1972)	5/3	-	39, 49	-
77	*Seladonia tumulorum* (Linnaeus, 1758)	70/63	1, 2, 4, 8, 12, 15, 16	24, 27, 49, 77	-
78	*Lasioglossum lativentre* (Schenck, 1853)	3/1	1, 2, 12	-	-
79	*Lasioglossum leucozonium* (Schrank, 1781)	12/5	1, 13	19, 26, 30, 47, 49, 76, 77, 81	-
80	*Lasioglossum prasinum* (Smith, 1848)	1/1	10	-	-
81	*Lasioglossum quadrinotatum* (Kirby, 1802)	5/1	12	30, 39, 47, 49	-
82	*Lasioglossum sexnotatum* (Kirby, 1802)	26/26	2, 9	26, 35, 39, 41, 47–49, 51, 64, 81	102, 121, 123
83	*Lasioglossum subfasciatum* (Imhoff, 1832)	3/2	-	49	123
84	*Lasioglossum xanthopus* (Kirby, 1802)	3/3	-	49, 66	-
85	*Lasioglossum zonulum* (Smith, 1848)	4/4	1, 10	24, 27	-
86	*Evylaeus albipes* (Fabricius, 1781)	16/10	1, 2, 9, 16	30, 51, 77, 86	101, 123
87	*Evylaeus calceatus* (Scopoli, 1763)	25/9	1, 8–10, 12, 13, 16	27, 35, 47, 48	-
88	*Evylaeus fulvicornis* (Kirby, 1802)	12/3	2, 9	-	101, 102, 108, 109, 123
89	*Evylaeus laticeps* (Schenck, 1869)	8/2	-	31, 49	-
90	*Evylaeus limbellus* (F. Morawitz, 1876)	1/1	15	-	-
91	*Evylaeus lucidulus* (Schenck, 1861)	2/1	15	47	-
92	*Evylaeus minutissimus* (Kirby, 1802)	1/0	16	-	-
93	*Evylaeus morio* (Fabricius, 1793)	20/5	2, 8, 12, 13, 15	48, 77	-
94	*Evylaeus parvulus* (Schenck, 1853)	6/3	2, 10, 15	-	-
95	*Evylaeus pauxillus* (Schenck, 1853)	21/14	1	47–49, 77	102
96	*Evylaeus quadrinotatulus* (Schenck, 1861)	10/4	2, 3, 15	-	-
97	*Evylaeus rufitarsis* (Zetterstedt, 1838)	1/1	15	-	-
98	*Evylaeus semilucens* (Alfken, 1914)	2/0	-	48	-
99	*Evylaeus sexstrigatus* (Schenck, 1869)	18/14	1, 2, 12, 15	47, 49	-
100	*Evylaeus tarsatus* (Schenck, 1869)	2/2	1	-	-
101	*Evylaeus villosulus* (Kirby, 1802)	1/1	-	77	-
102	*Systropha curvicornis* (Scopoli, 1770)	7/0	-	19, 40	-
103	*Rophites quinquespinosus* Spinola, 1808	3/2	-	49, 66	-
104	*Sphecodes albilabris* (Fabricius, 1793)	15/3	4, 15	76, 77	-
105	*Sphecodes crassus* Thomson, 1870	23/18	2, 15	27, 30, 49, 77, 78	102, 108
106	*Sphecodes ephippius* (Linnaeus, 1767)	34/16	2-4, 15	26, 47–49, 64, 77, 78	123
107	*Sphecodes ferruginatus* Hagens, 1882	3/3	-	47, 49	-

1	2	3	4	5	6
108	*Sphecodes geoffrellus* (Kirby, 1802)	12/9	15	49, 57, 59, 68, 76, 87	108
109	*Sphecodes gibbus* (Linnaeus, 1758)	45/27	2, 8, 13, 15	19, 28, 32, 39, 41, 47, 49, 50, 71, 73, 77, 80, 83	-
110	*Sphecodes longulus* Hagens, 1882	14/4	15	26, 30, 47–49, 73, 76	108, 123
111	*Sphecodes marginatus* Hagens, 1882	1/1	-	77	-
112	*Sphecodes miniatus* Hagens, 1882	10/2	2, 15	38, 49, 76	108
113	*Sphecodes monilicornis* (Kirby, 1802)	33/23	4, 8, 13	19, 29, 43, 49, 50, 57, 64, 76, 77, 86	102, 105
114	*Sphecodes niger* Hagens, 1874	4/0	1, 2, 4	48	-
115	*Sphecodes pellucidus* Smith, 1845	25/24	2, 4, 15	34, 47, 49, 86	-
116	*Sphecodes puncticeps* Thomson, 1870	1/0	-	49	-
117	*Sphecodes reticulatus* Thomson, 1870	12/8	8	26, 30, 38, 47, 49, 76, 77	-
	Melittidae				
118	*Dasypoda hirtipes* (Harris, 1780)	25/10	1, 12, 13	41, 48–51	-
119	*Macropis europaea* Warncke, 1973	10/6	4	21, 48, 61, 74	102, 121
120	*Macropis fulvipes* (Fabricius, 1804)	14/4	4	32, 47, 48, 72, 74, 81,	102, 115
121	*Melitta haemorrhoidalis* (Fabricius, 1775)	1/1	-		108
122	*Melitta leporina* (Panzer, 1799)	13/4	-	19, 39, 47–49, 78	-
123	*Melitta nigricans* Alfken, 1905	5/4	3, 4 -	75	-
	Megachilidae				
124	*Anthidium manicatum* (Linnaeus, 1758)	19/8	-	47, 49, 64, 71, 73	102
125	*Proanthidium oblongatum* Latreille, 1809	6/3	-	47, 67, 75	-
126	*Anthidiellum strigatum* (Panzer, 1805)	20/6	4	19, 22, 26, 39, 40, 47–49, 64, 75	-
127	*Stelis breviuscula* (Nylander, 1848)	32/20	2, 8, 9, 13	29, 30, 37, 45, 65, 76–78, 87	-
128	*Stelis minuta* Lepeletier and Serville, 1825	1/1	-	29	-
129	*Stelis ornatula* (Klug, 1807)	1/0	-	47	-
130	*Stelis phaeoptera* (Kirby, 1802)	9/9	9	38, 47, 51, 87	-
131	*Stelis punctulatissima* (Kirby, 1802)	5/4	9	47, 84	101
132	*Stelis signata* (Latreille, 1809)	3/1	-	64, 75	-
133	*Heriades crenulatus* Nylander, 1856	10/8	9	45, 76, 77	-
134	*Heriades truncorum* (Linnaeus, 1758)	168/108	1, 4, 8, 9, 12, 13, 16	19, 30, 35–38, 43, 45, 47–49, 58, 64, 72, 76–78, 84, 87	101, 105, 108, 123
135	*Chelostoma campanularum* (Kirby, 1802)	35/25	8, 9, 16	26, 27, 30, 49, 65, 87	101, 102
136	*Chelostoma distinctum* Stoeckhert, 1929	1/1	8	-	-
137	*Chelostoma florisomne* (Linnaeus, 1758)	35/19	8	29, 38, 41, 47, 81	98, 110, 123
138	*Chelostoma rapunculi* (Lepeletier, 1841)	50/23	2, 3, 8	37, 47, 49, 72, 87	101, 102, 114
139	*Anthocopa bidentata* (F. Morawitz, 1876)	16/15	-	58, 76, 77	-
140	*Hoplitis adunca* (Panzer, 1798)	10/5	9	38, 67, 75	117, 120
141	*Hoplitis anthocopoides* (Schenck, 1853)	1/1	-	75	-
142	*Hoplitis claviventris* (Thomson, 1872)	14/10	4, 15	32, 47, 48, 63, 75	-
143	*Hoplitis leucomelana* (Kirby, 1802)	2/2	-	30, 49	-
144	*Osmia aurulenta* (Panzer, 1799)	4/3	-	79	-
145	*Osmia brevicornis* (Fabricius, 1798)	26/2	8	47, 85	-

1	2	3	4	5	6
146	*Osmia coerulescens* (Linnaeus, 1758)	16/12	8	19, 47, 49	101
147	*Osmia fulviventris* (Panzer, 1798)	10/6	-	38, 72, 81	108, 110
148	*Osmia leaiana* (Kirby, 1802)	3/2	-	32, 78	108
149	*Osmia mustelina* Gerstaecker, 1841	3/2	-	47, 49	-
150	*Osmia rufa* (Linnaeus, 1758)	41/17	11	19, 40, 47–49, 51, 61, 81	123
151	*Osmia uncinata* Gerstaecker, 1869	1/1	-	68	-
152	*Chalicodoma ericetorum* (Lepeletier, 1841)	16/2	-	19, 47, 49, 76	-
153	*Megachile alpicola* Alfken, 1924	12/8	2, 4, 14	29, 47, 49	-
154	*Megachile centuncularis* (Linnaeus, 1758)	4/3	4	47, 87	117
155	*Megachile circumcincta* (Kirby, 1802)	19/11	4, 15	19, 47–49, 54, 63	-
156	*Megachile leachella* Curtis, 1828	11/7	4	75	-
157	*Megachile maritima* (Kirby, 1802)	10/8	4, 15	49, 50, 67, 75	-
158	*Megachile pilidens* Alfken, 1923	3/1	4	47, 75	-
159	*Megachile rotundata* (Fabricius, 1784)	10/4	1, 4, 8, 15	30	-
160	*Megachile versicolor* Smith, 1844	5/2	4	29, 30, 48, 49	-
161	*Megachile willughbiella* (Kirby, 1802)	19/3	1	25, 32, 43, 47, 49, 51, 75	123
162	*Coelioxys afra* Lepeletier, 1841	4/4	3	75, 77	-
163	*Coelioxys aurolimbata* Förster, 1853	1/0	-	47	-
164	*Coelioxys brevis* Eversmann, 1852	5/3	4	19, 50	-
165	*Coelioxys conoidea* (Illiger, 1806)	8/5	4	19, 51, 75	-
166	*Coelioxys elongata* Lepeletier, 1841	2/1	4	49	-
167	*Coelioxys inermis* (Kirby, 1802)	1/1	-	49	-
168	*Coelioxys mandibularis* Nylander, 1848	4/3	-	47	-
169	*Coelioxys quadridentata* (Linnaeus, 1758)	8/7	4, 15	40, 49, 75, 77, 78	-
170	*Coelioxys rufescens* Lepeletier, 1825	7/4	-	29, 30, 49, 64	123
171	*Coelioxys rufocaudata* Smith, 1854	2/1	-	60, 77	-
	Apidae				
172	*Nomada femoralis* F. Morawitz, 1869	3/3	-	49	-
173	*Nomada flava* Panzer, 1798	9/4	-	47, 49	111, 116
174	*Nomada flavoguttata* (Kirby, 1802)	14/12	-	29, 32, 47–49, 60, 64	111
175	*Nomada flavopicta* (Kirby, 1802)	19/12	-	19, 40, 47, 49, 57, 77	102, 120
176	*Nomada fulvicornis* Fabricius, 1793	48/27	11	29, 35, 41, 47, 49, 51, 53, 78	111, 121
177	*Nomada fuscicornis* Nylander, 1848	3/2	-	48, 49	-
178	*Nomada goodeniana* (Kirby, 1802)	13/13	15	47, 49, 51, 83, 86	121
179	*Nomada lathburiana* (Kirby, 1802)	6/6	-	47, 49, 83	-
180	*Nomada marshamella* (Kirby, 1802)	17/14	-	47, 49, 51, 64	109, 116, 121
181	*Nomada moeschleri* Alfken, 1913	34/28	3	32, 48, 49, 60, 64, 70, 81, 82, 86	123
182	*Nomada ochrostoma* Zetterstedt, 1838	9/7	3, 4	49	-
183	*Nomada panzeri* Lepeletier, 1841	2/1	-	49	-
184	*Nomada roberjeotiana* Panzer, 1799	36/19	8	19, 26, 28, 33, 47, 49, 53, 77, 78, 80, 83	102
185	*Nomada ruficornis* (Linnaeus, 1758)	38/33	15	48, 49, 61, 64, 70, 77, 78, 80, 81, 86	101, 109, 121, 122
186	*Nomada rufipes* Fabricius, 1793	8/7	4	24, 64	-
187	*Nomada sexfasciata* Panzer, 1799	3/3		34, 50, 64	-
188	*Nomada sheppardana* (Kirby, 1802)	5/5	-	48, 49, 81	102
189	*Nomada signata* Jurine, 1807	15/7	-	32, 34, 48, 49	111, 123
190	*Nomada zonata* Panzer, 1798	4/1	-	49	-

1	2	3	4	5	6
191	*Anthophora bimaculata* (Panzer, 1798)	7/3	-	19, 33, 49, 50, 67, 76	-
192	*Anthophora furcata* (Panzer, 1798)	20/6	9	29, 47, 49, 53, 74	102, 123
193	*Anthophora plagiata* (Illiger, 1806)	1/0	-	47	-
194	*Anthophora plumipes* (Pallas, 1772)	23/10	11	18, 20, 44, 47, 48, 62	123
195	*Anthophora quadrimaculata* (Panzer, 1806)	18/11	-	47, 49, 76, 77	112
196	*Anthophora retusa* (Linnaeus, 1758)	3/1	-	49	-
197	*Biastes emarginatus* (Schenck, 1853)	1/1	-	49	-
198	*Ceratina cyanea* (Kirby, 1802)	16/13	4, 8	26, 47, 49, 64, 77	-
199	*Epeoloides coecutiens* (Fabricius, 1775)	2/0	-	75	107
200	*Epeolus cruciger* (Panzer, 1799)	4/3	-	19, 47	-
201	*Epeolus variegatus* (Linnaeus, 1758)	22/16	2, 15	41, 47–49, 75	-
202	*Eucera longicornis* (Linnaeus, 1758)	9/2	-	47, 49, 51	-
203	*Melecta albifrons* (Förster, 1771)	7/3	11	47, 49, 62, 64	-
204	*Tetralonia dentata* (Klug, 1835)	9/3	-	42, 50, 80	-
205	*Thyreus histrionicus* (Illiger, 1806)	3/2	-	40, 50	-
206	*Thyreus orbatus* (Lepeletier, 1841)	3/1	4	45, 49	-
207	*Bombus cryptarum* (Fabricius, 1775)	21			
208	*Bombus distinguendus* (F. Morawitz, 1869)	2/1	-	32	-
209	*Bombus hortorum* (Linnaeus, 1761)	69/16	4	30, 35, 47–49, 51, 55, 72	101, 102, 109, 114, 121–125
210	*Bombus humilis* Illiger, 1806	3/3	-	73	102
211	*Bombus hypnorum* (Linnaeus, 1758)	40/13	-	47–49, 51, 76, 77	101, 102, 106, 109, 112, 113, 121, 125
212	*Bombus jonellus* (Kirby, 1802)	5/0	4	48, 76	-
213	*Bombus lapidarius* (Linnaeus, 1758)	94/33	1, 4, 8, 12, 15	24, 30, 47, 49, 51, 58, 61, 76–78	99, 100–102, 114, 117, 121–123
214	*Bombus lucorum* (Linnaeus, 1761)	159*	4, 8, 9, 12	48	-
215	*Bombus magnus* Vogt, 1911	1			
216	*Bombus muscorum* (Linnaeus, 1758)	21/7	4, 8	19, 24, 26, 48, 51	114
217	*Bombus pascuorum* (Scopoli, 1763)	145/71	4, 8	26, 30, 35, 39, 41, 43, 47–49, 51, 58, 72, 77, 78	99–103, 106, 109, 113, 114, 117, 119, 121–125
218	*Bombus pomorum* (Panzer, 1805)	4/4	-	25, 78	102
219	*Bombus pratorum* (Linnaeus, 1761)	50/23	1, 4	25, 30, 47–49, 51, 72, 78	101, 103, 106, 113, 121–124
220	*Bombus ruderarius* (Müller, 1776)	44/20	-	47–49, 51, 72, 74, 76, 77	101, 113, 114, 117, 121, 123, 124
221	*Bombus ruderatus* (Fabricius, 1775)	2/2	-	47	121
222	*Bombus subterraneus* (Linnaeus, 1758)	24/0	-	72	114, 123
223	*Bombus sylvarum* (Linnaeus, 1761)	7/4	8	49	101, 113, 122
224	*Bombus terrestris* (Linnaeus, 1758)	88*	8, 12	49, 77	-
225	*Bombus veteranus* (Fabricius, 1793)	9/7	4	49	101, 114, 122, 124
226	*Psithyrus barbutellus* (Kirby, 1802)	7/1	-	78	101, 102, 108, 122, 123
227	*Psithyrus bohemicus* (Seidl, 1837)	268/8	4	29, 32, 48, 51, 64, 72, 74	97, 100, 101, 104, 106, 109, 112, 114, 115, 119, 121–123
228	*Psithyrus campestris* (Panzer, 1801)	95/12	4	24, 29, 39, 48, 49, 51, 72, 78	100–102, 106, 108, 114, 121–123

1	2	3	4	5	6
229	*Psithyrus norvegicus* Sparre-Schneider, 1918	7/0	-	72	98, 123
230	*Psithyrus rupestris* (Fabricius, 1793)	40/5	4, 8	32, 51, 78	100, 114, 121–123
231	*Psithyrus sylvestris* Lepeletier, 1832	61/17	-	32, 48, 72	100, 106, 109, 119, 121–123
232	*Psithyrus vestalis* (Geoffroy in Fourcroy, 1785)	19/3	-	49, 78	101, 102, 108, 114, 121–123
233	*Apis mellifera* Linnaeus, 1758				

*see Banaszak & Rasmont, 1994;

Date from other regions:

Kraków-Wieluń Upland: *Andrena marginata* Fabricius, 1776 (96)

Wielkopolska-Kujawy Lowland: *Andrena chrysosceles* (Kirby, 1802) (91), *Andrena jakobi* Perkins, 1931 (90), *Dasypoda hirtipes* (Harris, 1780) (89), *Heriades truncorum* (Linnaeus1758) (91), *Chelostoma florisomne* (Linnaeus, 1758) (90), *Osmia brevicornis* (Fabricius, 1798) (92), *Osmia coerulescens* (Linnaeus, 1758) (95), *Megachile circumcincta* (Kirby, 1802) (89), *Coelioxys brevis* Eversmann, 1852 (89), *Nomada flavoguttata* (Kirby, 1802) (93), *Nomada moeschleri* Alfken, 1913 (90), *Nomada rufipes* Fabricius, 1793 (89), *Anthophora quadrimaculata* (Panzer, 1806) (94), *Anthophora retusa* (Linnaeus, 1758) (91), *Epeolus cruciger* (Panzer, 1799) (89), *Thyreus histrionicus* (Illiger, 1806) (89), *Bombus distinguendus* (F. Morawitz, 1869) (95),

Two bumblebee species, *Bombus distinguendus* and *B. ruderatus*, were very rarely reported in the last 2–3 decades, so their localities recorded during this study are noteworthy. By contrast, *B. humilis* is quite common in some parts of Poland.

Thyreus histrionicus – recorded in 1944 (locality no. 40) and in the 1970s (no. 50). This seems interesting, because the species is a cleptoparasite of *Anthophora quadrifasciata* (Vil.), which has not been recorded in Poland for a long time. Its last record was 1♀ caught on 3 Sep 1965 in Nowa Grobla near Mielec (Banaszak 1973).

It must be emphasized that some of the species infrequently caught near Łódź are only locally rare. In other parts of Poland some of them are quite common, e.g. *Andrena fucata, A. helvola, A. humilis, A. ventralis, Evylaeus villosulus,* and *Andrena vaga*. The last of the mentioned species is often abundant near Bydgoszcz and Poznań. In early spring it forms large local populations on sandy sites, e.g. on mineral hills near meadows, especially if bee forage plants, like willows (*Salix* sp.) and dandelions (*Taraxacum* sp.), are abundant there.

List of species represented by 1–3 individuals

Hylaeus gibbus: Niesułków Kolonia, 22 Jul 1993, ♂.

H. gracilicornis: Cząstków–Zapusty, 6 Aug 1984, ♀.

H. pictipes: Marianów, 4 Jul 1990, ♀; 'Wolbórka' reserve, 25 Jul 1980, ♂; Łódź–Stoki, 14 Jul 1985, ♀.

H. punctatus: Łódź, ul. Banacha, 23 Jul 1986, ♀.

H. punctulatissimus: Rogów, 12 Jul 1977, ♀, on a wooden building.

H. rinki: Tomaszów Mazowiecki, Księża Góra, 22 Aug 1988, ♀.

Colletes fodiens: Łódź–Stoki, 26 Jun 1986, ♂, sand pit.

C. succinctus: Bukowiec, 22 Aug 1986, ♀, moor (afforested in 1990s); Łódź–Stoki, 26 Aug 1984, ♀; 25 Aug 1985, ♀, sand pit.

Andrena alfkenella: Łódź–Stoki, 22 Jul 1988, ♂, sand pit.

A. apicata: 'Wolbórka' reserve, 9 May 1980, ♀; Pytowice, 1 May 1987, ♀.

A. chrysosceles: Łódź – Botanical Garden, 28 Jul 1995, ♀, grassland; Daszyna, 26 May 1988, ♀, village park.

A. fucata: Łódź – Łagiewniki Forest, 25 Apr 1984, ♂; 30 May 1988, ♀; 'Molenda' reserve, 12 Jul 1980, ♀.

A. helvola: Wiączyń, 4 May 1984, ♀; Łódź – Łagiewniki Forest, 18 Apr 1986, ♀; Łódź–Stoki, 14 May 1986, ♂, sand pit.
A. humilis: Modlica, 14 Jun 1943, ♀; Kalonka, 16 May 1986, ♀; Chełmowa Góra, 15 Jun 1984, ♀, meadow.
A. labialis: Uniejewo, 5 Jun 1988, ♂, slope of Vistula valley.
A. lapponica: 'Łaznów' reserve, 31 May 1991, ♀.
A. marginata: Działoszyn, 20 Aug 1976, ♀; Pińczów, 6 Aug 1976, ♀.
A. mitis: Łódź – Botanical Garden, 11 Jun 1980, ♀.
A. ovatula: Łódź – Łagiewniki Forest, 25 Aug 1987, ♂; Łódź–Stoki, 4 Aug 1990, ♀ , grassland; Nowa Słupia, 27 Aug 1980, ♀.
A. rosae: Cząstków–Zapusty, 14 Jul 1979, ♂; 7 Aug 1979, ♀.
A. ruficrus: Modlica, 14 Jun 1943, ♀; 9 Jun 1944, ♀.
A. schencki: Modlica, 6 Jun 1944, ♂.
A. suerinensis: Łódź–Stoki, 5 Jun 1977, ♂, sand pit.
A. synadelpha: Łódź–Stoki, 14 May 1989, ♀, sand pit; Smardzew, 6 May 1990, ♀.
A. vaga: Bromierzyk, 1 May 1992, ♂.
A. ventralis: Łódź – Łagiewniki Forest, 23 Apr 1984, ♀; Łódź–Radogoszcz, 23 Apr 1986, 2 ♀♀, near railway tracks.
A. wilkella: Marianów, 21 Jul 1988, ♀; Dąbrowa, 8 Aug 1986, ♀.
Seladonia confusa: Barycz, 8 Jul 1943, ♂; Dobryszyce, 14 Aug 1988, ♂ , ♀.
Lasioglossum lativentre: 'Babsk' reserve, 6 Sep 1988, ♂; Biskupice, 13 Aug 1988, ♀; Rawa Mazowiecka, 10 Sep 1988, ♂, park.
L. prasinum: Osiny, 23 Aug 1990, ♀.
L. subfasciatum: Łódź–Stoki, 22 Apr 1986, 2 ♀♀, sand pit; Święty Krzyż, 10 Aug 1983, ♂.
L. xanthopus: Łódź–Stoki, 21 Jun 1977, 2 ♀♀; Skowronno, 17 Jun 1972, ♀.
Evylaeus limbellus: Uniejewo, 9 Aug 1988, ♀.
E. lucidulus: Uniejewo, 9 Aug 1988, ♂; Łódź – Botanical Garden, 17 Jul 1992, ♀.
E. minutissimus: Uroczysko Rawski Las, 25 Aug 1988, ♂.
E. rufitarsis: Uniejewo, 16 Jun 1991, ♀, slope of Vistula valley.
E. semilucens: Łódź – Łagiewniki Forest, 9 Aug 1989, 2 ♂♂.
E. tarsatus: 'Babsk' reserve, 12 Jul 1988, ♀; 15 Jul 1988, ♀.
E. villosulus: Tomaszów Mazowiecki – Księża Góra, 10 Jul 1989, ♀.
Rophites quinquespinosus: Łódź–Stoki, 28 Jul 1990, ♀, sand pit; Łódź–Stoki, 1 Aug 1990, ♀ grassy slopes between fields; Skowronno, 7 Jun 1972, ♂.
Sphecodes ferruginatus: Łódź–Lublinek, 24 Aug 1976, ♀; Łódź–Stoki, 24 Aug 1976, ♀; 16 Aug 1985, ♀, sand pit.
S. marginatus: Tomaszów Mazowiecki – Księża Góra, 12 Aug 1989, ♀.
S. puncticeps: Łódź–Stoki, 16 Aug 1985, ♂, sand pit.
Melitta haemorrhoidalis: Grzegorzowice – 'Wąwóz w Skałach' reserve, 9 Aug 1984, ♀.
Stelis minuta: Dobieszków, 2 Jul 1991, ♀.
S. ornatula: Łódź – Park 3-go Maja, 13 Jun 1987, ♂.
S. signata: Rogów – Uroczysko Górki, 11 Jul 1976, 2 ♂♂; Szynkielów, 22 Jul 1992, ♀.
Chelostoma distinctum: Marianów, 25 Aug 1990, ♀.
Hoplitis anthocopoides: Szynkielów, 14 Jul 1992, ♀.
H. leucomelana: Dobryszyce, 14 Aug 1988, ♀; Łódź–Stoki, 31 Aug 1988, ♀, sand pit.
Osmia leaiana: Tuszyn–Poddębina, 27 Jul 1980, ♂, wooden building; Gałków, 20 Jun 1990, ♀, near railway tracks; Grzegorzowice, 9 Aug 1984, ♀, meadow.

O. mustelina: Łódź–Stoki, 22 Jun 1985, ♀, sand pit; Łódź – Park Źródliska, 17 Jun 1986, ♀, didactic garden; Łódź – ul. Giewont, 8 Jun 1986, ♂, wooden building.
O. uncinata: Smardzew, 6 May 1990, ♀, flowering hawthorn.
Megachile pilidens: Bromierzyk, 5 Aug 1992, ♂; Łódź – Botanical Garden, 9 Jul 1992, ♀; Szynkielów, 14 Jul 1992, ♂.
Coelioxys aurolimbata: Łódź – Park Źródliska, 17 Jun 1986, ♂, didactic garden.
C. elongata: Bromierzyk, 7 Aug 1991, ♀, road among fields; Łódź–Stoki, 28 Jul 1991, ♂, sand pit.
C. inermis: Łódź–Stoki, 8 Sep 1984, ♀, sand pit.
C. rufocaudata: 'Popień' reserve, 26 Jul 1976, ♀; Tomaszów Mazowiecki – Księża Góra, 25 Jun 1989, ♂.
Nomada femoralis: Łódź–Stoki, 29 May 1985, 3 ♀♀, afforested former farmland.
N. fuscicornis: Łódź – Łagiewniki Forest, 8 Aug 1987, ♂, side of forest road; Łódź–Stoki, 31 Jul 1988, ♀, sand pit; Łódź–Stoki, 1 Aug 1990, ♀, grassy slopes between fields.
N. panzeri: Łódź–Stoki, 26 Apr 1981, ♂, sand pit; Łódź–Stoki, 14 May 1992, ♀, green areas between apartment blocks.
N. sexfasciata: Rogów, 28 Jun 1975, ♀; Michałów, 5 Jul 1976, ♀; Glinnik, 3 Jun 1984, ♀, cmentarz.
Anthophora plagiata: Łódź – Park Źródliska, 17 Jun 1986, ♂, didactic garden.
A. retusa: Łódź–Stoki, 18 May 1976, ♀ (melanotic individual), grassy slopes between fields; Łódź–Stoki, 11 May 1985, ♂, afforested former farmland; Daszyna, 26 May 1988, ♂, gravel mine.
Biastes emarginatus: Łódź–Stoki, 8 Jul 1990, ♀, sand pit.
Epeoloides coecutiens: Szynkielów, 22 Jul 1992, ♂, mire; Góra Radostowa, 9 Jul 1981, ♂, meadow.
Thyreus histrionicus: Justynów, 27 Jul 1944, ♀; Michałów, 14 Aug 1974, ♂; Burzenin, 10 Aug 1973, ♀.
T. orbatus: Bromierzyk, 5 Aug 1992, ♂, meadow; Ludwików, 10 Jul 1989, ♀; Łódź–Stoki, 28 Jul 1991, ♂, sand pit.
Bombus distinguendus: Gałków, 3 May 1987, ♀, near railway tracks; 'Winnica' reserve, 14 Jul 1992, ♂.
B humilis: Szewna, 6 Sep 1979, ♀, loess ravines; Cząstków-Zapusty, 30 Jun 1979, ♀, worker, on flowers of *Astragalus* sp.
B. ruderatus: Łódź – Botanical Garden, 24 Apr 1986, ♀; Szklana Huta, 16 Aug 1979, ♀.

SUMMARY AND CONCLUSIONS

This study fills an important gap in the current knowledge of the bee fauna (Apiformes) in Poland, as it provides data on the distribution of bees in central Poland. A total of 233 bee species were recorded in the study area, including 218 in the northwestern part of the Małopolska Upland (mainly on the Łódź Hills), 89 in the Świętokrzyskie Mts., and 49 in the Vistula valley near Płock. In the area of Łódź Hills, the most common were *Heriades truncorum* (4.3% of individuals caught there) and *Hylaeus communis* (2.7%), while in the Świętokrzyskie Mts., bumblebees and cuckoo bees were the most abundant: *Psithyrus bohemicus* (6.8%), *Bombus lucorum* (4.2%), *Bombus pascuorum* (3.7%), *B. lapidarius* (2.4%) and *Psithyrus campestris* (2.4%).

The collected material includes 71 rare species (over 30% of all species recorded in this study). Particularly noteworthy are: *Hylaeus gredleri, Andrena suerinensis, Lasioglossum prasinum, Evylaeus limbellus, E. semilucens, E. tarsatus, Osmia mustelina, O. uncinata, Anthophora plagiata and Thyreus histrionicus.* Some of the recorded taxa have become locally rare recently: *Andrena vaga, A. fucata, A. helvola, A. humilis, A. ventralis* and *Evylaeus villosulus.*

ACKNOWLEDGMENTS

We are grateful to E. Ambrozik, B. Gałczyńska, M. Kobalczyk, J. Kurzawa, E. Kwiatkowska, A. Liana, J. Mańkowska, M. Mastalerz, Z. Myślicka, J. Nadolski, J. Sobczak, B. Soszyński, E. Szczepański, J. Szczypciak, Z. Śliwiński, M. Wanat, C. Watała and A. Zborowska, who kindly provided some bee specimens from the study area. We also thank Mr. T. Kurzac, who greatly helped us in the preparation of this paper for publication.

REFERENCES

ABRASZEWSKA-KOWALCZYK A., KOWALCZYK J. K., HEJDUK J., PRZYBYLSKI M. & TUSZEWICKI W. 2002. Świat zwierzęcy Brudzeńskiego Parku Krajobrazowego. Mantis, Olsztyn, 101 pp.

BANASZAK J. 1973. Materiały do znajomości fauny pszczołowatych (Hymenoptera, Apoidea) Rzeszowszczyzny. Polskie Pismo Entomol. 43: 55–60.

BANASZAK J. 1982. Pszczoły (Apoidea, Hymenoptera) Niziny Wielkopolsko-Kujawskiej. Fragmenta Faunistica 27: 75–92.

BANASZAK J. 2004. Apidae. In: BOGDANOWICZ W., CHUDZICKA E., PILIPIUK I. & SKIBIŃSKA E. (eds), Fauna of Poland. I., pp. 358–362. Museum and Institute of Zoology PAS, Warszawa.

BANASZAK J. & RASMONT P. 1994. Occurrence and distribution of the subgenus *Bombus* Latreille sensu stricto in Poland (Hymenoptera, Apoidea). Polskie Pismo Entomologiczne 63: 337–356.

BANASZAK J. & PLEWKA T. 1981. Apoidea (Hymenoptera) Kampinoskiego Parku Narodowego. Fragmenta Faunistica 25: 435–452.

BANASZAK W. A. 2003. Rozmieszczenie i ocena zagrożeń występowania w Polsce *Anthophora plagiata* (Illiger 1806) (Hymenoptera: Apoidea). Nowy Pamiętnik Fizjograficzny 2: 53–68.

BANASZAK W. A. 2005. What has caused the decline of the solitary bee *Anthophora plagiata* (Illiger, 1806) (Hymenoptera: Apoidea) in the Wielkopolska-Kujawy Lowland in west Poland? Polskie Pismo Entomologiczne 74: 157–185.

BĄK J. 1998. Trzmiele (Bombus Latr.) (Hymenoptera, Apidae) na terenie rezerwatu „Cisów" w Górach Świętokrzyskich. In the conference material: Przemiany środowiska geograficznego obszarów górskich w Polsce i jego stan współczesny, Wólka Milanowska, 26–27. 10. 1998, Instytut Geografii Wyższej Szkoły Pedagogicznej, Komitet Zagospodarowania Ziem Górskich, pp. 16–19, Kielce.

BĄK J. 1999a. Skład gatunkowy i struktura dominacji trzmieli (*Bombus* spp.) (Hymenoptera: Apoidea) rezerwatu „Białe Ługi" w Górach Świętokrzyskich. In the conference material: Ochrona owadów w Polsce u progu integracji z Unią Europejską. Konferencja Naukowa, Kraków 23–24. 09. 1999, p. 1. Poznań-Kraków.

BĄK J. 1999b. Nowe stanowisko *Bombus magnus* Vogt, 1911 (Hymenoptera, Apidae) w Polsce. Rocznik Świętokrzyski, ser. B, 26: 71–72.

BĄK J. 2003. Trzmiele (*Bombus* Latr.) i trzmielce (*Psithyrus* Lep.) (Hymenoptera, Apidae) w wybranych fitocenozach Suchedniowsko-Oblęgorskiego Parku Krajobrazowego w Górach Świętokrzyskich. Prądnik. Prace Muzeum Szafera 13: 235–244.

ĆMAK J. & SZCZYPCIAK-BĄK J. 1987. Trzmiele (Bomus Latr.) w biotopach Świętokrzyskiego Parku Narodowego. Studia Kieleckie 4: 101–112.

DROGOSZEWSKI K. 1932. Wykaz żądłówek zebranych w Polsce Środkowej. Pol. Pismo Entomol., Lwów, 11: 113–118.

DROGOSZEWSKI K. 1934. Nowe dla Polski Środkowej żądłówki. Polskie Pismo Entomologiczne, Lwów, 13: 125–130.

DYLEWSKA M. 2000. Pszczołowate – Apidae, Podrodzina Andreninae. Klucze do oznaczania owadów Polski. Część XXIV. Błonkówki – Hymenoptera. Polskie Towarzystwo Entomologiczne. Toruń, 152 pp.

DYLEWSKA M. & BĄK J. 2005. Apiformes (Hymenoptera, Apoidea) of the Łysogóry Mountains and adjacent area. Acta Zoologica Cracoviensia 48 B: 145–179.

DYLEWSKA M., GĄSIENICA-CHMIEL M., KOSIOR A., SUMERA B., SZAFRANIEC S., WERSTAK K. & WIŚNIOWSKI B. 1998. Skład gatunkowy i liczebność trzmieli i trzmielców (Bombinae, Apoidae, Hymenoptera) na łąkach w wybranych parkach narodowych oraz kwiecistość łąk w tych parkach w 1998 roku. Prądnik. Prace Muzeum Szafera 11–12: 279–292.

KOWALCZYK J. K. 1996a. Bezkręgowce lądowe Ogrodu Botanicznego w Łodzi. In: KURZAC T. (ed.), Przyroda Ogrodu Botanicznego w Łodzi, pp. 141–157. Sagalara, Łódź.

KOWALCZYK J. K. 1996b. O ochronę siedlisk owadów leśnych w zieleni miejskiej Łodzi. Chrońmy Przyrodę Ojczystą 52: 106–107.

KOWALCZYK J. K. 1997. Nowe stanowiska żądłówek (Hymenoptera: Aculeata) rzadko spotykane w Polsce. Wiadomości entomologiczne 16: 53–54.

KOWALCZYK J. K. & KURZAC T. 2002. Wstępna lista wybranych rodzin błonkówek (Hymenoptera) i muchówek (Diptera) Załęczańskiego Parku Krajobrazowego. In: KUROWSKI J. K. & WITOSŁAWSKI P. (eds), Funkcjonowanie

Parków Krajobrazowych w Polsce, pp. 147–151. Katedra Geobotaniki i Ekologii Roślin, Uniwersytet Łódzki, Łódź.

KOWALCZYK J. K. & KURZAC T. 2005. Żądłówki (Hymenoptera, Aculeata) Ogrodu Botanicznego w Łodzi. Biuletyn Ogrodów Botanicznych 14: 101–113.

KOWALCZYK J. K., MAJECKI J., SOSZYŃSKI B. & ŚLIWIŃSKI Z. 1998. Świat zwierzęcy. In: KUROWSKI J. K. (ed.), Park Krajobrazowy Wzniesień Łódzkich, pp. 81–96. Wojewódzki Fundusz Ochrony Środowiska i Gospodarki Wodnej w Łodzi. Eko-Wynik, Łódź.

KOWALCZYK J. K., SZCZEPKO K., KURZAC T. & PAWLIKOWSKI T. 2004. Pszczoły (Hymenoptera, Apoidea) Ogrodu Botanicznego w Łodzi. In: Indykiewicz P. & Barczak T. (eds), Fauna miast Europy Środkowej 21. wieku, pp. 67–82. Wyd. LOGO, Bydgoszcz.

KOWALCZYK J. K. & ŚLIWIŃSKI Z. 1988. Uwagi o entomofaunie lądowej Świętokrzyskiego Parku Narodowego. Parki Narodowe i Rezerwaty Przyrody 8: 33–39.

KOWALCZYK J. K. & WATAŁA C. 1987. Interesujące gatunki żądłówek (Hymenoptera, Aculeata) na Wyżynie Łódzkiej. Przegląd Zoologiczny 31: 59–62.

KOWALCZYK J. K. & WATAŁA C. 1990. Przyczynek do poznania entomofauny projektowanego Suchedniowsko-Oblęgorskiego Parku Krajobrazowego. Rocznik Świętokrzyski, Kielce, 17: 173–180.

ŁOZIŃSKI J. 1920. Błonkówki pszczołowate okolic Krakowa. Sprawozdania Komisji Fizjograficznej 53/54: 125–135.

OSYTSHNJUK A. Z., ROMASENKO L., BANASZAK J. & CIERZNIAK T. 2005. Andreninae of the Central and Eastern Palaearctic. Part 1. Polish Entomological Monographs, 2. Polish Entomological Society, Poznań-Bydgoszcz, 235 pp.

PESENKO Yu., BANASZAK J., RADCHENKO V.G. & CIERZNIAK T. 2000. Bees of the family Halictidae (excluding *Sphecodes*) of Poland: taxonomy, ecology, bionomics. Wydawnictwa Uczelniane Wyższej Szkoły Pedagogicznej w Bydgoszczy, Bydgoszcz, 348 pp.

RUSZKOWSKI A., BILIŃSKI M., KOSIOR A., BĄK J. & KACZMARSKA K. 1989. Trzmiele Wyżyny Małopolskiej. Pszczelnicze Zeszyty Naukowe, Puławy, 33: 55–76.

SZCZEPKO K., KOWALCZYK J. K. & NADOLSKI J. 2004. Stan poznania oraz próba wstępnej waloryzacji żądłówek (Hymenoptera, Aculeata) Łodzi. In: INDYKIEWICZ P. & BARCZAK T. (eds), Fauna miast Europy Środkowej 21. wieku, pp. 49–65. Logo, Bydgoszcz.

SZCZEPKO K., PAWLIKOWSKI T. & KOWALCZYK J. K. 2002. Apoidea (Hymenoptera) in habitats of former agriculture area in renaturalization stage of Kampinos National Park (Poland). Fragmenta Faunistica 45: 115–122.

ZARĘBA R. 1981. Puszcze, bory i lasy Polski. PWRiL, Warszawa, 187 pp.

STRESZCZENIE

[**Materiały do znajomości pszczół środkowej Polski (Hymenoptera: Apoidea: Apiformes)**]

Praca wypełnia poważną lukę w poznaniu fauny pszczół Apiformes Polski, jaką stanowiła centralna część kraju. Ogółem wykazano 233 gatunki Apiformes, z tej liczby z Wyżyny Małopolskiej (głównie Wzniesienia Łódzkie) – 218 gatunków, z Gór Świętokrzyskich – 89 i z Doliny Wisły pod Płockiem – 49 gatunków.

Do najliczniejszych gatunków Wzniesień Łódzkich należały *Heriades truncorum* (4,3%) i *Hylaeus communis* (2,7%), natomiast w Górach Świętokrzyskich dominują ilościowo trzmiele i ich pasożyty: *Bombus lucorum* (4,2%) i *Psithyrus bohemicus* (6,8%). Tam też liczne były: *Bombus pascuorum* (3,7%), *B. lapidarius* (4%) i *Psithyrus campestris* (2,4%).

W omawianym materiale 71 gatunków (ponad 30%) to taksony rzadkie. Spośród nich na szczególną uwagę zasługują: *Hyaleus gredleri, Andrena suerinensis, Lasioglossum prasinum, Evylaeus limbellus, E. semilucens, E. tarsatus, Osmia mustelina, O. uncinata, Anthophora plagiata* i *Thyreus histrionicus.* Do gatunków lokalnie rzadkich w ostatnich latach należy *Andrena vaga, A. fucata, A. helvola, A. humilis, A. ventralis* i *Evylaeus villosulus*.

Accepted: 15 February 2007