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Occurrence and distribution of the subgenus *Bombus* LATREILLE sensu stricto in Poland (*Hymenoptera, Apoidea*)

Występowanie i rozmieszczenie trzmieli z podrodzaju *Bombus* LATREILLE s. str. w Polsce

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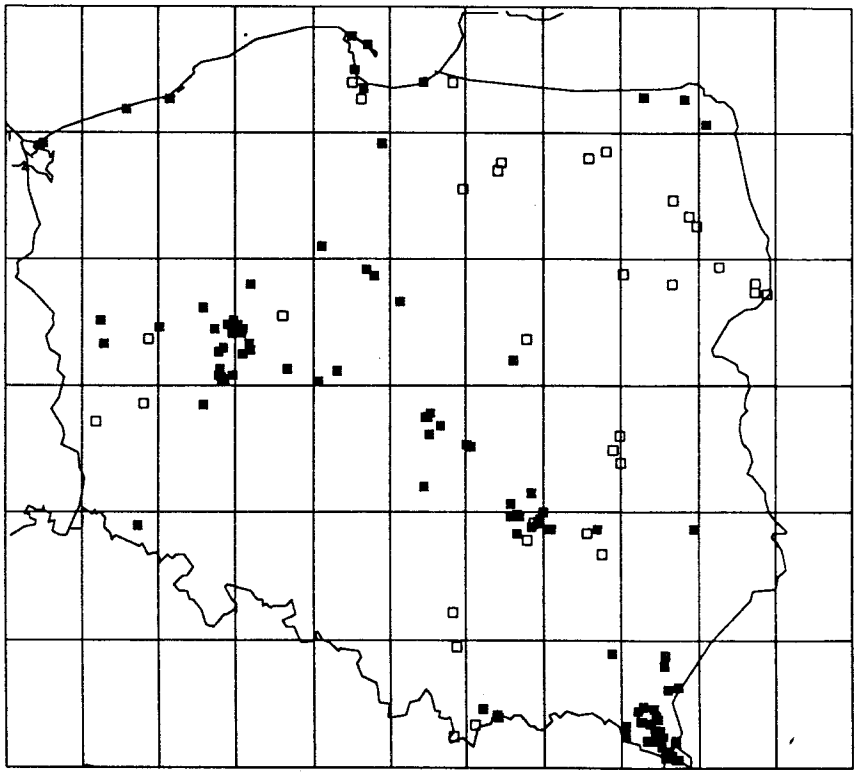
ABSTRACT. Occurrence of 4 species of the subgenus *Bombus* LATREILLE s. str. is confirmed: *Bombus lucorum* (L.), *B. terrestris*, *B. cryptarum* (FABRICIUS) and *B. magnus* VOGT; maps of their distribution in Poland and variations of their relative number are provided. Two most abundant species, *B. lucorum* and *B. terrestris*, appear in the entire country, though *B. lucorum* is more frequent in highland and submontane areas where its proportion is 62.5% and 83.6%, respectively, while in N. Poland *B. terrestris* is the dominant (79.1%). The proportion of *B. cryptarum* in the analysed material is 14.3%, and that of *B. magnus* in² very low - only 2.0%. It is noteworthy that the proportion of *B. cryptarum* (24.7%) in NE Poland (Białystok - Suwałki) is quite high in contrast to its very low occurence in the highlands, sub-montane and mountain regions.

INTRODUCTION

Till the publications of KRÜGER (1951, 1954, 1956, 1958) only two species of the subgenus *Bombus* LATREILLE sensu stricto (= *Terrestribombus* VOGT, 1911): *Bombus terrestris* auct. (nec L., 1758) and *B. lucorum* (L., 1761) were known in Western and Central Europe.

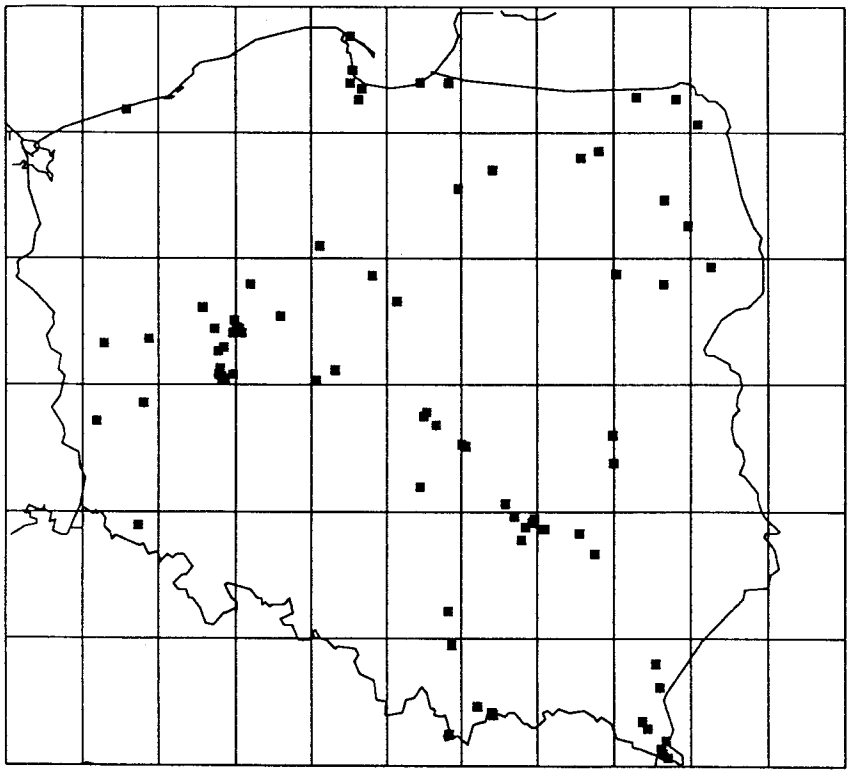
KRÜGER considered *B. magnus* VOGT, 1911, as a good species. However, though many authors agreed on the status of the third species (LØKEN 1973; REINIG 1973, 1976, 1981; ALFORD 1975; DELMAS 1976) others expressed a different opinion (ELFVING 1960) or contested its validity (PEKKARINEN 1979). Thus *B. magnus* has always been a critical taxon. As far as the nomenclature problems pointed out by DAY (1979) are concerned this species will only deteriorate the already confused situation in this taxonomic group.

Soon, the considerations on the three main representatives of "*Terrestribombus*" in Europe, were complicated by the issue of possible existence of a fourth species - *Bombus cryptarum* FABRICIUS, 1775 (= *B. lucocryptarum* BALL, 1914; RASMONT, 1981). Eventually, based on morphological and zoogeographical analysis (RASMONT 1981a, b, 1984), attempts at crossbreeding the species (DE JONGHE 1982, DE JONGHE and RASMONT 1983) and analysing enzymes (SCHOLL and OBRECHT 1983, OBRECHT and SCHOLL 1984) it was found, that in Western and



1. Summary of distribution data on subgenus *Bombus* LATREILLE s. str. in Poland. Data from J. BANASZAK (solid squares) - 733 individuals; data from P. RASMONT (empty squares) - 362 ind.

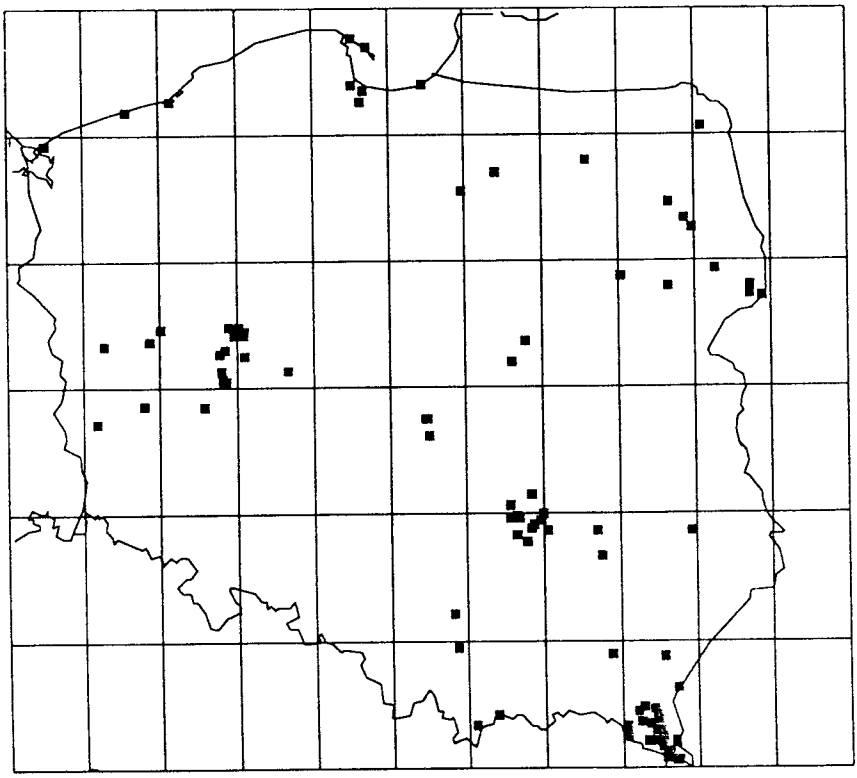
Central Europe, four *Terrestribombus* species coexistet: *Bombus terrestris* auct., *B. lucorum* (L., 1761), *B. cryptarum* (FABRICIUS, 1775), and *B. magnus* VOGT, 1911. Accordingly, they were all redescribed and new characteristics are provided and illustrated to permit a safe determination of queens, workers (RASMONT 1984) and males (RASMONT et al. 1986). In a recent study SCHOLL et. (1990, 1992 ab) investigated phyletic relationships of Nearctic and Palaearctic representatives of the subgenus *Bombus* s. str. with the enzyme electrophoretic data and, until now, confirmed as distinct as many as 11 species: *Bombus franklini* (FRISON), *B. cryptarum* (FABR.), *B. magnus* VOGT, *B. moderatus* CRESSON, *B. hypocrita* PÉREZ, *B. occidentalis* GREENE, *B. terricola* KIRBY, *B. lucorum* (L.), *B. terrestris* auct., *B. affinis* CRESSON and *B. sporadicus* NYLANDER. TENGÖ et al. (1991) found recently new chemical characters to distinguish these three species and *B. terrestris* auct., providing new evidence for their specific status. Only WILLIAMS (1991) still considers *B. magnus* VOGT, *B. cryptarum* (FABRICIUS) and *B. lucorum* (L.) as conspecific.



2. Distribution of *Bombus terrestris* auct. in Poland. 169 data about 410 specimens

In Poland till the mid 80s, and, practically, till the beginning of the 90s only two *Terrestribombus* species were known - *B. terrestris* auct. and *B. lucorum* (L.) - which were not always discerned (RUSZKOWSKI 1971, RUSZKOWSKI et al. 1992). Some researchers believe that those two bumblebees are probably not two separate species but only two subspecies which differ with respect to their biology and ecology and which are difficult to cross breed (RUSZKOWSKI et al. 1992).

Some information on the possible occurrence of *B. magnus* VOGT in Poland comes from the work of LOKEN (1973) later confirmed by RASMONT (1984), PAWLIKOWSKI (1985), and BANASZAK (1991). First some data on the occurence of *B. cryptarum* (FABR.) in Poland can be found in the publication by RASMONT (1984). BANASZAK (1993), mainly on the basis of RASMONT's (1984, RASMONT et al. 1986) studies and his own research on these species carried out in Mons (Belgium) described their morphology and presented keys for their determination in his monograph of Polish bumblebees.



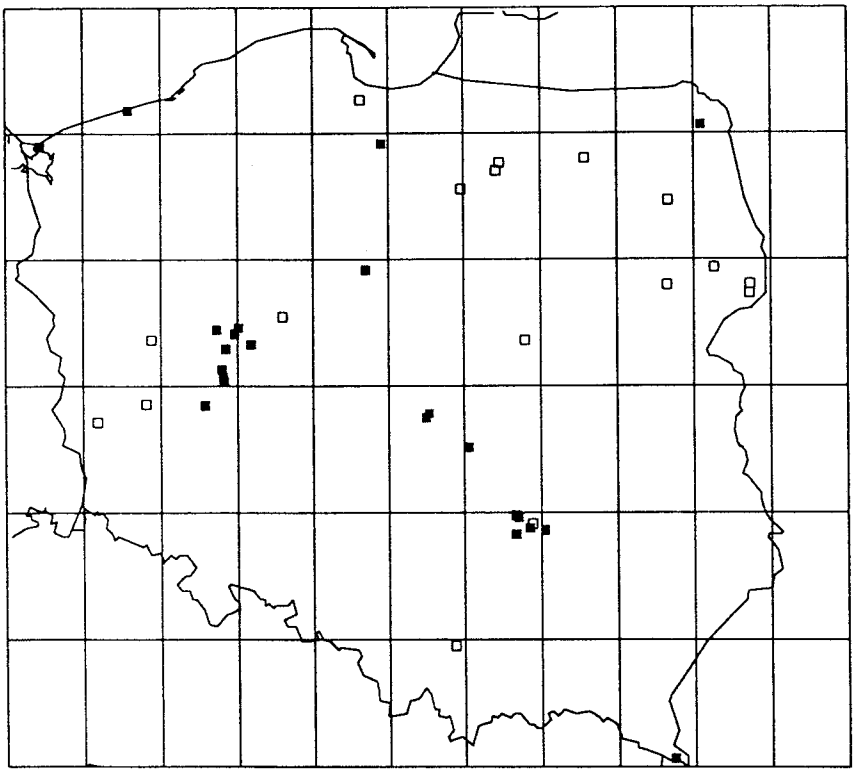
3. Distribution of *Bombus lucorum* (L.) in Poland. 217 data about 523 specimens

MATERIAL AND METHODS

733 specimens of males and females were identified which came from different parts of Poland, mainly from the Wigry National Park, Wielkopolsko-Kujawska Lowland, from Łódź Highland and Świętokrzyski National Park, and from the Bieszczady Mts. though some material came from the Baltic Coast and SE Poland (vicinity of Jarosław, Pieniny Mts.). Considerable part of the material was earlier identified as *Bombus lucorum* (L.) and *B. terrestris* auct.

Additionally, earlier data of RASMONT (1984, RASMONT et al. 1986) on 362 specimens from Poland were taken into account.

The data were processed with the software Microbanque Faune-Flore (RASMONT et al. 1993). They are included in the Gembloux and Mons Faunistic Data Bank.

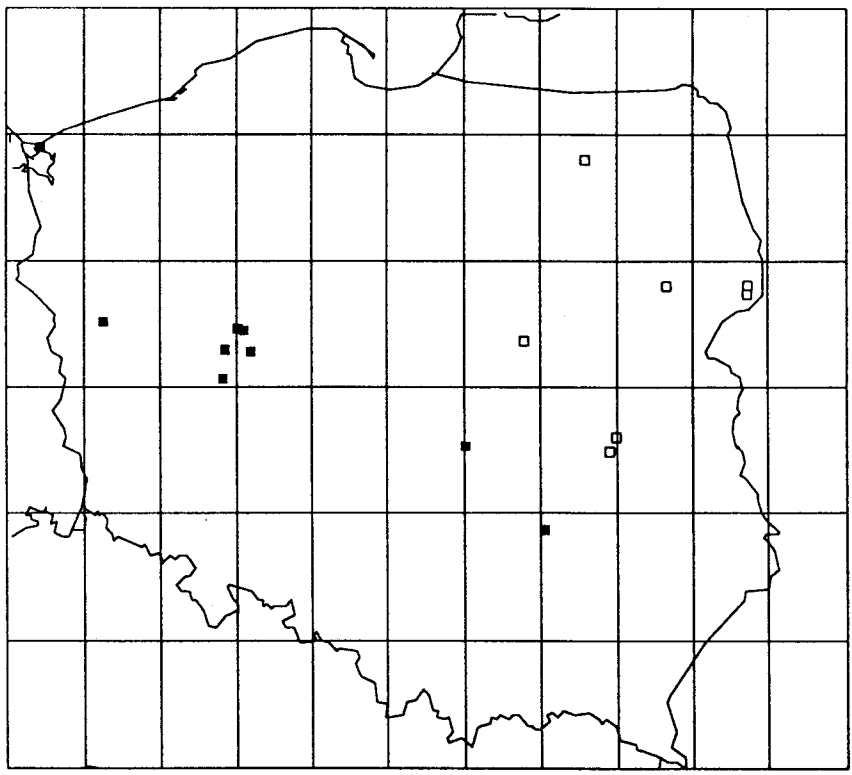


4. Distribution of *Bombus cryptarum* (FABRICIUS) in Poland. Hollow squares: data from RASMONT (1984): solid squares: new data. 89 data about 160 specimens

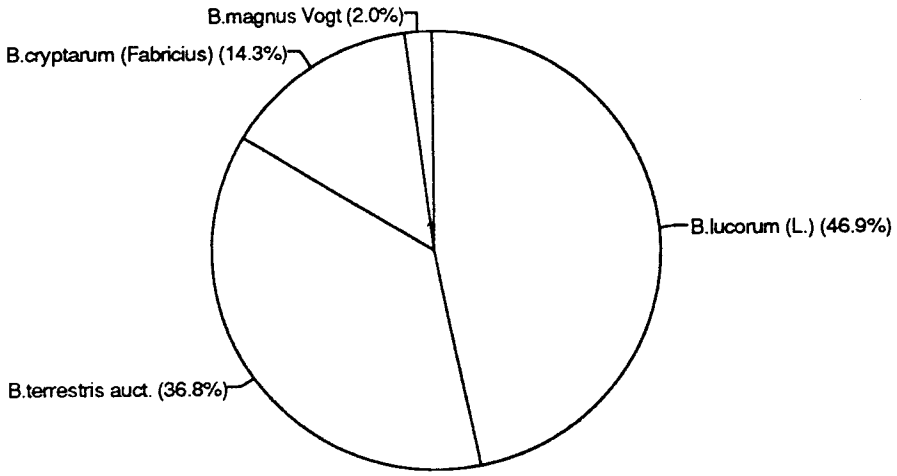
DISTRIBUTION OF "*TERRESTRIBOMBUS*" IN POLAND

Table 1 presents all so far recognized localities of *Bombus magnus* VOGT and *B. cryptarum* (FABR.) as well as the sites of correctly identified *B. lucorum* (L.) and *B. terrestris* auct. Distribution of each species in Poland is given in Fig. 1.

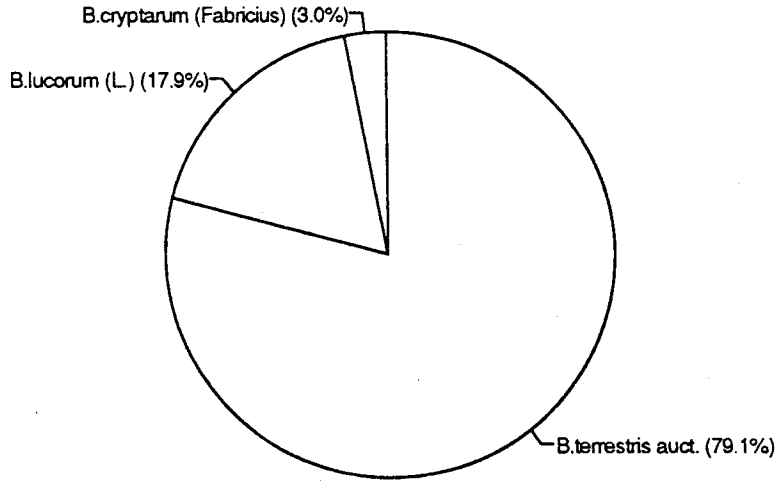
The distribution of the four taxa seems not to be regular in Poland. *Bombus terrestris* auct. and *B. lucorum* (L.) appear to be more evenly distributed on the territory. However, *B. lucorum* (L.) seems to be more abundant than *B. terrestris* auct. in the Bieszczady (Fig. 2-3). *Bombus cryptarum* (FABR.) and *B. magnus* VOGT are distributed nearly along the coast, especially in the Gdańsk region (Fig. 4-5). It can be supposed that, as both species inhabit wild heath areas, the industrialization and the agriculture are too intense in the Gdańsk



5. Distribution of *Bombus magnus* VOGT in Poland. Hollow squares: data from RASMONT (1984); solid squares: new data. 18 data about 22 specimens

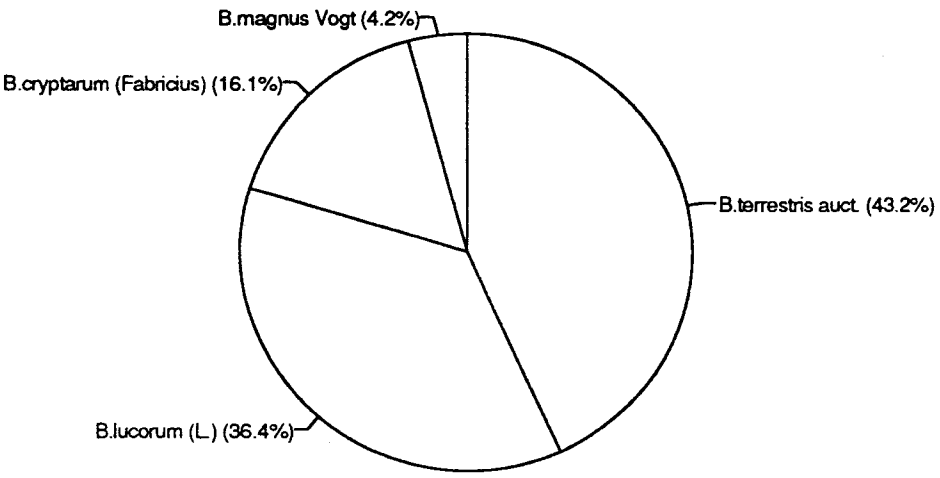


6. Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: summary of the studied material (1115 specimens)



7. Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: region of Gdańsk + Elbląg (67 specimens)

region to permit survival of this species. *Bombus cryptarum* (FABR.) seems absent from the Tatra (Zakopane region) and very rare in the Bieszczady Mts. *Bombus magnus* VOGT appears to be to totaliy absent from the Tatra and Bieszczady Mts and very rare in the Świętokrzyskie Mts.



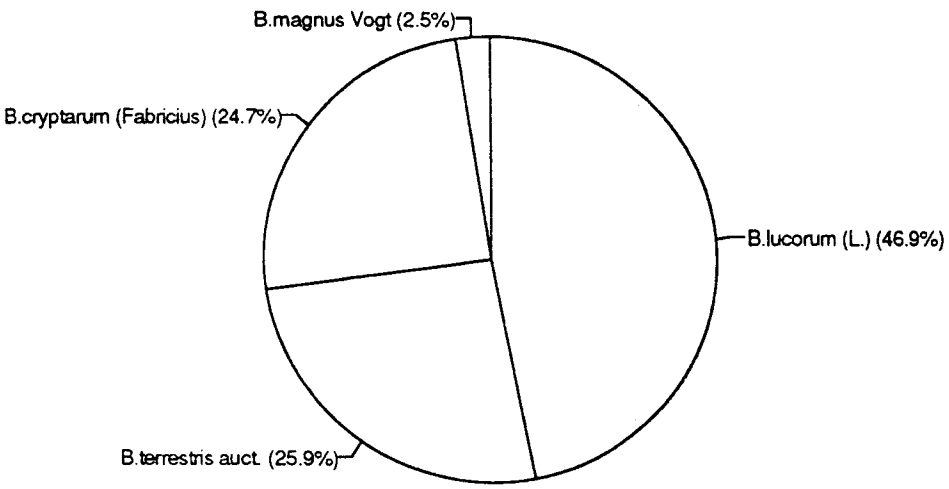
8. Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: region of Poznań (118 specimens)

ESTIMATE OF RELATIVE ABUNDANCE OF *BOMBUS SENSU* STRICTO IN POLAND

In the studied material (1115 specimens) the most numerous species was *Bombus lucorum* (L.) constituting 46.9% while *B. terrestris* auct. was represented by 36.8% specimens (Fig. 6). Both species are listed by Polish apidologists among the most frequently encountered bumblebees of the country (DYLEWSKA 1957, BANASZAK 1976, 1993, RUSZKOWSKI et al. 1992).

Among 18 bumblebee species foraging on red clover the most numerous were *B. terrestris* auct. and *B. lucorum* (L.) - totally 50% (BILIŃSKI, SOWA, KOSIOR 1992) particularly in the western part of Poland (RUSZKOWSKI et al. 1992). *Bombus terrestris* auct. and *B. lucorum* (L.) were treated as conspecific while *B. cryptarum* and *B. magnus* was totally ignored by these authors. Some ecological information on *B. terrestris* and *B. lucorum* was also given by these authors but, with the present revision, they have to be entirely revised.

Bombus cryptarum (FABR.) constituted 14.3% of analysed material. This species is associated with forest areas which is indicated also by its main forage plants - *Vaccinium myrtillus* and *Calluna vulgaris* (RASMONT 1988). In our material also the majority of specimens was collected in forest areas though some small part was caught in the agricultural landscape of the Poznań region on alfalfa and sunflower crops (Tab. 2).

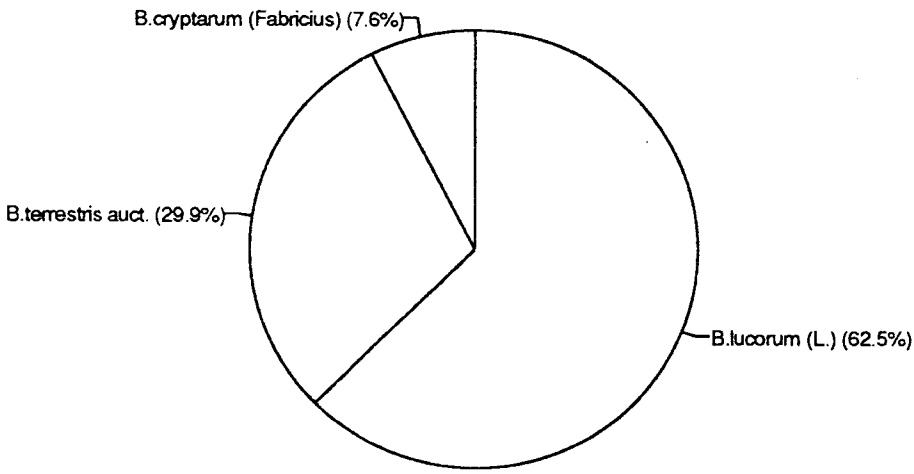


9. Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: region of Białystok + Suwałki (324 specimens)

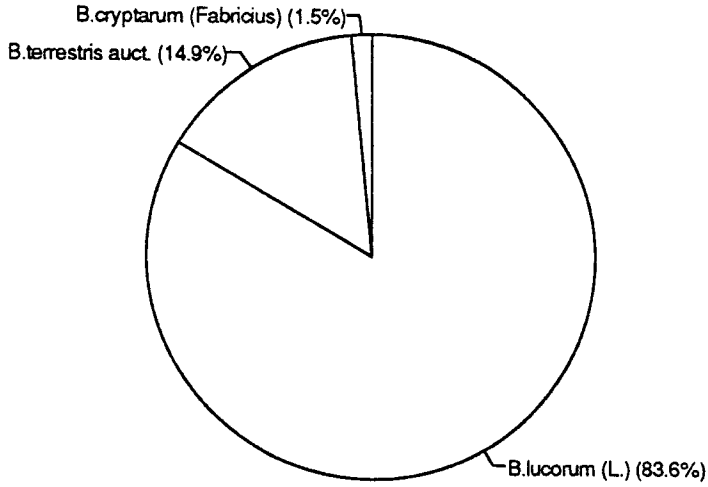
Bombus magnus is the less frequent species; in the investigated material we found only 22 specimens (2.0%). The species is associated with plant communities rich in *Calluna vulgaris* and *Erica* spp. (RASMONT 1988).

Considering sample regions (Fig. 7-11), more information becomes ovailable. In the most industrial studied regions Gdańsk end Elbląg, *B. terrestris* auct. is the main species and *B. magnus* VOGT is absent. The region of Poznań seems representative of the mean population structure of the whole Poland: nearly 50% *B. lucorum* (L.), ca. 40% *B. terrestris* auct., 15% *B. cryptarum* (FABR.), and < 5% *B. magnus* VOGT. The most eastern region of Białystok and Suwałki (forest and lakes) is characterized by a large proportion of *B. cryptarum* (FABR.) - ca. 25%. The highland and sub-montane regions of Kielce and Krosno are both characterized by a complete absence of *B. magnus* VOGT, scarcity of *B. cryptarum* (FABR.) and relative scarcity of *B. terrestris* auct. These particularities seem more marked in the Krosno region with more than 80% *B. lucorum* (L.).

The progressive replacement of *B. terrestris* auct. by *B. lucorum* (L.) with increasing altitude is a general observation in Europe (LOKEN 1973, RASMONT 1988). The most astounding observation is the apparent decrease of populations of *B. cryptarum* (FABR.) with altitude while SCHOLL and OBRECHT (1983) and RASMONT (1988) observe that at high altitudes, *B. cryptarum* (FABR.) replaces *B. lucorum* (L.). In



10. Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: region of Kielce (258 specimens)



11. Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: region of Krosno (67 specimens)

Poland the situation is the opposite. However, the observations of these authors were made in South Europe (respectively Switzerland and southern France) and concern the southern light subspecies *B. cryptarum reinigianus* RASMONT. In Poland there occurs the typical dark form *B. cryptarum* (FABR.). It is possible that the climatic requirements of the two forms diverge significantly.

Table 1.
Bumblebees of the subgenus *Bombus Latreille* s. str. of Poland: summary of localities

UTM	Locality	Province		N ind.	Occ	%n ind.	% occ
		Bombus terrestris					
FE30	Kozince	W. Białystok		1	1	0,09	0,02
FE12	Osowiec		25 spec.	15	2	1,36	0,40
FD56	Ryboły			7	2	0,63	0,40
FD15	Wyliny Rus.			2	1	0,18	0,20
CD08	Legnowo			1	1	0,09	0,20
DF22	Braniewo	W. Elbląg		3	1	0,27	0,20
CF92	Krynica Morska			1	1	0,09	0,20
CF47	Chałupy	W. Gdańsk		1	1	0,09	0,20
CF42	Gdańsk		3 spec.	2	1	0,18	0,20
CF44	Gdynia			1	1	0,09	0,20
CF44	Jelitkowo			1	1	0,09	0,20
CF33	Oliwa			20	2	1,82	0,30
CF41	Pruszcz Gdański			24	2	2,19	0,40
WU50	Trzciel	W. Gorzów Wlkp.	2	1	0,18	0,20	
WS53	Jelenia Góra	W. Jelenia Góra	1	1	0,09	0,20	
DB94	Bodzentyn	W. Kielce		2	1	0,18	0,20
DB94	Celiny			1	1	0,09	0,20
EB03	Chełmowa Góra			1	1	0,09	0,20
EB03	Dutkowo			1	1	0,09	0,20
EB33	Koszyce		75 spec.	1	1	0,09	0,20
DB83	Pogorzele			46	1	4,20	0,20
EB51	Sandomierz			3	2	0,27	0,40
EB03	Świętokrzyski N.P.		15	9	1,36	1,82	
DB82	Góry Świętokrzyskie		2	1	0,18	0,20	
DB75	Szalas			2	2	0,18	0,40
DB74	Zachełmie			1	1	0,09	0,20
BC96	Grodziec	W. Konin		2	1	0,18	0,20
CC17	Kępina			2	1	0,18	0,20
WA30	Kołobrzeg	W. Koszalin		1	1	0,09	0,20
DV15	Kirowa Woda	W. Nowy Sącz		4	1	0,36	0,20
DA16	Ojców	W. Kraków		9	1	0,82	0,20
EV96	Bereźnica Wyżna	W. Krosno		1	1	0,09	0,20
FV23	Bieszczady			2	1	0,18	0,20
FV25	Bieszczady		10 spec.	2	1	0,18	0,20
FV14	Połonina Caryńska			1	1	0,09	0,20
FV06	Terka			2	1	0,18	0,20
FV23	Ustrzyki Górne			2	1	0,18	0,20
XT25	Łuszkowo	W. Leszno		1	1	0,09	0,20
XT26	Rabin			1	1	0,09	0,20
XT26	Rogaczewo			4	4	0,36	0,81
XT27	Turew			31	24	2,83	4,87
DC02	Bukowiec	W. Łódź		1	1	0,09	0,20
CC93	Łódź			1	1	0,09	0,20
CC93	Stoki			1	1	0,09	0,20
EB69	Parchatka	W. Lublin		3	2	0,27	0,40

DV47	Dębno	W. Nowy Sącz		1	1	0,09	0,20
DV57	Sromowce Niżne			1	1	0,09	0,20
DV57	Wąwóz Sobczański			1	1	0,09	0,20
DE65	Dórotowo	W. Olsztyn		7	1	0,63	0,20
DE33	Dylewska Góra			15	2	1,36	0,40
DC30	Białobrzegi	W. Piotrków Trybun.		1	1	0,09	0,20
CB97	Putowice			1	1	0,09	0,20
DC30	Tomaszów			1	1	0,09	0,20
XT27	Borowo	W. Poznań		10	3	0,91	0,60
XT27	Golebin	W. Poznań		2	2	0,18	0,40
XU31	Kicin	W. Poznań		2	2	0,18	0,40
XU31	Mechowo	W. Poznań		1	1	0,09	0,20
XT37	Nochowo	W. Poznań		1	1	0,09	0,20
XU32	Owińska	W. Poznań	51 spec.	1	1	0,09	0,20
XU30	Poznań	W. Poznań		2	2	0,18	0,40
XU11	Sady	W. Poznań		1	1	0,09	0,20
XU40	Swarzędz	W. Poznań		1	1	0,09	0,20
XU03	Szamotuły	W. Poznań		1	1	0,09	0,20
XU45	Wągrowiec	W. Poznań		2	2	0,18	0,40
XT29	Wielkopolski N.P.	W. Poznań		17	9	1,55	1,82
XU31	Wierzenica	W. Poznań		4	4	0,36	0,81
FA11	Krywcza	W. Przemyśl		1	1	0,09	0,20
FV19	Reczpol	W. Przemyśl		1	1	0,09	0,20
FV14	Połonina Caryńska	W. Krosno		3	1	0,27	0,20
EE56	Drozdowo	W. Suwałki		3	1	0,27	0,20
FF11	Hańcza	W. Suwałki		1	1	0,09	0,20
EE36	Mikołajki	W. Suwałki	59 spec.	16	2	1,46	0,40
EF81	Szeskie	W. Suwałki		2	1	0,18	0,20
FE39	Wigry	W. Suwałki		37	25	3,37	5,08
CD73	Kulin	W. Toruń		1	1	0,09	0,20
EC61	Moszczanka	W. Warszawa		4	1	0,36	0,20
ED65	Prosienica	W. Warszawa		4	2	0,36	0,40
CD55	Ciechocinek	W. Włocławek		2	1	0,18	0,20
WT12	Bieniów	W. Zielona Góra	6	1	0,54	0,20	
WT19	Łagów	W. Zielona Góra	1	1	0,09	0,20	
WT54	Lipiny	W. Zielona Góra	1	1	0,09	0,20	

Bombus lucorum

VF07	Solina	W. Białystok		1	1	0,09	0,20
FD94	Białowieża	W. Białystok		1	1	0,09	0,20
FD84	Budy	W. Białystok		12	2	1,09	0,40
FD85	Czerlonka	W. Białystok		7	3	0,63	0,60
FE21	Knyszyn	W. Białystok	39 spec.	6	2	0,54	0,40
FE30	Kozince	W. Białystok		2	1	0,18	0,20
FE12	Osowiec	W. Białystok		2	2	0,18	0,40
FD56	Ryboły	W. Białystok		3	1	0,27	0,20
FD15	Wyliny Rus.	W. Białystok		6	1	0,54	0,20
CF92	Krynica Morska	W. Elbląg		2	1	0,18	0,20
CF47	Chałupy	W. Gdańsk		1	1	0,09	0,20
CF42	Gdańsk	W. Gdańsk	12 spec.	2	1	0,18	0,20
CF56	Jurata	W. Gdańsk		1	1	0,09	0,20

CF33	Oliwa	W. Gdańsk		3	2	0,27	0,40
CF41	Pruszcz Gdański	W. Gdańsk		3	1	0,27	0,20
WU50	Trzciel	W. Gorzów Wlkp.	2	1	0,18	0,20	
DB94	Bodzentyn	W. Kielce		5	2	0,45	0,40
EB03	Chełmowa Góra	W. Kielce		2	1	0,18	0,20
EB04	Jasiów	W. Kielce		1	1	0,09	0,20
DB74	Kaniów	W. Kielce		1	1	0,09	0,20
DB73	Kielce	W. Kielce		21	2	1,91	0,40
DB83	Krajno	W. Kielce	157 spec.	5	3	0,45	0,60
DB86	Pogorzela	W. Kielce		2	1	0,18	0,20
EB51	Sandomierz	W. Kielce		1	1	0,09	0,20
DB94	Święta Katarzyna	W. Kielce		13	1	1,18	0,20
EB03	Świętokrzyski N.P.	W. Kielce		87	11	7,94	2,23
DB82	Góry Świętokrzyskie	W. Kielce		6	1	0,54	0,20
DB75	Szałas	W. Kielce		11	1	1,00	0,20
DB74	Tumlin	W. Kielce		1	1	0,09	0,20
DB74	Zachelnie	W. Kielce		1	1	0,09	0,20
WA30	Kołobrzeg	W. Koszalin		1	1	0,09	0,20
WA71	Sarbinowo	W. Koszalin		1	1	0,09	0,20
DA13	Mogilany	W. Kraków		2	2	0,18	0,40
DA16	Ojców	W. Kraków		6	1	0,54	0,20
DV36	Polana Głodówka	W. Kraków		7	1	0,53	0,20
EV96	Bereźnica Wyżna	W. Krosno		3	1	0,27	0,20
FV23	Bieszczady	W. Krosno		19	1	1,73	0,20
FV07	Bóbrka	W. Krosno		1	1	0,09	0,20
EV95	Cisna	W. Krosno		3	1	0,27	0,20
EV87	Czaszyn	W. Krosno		2	1	0,18	0,20
EV25	Dolina Wołosatego	W. Krosno		1	1	0,09	0,20
FV15	Hnatowe Berdo	W. Krosno		1	1	0,09	0,20
FV05	Kalnica	W. Krosno	56 spec.	4	1	0,36	0,20
EV96	Kielczawa	W. Krosno		2	1	0,18	0,20
EV76	Kamańcza	W. Krosno		2	1	0,18	0,20
FV13	Krzemieniec	W. Krosno		5	1	0,45	0,20
EV75	Łupków	W. Krosno		1	1	0,09	0,20
EV96	Mchawka	W. Krosno		1	1	0,09	0,20
FV06	Moczarne	W. Krosno		1	1	0,09	0,20
FV29	Nowosiółki	W. Krosno		1	1	0,09	0,20
EA62	Połomia	W. Krosno		1	1	0,09	0,20
FV14	Połonina Wetlińska	W. Krosno		1	1	0,09	0,20
EV76	Radoszyce	W. Krosno		1	1	0,09	0,20
FV14	Rozsypaniec	W. Krosno		1	1	0,09	0,20
FV06	Smerek	W. Krosno		3	2	0,27	0,40
FV06	Terka	W. Krosno		1	1	0,09	0,20
EV98	Wielopole	W. Krosno		1	1	0,09	0,20
XT04	Henryków	W. Leszno		2	1	0,18	0,20
XT26	Rabin	W. Leszno		2	2	0,18	0,40
ST26	Rogaczewo	W. Leszno		2	2	0,18	0,40
XT27	Turew	W. Leszno		4	4	0,36	0,81
CC93	Łódź	W. Łódź		3	3	0,27	0,60
DV57	Wąwóz Sobczański	W. Nowy Sącz		2	1	0,18	0,20
DE65	Dórotowo	W. Olsztyn		11	2	1,00	0,40

DE33	Dylewska Góra	W. Olsztyn		16	2	1,46	0,40
CC91	Poddębina	W. Piotrków Tryb.	1	1	0,09	0,20	
XT27	Borowo	W. Poznań		2	2	0,18	0,40
XU31	Dziewicza	W. Poznań		3	2	0,27	0,40
XU21	Goramoraska	W. Poznań		1	1	0,09	0,20
XU31	Janikowo	W. Poznań		1	1	0,09	0,20
WU61	Kicin	W. Poznań		1	1	0,09	0,20
XU31	Kicin	W. Poznań	43 spec.	1	1	0,09	0,20
XU41	Kobylnica	W. Poznań		8	3	0,73	0,60
XT49	Kórnik	W. Poznań		1	1	0,09	0,20
XU31	Mechowo	W. Poznań		2	2	0,18	0,40
XT87	Modlica	W. Poznań		1	1	0,09	0,20
XU30	Poznań	W. Poznań		1	1	0,09	0,20
XU40	Swarzędz	W. Poznań		1	1	0,09	0,20
XT29	Wielkopolski	W. Poznań		17	17	1,55	3,45
XU31	Wierzenica	W. Poznań		3	2	0,27	0,40
FA12	Węgierka	W. Przemyśl		2	2	0,18	0,40
FV14	Połonina Caryńska	W. Rzeszów		4	3	0,36	0,60
FV25	Smolnik	W. Rzeszów		1	1	0,09	0,20
FV23	Tarnica	W. Rzeszów		3	1	0,27	0,20
FV08	Uherce	W. Rzeszów		1	1	0,09	0,20
EE36	Mikołajki	W. Suwałki	113 spec.	5	1	0,45	0,20
FE39	Wigry	W. Suwałki		108	58	9,86	11,78
VV67	Wolin	W. Szczecin		11	9	1,00	1,82
DC78	Błonie	W. Warsaw		1	1	0,09	0,20
DD80	Palmiry	W. Warsaw		1	1	0,09	0,20
ED65	Prosienica	W. Warsaw		2	1	0,18	0,20
FB33	Nierzbica	W. Zamość		2	1	0,18	0,20
WT12	Bieniów	W. Zielona Góra		6	1	0,54	0,20
WT19	Łagów	W. Zielona Góra		2	2	0,18	0,40
WT54	Lipiny	W. Zielona Góra		4	1	0,36	0,20
		Bombus cryptarum					
FD84	Budy	W. Białystok		6	2	0,54	0,40
FD85	Czerlonka	W. Białystok		6	4	0,54	0,81
FE12	Osowiec	W. Białystok	18 spec.	1	1	0,09	0,20
FD56	Ryboły	W. Białystok		2	1	0,18	0,20
FD15	Wyliny Rus.	W. Białystok		3	1	0,27	0,20
CE67	Biała Góra	W. Elbląg	2 spec.	1	1	0,09	0,20
XF41	Pruszcz Gdański	W. Gdańsk		1	1	0,09	0,20
WU50	Trzciel	W. Gorzów Wlkp.	5	1	0,45	0,20	
DB74	Kaniów	W. Kielce		1	1	0,09	0,20
DB73	Kielce	W. Kielce		1	1	0,09	0,20
DB83	Pogorzele	W. Kielce	19 spec.	6	1	0,54	0,20
DB94	Święta Katarzyna	W. Kielce		1	1	0,09	0,20
EB03	Świętokrzyski N.P.	W. Kielce		9	6	0,82	1,21
DB74	Zachelnie	W. Kielce		1	1	0,09	0,20
WA30	Kołobrzeg	W. Koszalin		1	1	0,09	0,20
DA13	Mogilany	W. Kraków		1	1	0,09	0,20
FV23	Krzemień	W. Krosno	1 spec	1	1	0,09	0,20
XT04	Henrykowo	W. Leszno		2	1	0,18	0,20

XT26	Rogaczewo	W. Leszno		4	3	0,36	0,60
XT27	Turew	W. Leszno		1	1	0,09	0,20
CC93	Łódź	W. Łódź		1	1	0,09	0,10
CC93	Stoki	W. Łódź		1	1	0,09	0,20
DE65	Dorotowo	W. Olsztyn		4	1	0,36	0,20
DE33	Dylewska Góra	W. Olsztyn		3	1	0,27	0,20
DE65	Kortowo	W. Olsztyn		1	1	0,09	0,20
DC30	Białobrzegi	W. Piotrków Trybun.		6	3	0,54	0,60
XT27	Borowo	W. Poznań		1	1	0,09	0,20
XU72	Gniezno	W. Poznań		2	1	0,18	0,20
XU31	Kicin	W. Poznań		1	1	0,09	0,20
XU40	Kleszczewo	W. Poznań		4	2	0,36	0,40
XU30	Poznań	W. Poznań	19 spec.	2	2	0,18	0,40
XU11	Sady	W. Poznań		1	1	0,09	0,20
XT29	Wielkopolski NP	W. Poznań		4	4	0,36	0,81
XU31	Wierzenica	W. Poznań		4	4	0,36	0,81
EE36	Mikołajki	W. Suwałki	62 spec.	22	3	2,00	0,60
FE39	Wigry	W. Suwałki		40	26	3,65	5,28
VV67	Wolin	W. Szczęcin		1	1	0,09	0,20
CD46	Otloczyn	W. Toruń		1	1	0,09	0,20
DD80	Palmiry	W. Warszawa		1	1	0,09	0,20
WT12	Bieniów	W. Zielona Góra	1	1	0,09	0,20	
WT54	Lipiny	W. Zielona Góra	5	1	0,45	0,20	
		Bombus magnus					
FD84	Budy	W. Białystok		1	1	0,09	0,20
FD85	Czerlonka	W. Białystok	6 spec.	2	2	0,18	0,40
FD15	Wyliny Rus.	W. Białystok		4	1	0,36	0,20
WU11	Lubniewice	W. Gorzów Wlkp.	1	1	0,09	0,20	
EB03	Chelmowa Góra	W. Kielce	1 spec.	1	1	0,09	0,20
XT27	Turew	W. Leszno		1	1	0,09	0,20
EC60	Golab	W. Lublin		1	1	0,09	0,20
DC30	Tomaszów	W. Piotrków Trybun.	1	1	0,09	0,20	
XU31	Kicin	W. Poznań		2	2	0,18	0,40
XU41	Kobylnica	W. Poznań	5 spec.	1	1	0,09	0,20
XT59	Krerowo	W. Poznań		1	1	0,09	0,20
XT29	Wielkopolski N.P.	W. Poznań		1	1	0,09	0,20
EE36	Mikołajki	W. Suwałki	2 spec.	2	1	0,18	0,20
VV67	Wolin	W. Szczecin		1	1	0,09	0,20
EC61	Moszczanka	W. Warszawa		1	1	0,09	0,20
DD80	Palmiry	W. Warszawa		1	1	0,09	0,20

Nombre total de spécimens (NIND): 1090
Nombre total d'occurences (OCC): 492
Nombre total de rubriques: 235

As the sampling is still incomplete in mountainous regions there are (nearly no data on Silesia and only few from the central Tatra), we cannot conclude about this Polish ecological particularity. However, the problem should be borne in mind in future acological studies.

Table 2

Bumblebees of the subgenus *Bombus* LATREILLE s. str. of Poland: summary of forage flowers

		N ind.	Occur-rence	% N ind.	% occurrence
	Bombus terrestris				
	Pas de plante observée	287	135	26,21	27,43
	Salicaceae				
031	*Salix* sp.	1	1	0,09	0,20
	Polygonaceae				
047	*Fagopyrum esculentum* MÜH.	1	1	0,09	0,20
	Brassicaceae				
068	*Brassica napus* L	3	3	0,27	0,60
	Fabaceae				
081	*Fabaceae*	37	5	3,37	1,01
081	*Lupinus luteus* L.	1	1	0,09	0,20
081	*Vicia cracca* L.	4	1	0,36	0,20
081	*Pisum* sp.	1	1	0,09	0,20
081	*Anthyllis vulneraria* L.	4	2	0,36	0,40
	Oleaceae				
139	*Syringa* sp.	1	1	0,09	0,20
	Boraginaceae				
148	*Boraginaceae*	21	3	1,91	0,60
148	*Echium vulgare* L.	4	2	0,36	0,40
148	*Anchusa officinalis* L.	9	3	0,82	0,60
	Scrophulariaceae				
154	*Linaria vulgaris* MIL.	2	2	0,18	0,40
	Asteraceae				
169	*Helianthus annuus* L.	11	4	1,00	0,81
169	*Cirsium oleraceum* (L.)	1	1	0,09	0,20
169	*Taraxacum officinale* WEB.	2	2	0,18	0,40
	Bombus lucorum				
	pas de plante observée	416	181	37,99	36,78
	Papaveraceae				
066	*Corydalis* sp.	1	1	0,09	0,20
	Brassicaceae				
068	*Brassica napus* L.	1	1	0,09	0,20
	Crassulaceae				
072	*Sedum telephium* L.	1	1	0,09	0,20
	Ribesiaceae				
077	*Ribes nigrum* L.	1	1	0,09	0,20
	Rosaceae				
080	*Rubus idaeus* L.	13	1	1,18	0,20
080	*Potentilla anserina* L.	1	1	0,09	0,20
080	*Prunus spinosa* L.	27	4	2,46	0,81
	Fabaceae				
081	*Fabaceae*	27	4	2,46	0,81
081	*Vicia* sp.	3	2	0,27	0,20
081	*Trifolium pratense* L.	15	4	1,36	0,81
081	*Lotus corniculatus* L.	1	1	0,09	0,20
081	*Anthyllis vulneraria*	2	1	0,18	0,20
	Ericaceae				
132	*Calluna vulgaris* (L.)	7	2	0,63	0,40

132	*Vaccinium myrtillus* L.	7	1	0,63	0,20
	Boraginaceae				
148	*Boraginaceae*	13	5	1,18	1,01
148	*Echium vulgare* L.	2	1	0,18	0,20
148	*Anchusa officinalis* L.	3	1	0,27	0,20
	Lamiaceae				
151	*Thymus* sp.	1	1	0,09	0,20
	Scrophulariaceae				
154	*Linaria* sp.	4	4	0,36	0,81
	Asteraceae				
169	*Helianthus annuus* L.	2	2	0,18	0,40
169	*Taraxacum officinale* WEB.	1	1	0,09	0,20

Bombus cryptarum

	pas de plante observée	105	67	9,58	13,61
	Crassulaceae				
072	*Sedum telephium* L.	1	1	0,09	0,20
	Rosaceae				
080	*Rubus idaeus* L.	1	1	0,09	0,20
	Fabaceae				
081	*Fabaceae*	26	5	2,37	1,01
081	*Medicago sativa* L.	4	2	0,36	0,40
081	*Trifolium repens* L.	1	1	0,09	0,20
081	*Trifolium pratense* L.	9	4	0,82	0,81
081	*Lotus corniculatus* L.	1	1	0,09	0,20
	Oenotheraceae				
123	*Epilobium angustifolium* L.	1	1	0,09	0,20
	Boraginaceae				
148	*Boraginaceae*	5	1	0,45	0,20
148	*Anchusa officinalis* L.	2	1	0,18	0,20
	Lamiaceae				
151	*Thymus* sp.	1	1	0,09	0,20
	Asteraceae				
169	*Helianthus annuus* L.	2	2	0,18	0,40
169	*Cirsium* sp.	1	1	0,09	0,20

Bombus magnus

	pas de plante observée	12	9	1,09	1,82
	Fabaceae				
081	*Fabaceae*	2	1	0,18	0,20
081	*Vicia gracca* L.	1	1	0,09	0,20
081	*Trifolium pratense* L.	1	1	0,09	0,20
081	*Lotus corniculatus* L.	1	1	0,09	0,20
	Ericaceae				
132	*Calluna vulgaris* (L.)	2	2	0,18	0,40
	Boraginaceae				
148	*Anchusa officinalis* L.	1	1	0,09	0,20
	Asteraceae				
169	*Helianthus annuus* L.	1	1	0,09	0,20
169	*Cichorium intybus* L.	1	1	0,09	0,20

Nombre total de specimens	(NIND)	:	1095
Nombre total d'occurences	(OCC)	:	492
Nombre total de rubriques		:	63

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STRESZCZENIE

Potwierdzono występowanie w Polsce 4 gatunków trzmieli z podrodzaju *Bombus* LATREILLE s. str. (= *Terrestribombus* VOGT, 1911): *Bombus lucorum* (L.), *B. terrestris* auct., *B. cryptarum* (FABRICIUS) i *B. magnus* VOGT; podano mapy ich rozsiedlenia oraz wahania liczebności względnej w poszczególnych częściach kraju. Dwa najliczniejsze gatunki, *B. lucorum* i *B. terrestris*, występują na obszerze całej Polski, chociaż *B. lucorum* jest liczniejszy na terenach wyżynnych i podgórskich (Kielce - Krosno) i odpowiednio jego udział wynosi 62.5% i 83,6%, podczas gdy w rejonie Gdańska i Elbląga zdecydowanie dominuje *B. terrestris* - 79,1%. Zróżnicowany jest też udział i rozkład liczebności w poszczególnych częściach kraju *B. cryptarum* (dla całego kraju 14,3%) i *B. magnus* (zaledwie 2,0%). Zwraca uwagę znaczny udział (24,7%) *B. cryptarum* w rejonie Białystok - Suwałki, w przeciwieństwie do bardzo nielicznego występowania tego gatunku w rejonie Kielce - Krosno.

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