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The genus *Rubus* in the Bardo Mts (Central Sudetes)

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Abstract: This paper presents the results of detailed field investigations and herbarium studies on the occurrence of representatives of the genus *Rubus* L. in the Bardo Mts (SW Poland). For each species a short description, as well as horizontal and vertical distribution maps are provided. This region is one of the areas of the greatest concentration of bramble species in Poland, with 50 species being documented, of which 37 species were found there for the first time. Forty-eight species belong to the subgenus *Rubus*, one to the subgenus *Idaeobatus* and one taxon is of hybrid origin (nothosubgenus ×*Idaeorubus*). The subgenus *Rubus* is represented by 3 sections, 4 subsections and 20 series, among which the most numerous are *Discolores* (11 species), *Glandulosi* (7 species) and *Rubus* (4 species). The distribution and migratory patterns of particular species are discussed. In the bramble flora, transitional elements are prevalent (66%), while 9 species reach northern, 4 species western and 4 southern limits of their ranges. Presumably southern species did not immigrate directly from the south by the Międzylesie Pass, but rather through the foothill zone along the Sudetian fault line, from the Moravian Gate. The vertical distribution of most of the species was confined to the submontane belt. The study contributed significantly to the description of one species which is new to science and two species which have not previously been recorded in Poland.

Additional key words: Rosaceae, chorolgy, category of threat, Lower Silesia

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Introduction

The idea of intensively exploring the occurrence of brambles in the Bardo Mts emerged during reconnaissance field observations, which revealed not only their abundance, but also their high species richness. Such observations resulted in the discovery of very rare taxa, including several species of the series *Discolores*, described recently by Czech botanists (Trávníček and Zázvorka 2005), and contributed substantially to the description of a new species, *Rubus lucentifolius* (Zieliński et al. 2004).

The main aim of the study was to determine the distribution of bramble species in this part of Poland, which has been rather poorly investigated in this respect until now. The results should enable more complete geographical analysis of this genus, clarifying the migration patterns of certain species (the gentle Międzyleska Pass and the warm climate of the Kłodzko Basin make these sites a potential migration corridor for some southern plants). As the rare brambles may be just as endangered as species from other taxonomic groups, the data collected should be helpful in the compilation of the "red list" of Polish representatives of the genus *Rubus*.

Study area

The Bardo Mts (Góry Bardzkie) enclose from the south the Kłodzko Basin (Kotlina Kłodzka). The Silver Pass (Przełęcz Srebrna) separates them in the northwest from the Owl Mts (Góry Sowie; Central Sudetes), while the Kłodzko Pass (Przełęcz Kłodzka), in the southeast, separates them from the Golden Mts (Góry Złote; Eastern Sudetes). The Bardo Mts formed in the Variscan orogeny, and were then levelled off and upthrusted in the Alpine orogeny (fault-block mountains; Kondracki 2002). North-eastern slopes, associated with the Sudetian fault line, are steeper than those going down to the Kłodzko Basin. Despite their low altitude, the relief is relatively varied. The mountains are divided by the antecedent Bardo Gorge (Przełom Nysy Kłodzkiej) into two parts: the lower north-western part with Mt Słup (667 m) and Mt Wilczak (637 m), and the higher south-eastern part with the peaks Mt Kłodzka Góra (765 m) and Mt Ostra Góra (751 m). The Bardo Mts are about 20 km long, and 6–10 km wide (160 km^2). The study area includes small parts of neighbouring regions of the Nowa Ruda Depression (Obniżenie Noworudzkie), the northern end of the Kłodzko Basin and the southern part of the Otmuchów Depression (Obniżenie Otmuchowskie; mainly the Grochów Massif). It is located between 50°34.5'–50°25.9' N and 16°33.3'–16°51' E with a total surface area of approximately 220 km^2 and a vertical range of 515 m (Fig. 1, 2).

Materials and methods

Detailed field studies provided the main body of information about the present-day bramble flora of the Bardo Mts. They were supplemented by sparse historical materials, deposited mainly in herbaria of the University of Wrocław (WRSL), the National Museum in Prague (PR) and the Charles University in Prague (PRC), which document 22 localities of 13 species (2/3 of them were collected by Kinscher at the beginning of the last century).

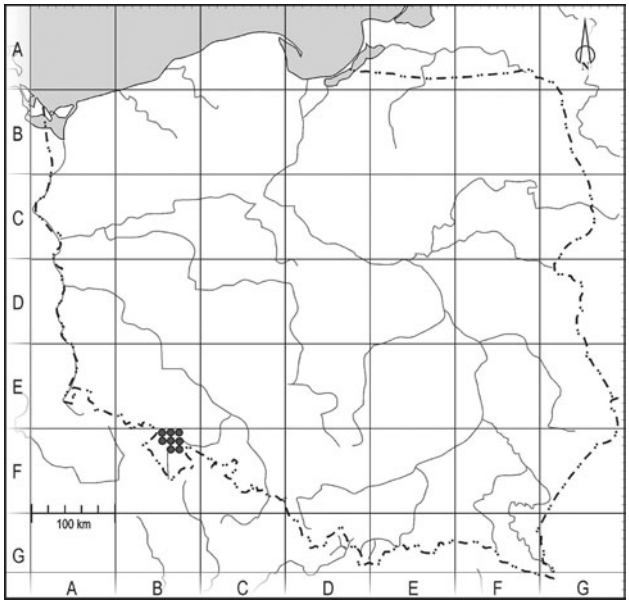

Fig. 1. Location of the study area in Poland (ATPOL grid)

In the present study a locality was taken to be an area of 0.015–0.02 km^2 with a difference in height of no more than 10 m. Observations in each locality were recorded on a relevé, comprising a description of the location and habitat, together with a list of the bramble taxa found and an estimate of their abundance. Data were gathered from a total of 763 sites, which yielded a collection of 5212 records. Common, easily identified species were usually only noted. Apart from field records, the study produced an abundant herbarium collection (deposited at KOR), which encompasses mainly the rarest and most interesting species or dubious specimens.

The names of species and information about their general range and distribution in Poland follow Weber (1995) and Zieliński (2004), and in cases of species not previously mentioned, i.e. not previously discovered or distinguished in Poland, were based on recent taxonomical studies dedicated to the genus *Rubus* (Oklejewicz 2006; Trávníček and Zázvorka 2005; Zieliński et al. 2004).

The distribution of individual species was presented on horizontal and vertical distribution maps. The former were made using a grid of 246 1×1 km squares, in accordance with the principles outlined in the Atlas of Distribution of Vascular Plants in Poland (ATPOL; Zając 1978); the latter is a vertical west–east cross section of the area (a projection of the main ridge onto a latitudinal plane). Presence of particular species was marked by circlets with three grades of gray reflecting their maximum abundance observed in spatial units (light gray – 1–10 specimens, dark gray – 11–20 specimens, black – more then 20). The same maximal abundance classes in twenty-metre interval of altitude were depicted on vertical maps as gray lines, dark gray bars and black bars respectively. Historical records based on existing herbarium materials were marked by diamonds.

Results

The studies proved that previous conjectures about the bramble species richness of the Bardo Mts were correct. Its flora turned out to be very diverse, comprising as many as 50 taxa (including two neophytes), which constitutes about half of all species of this genus known from Poland and means that the Bardo Mts count among the areas of the highest concentration of *Rubus* species in the country. The results are especially striking when we take into account the relatively small surface area under investigation.

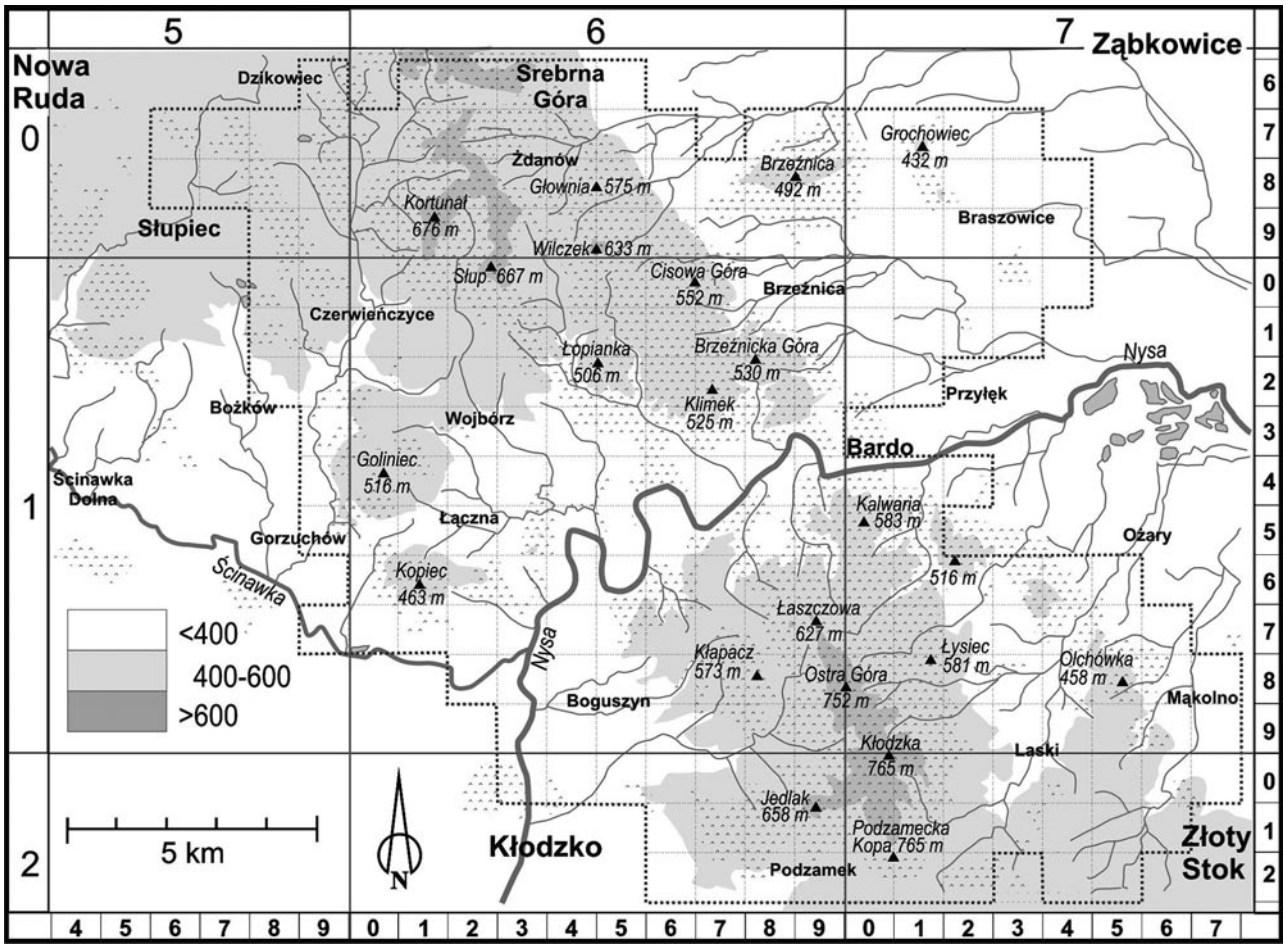

Fig. 2. The study area

Forty-eight species belong to the subgenus *Rubus*, one to the subgenus *Idaeobatus* and one taxon is of hybrid origin (nothosubgenus ×*Idaeorubus*). The subgenus *Rubus* is represented by 3 sections, 4 subsections and 20 series, among which the most numerous are *Discolores* (11 species), *Glandulosi* (7 species) and *Rubus* (4 species). Only 13 species had been found previously (usually at the beginning of the last century) and in the course of study their occurrence was not only confirmed, but they were encountered at many new localities. This high proportion of newly-discovered taxa seems to be due to detailed field investigations, and the fact that the genus *Rubus* hitherto has been given fairly scant treatment. It is noteworthy that many of the 37 previously unrecorded in the Bardo Mts species are rare in Poland. Among them four species of the series *Discolores*, described recently by Czech researchers (Trávníček and Zázvorka 2005) were the first specimens to be found in Poland: *R. austroslovacus, R. guttiferus*, *R. parthenocissus* and *R. pericrispatus* (they were reported simultaneously or a little earlier at a few other sites in southern Poland; see description of species). The results of provisional observations have already contributed to describing a new species, *R. lucentifolius* (Zieliński et al. 2004), which in the course of later investigations turned out to be much more frequent in the north-eastern part of the main mountain massif.

In the bramble flora, transitional elements are visibly prevalent (66%). This applies especially to widespread species found throughout the study area. One third of species reaches (or approaches) the limits of their ranges. Those with northern limits predominate in this group (9 species): *R. austroslovacus*, *R. flos-amygdalae*, *R. graecensis*, *R. guttiferus*, *R. henrici-egonis*, *R. hercynicus*, *R. mollis*, *R. parthenocissus* and *R. pericrispatus*. Contrary to expectations, it seems that they did not immigrate directly from the south by the Międzyleska Pass, but rather through the foothill zone along the Sudetian fault line, probably from the south-east, i.e. from the Moravian Gate. To a certain extent this can be proved by their current distribution in the study area, with a distinct concentration of stands to the north-east of the main massif ridge and in the surroundings of the Bardo Gorge, with only a few localities on the opposite, southern side of the mountains (Fig. 3). Their distribution on neighbouring, thoroughly examined areas to the south (Kosiński 2007) and the south-east (Zieliński et al. 2004) also confirms this provisional hypothesis (except for *R. mollis*, which is relatively frequent in the area lying to the south of the Biała Lądecka valley, but is still absent in

more southern regions). However, it is necessary to realize that this group consists mostly of representatives of newly described species from the *Discolores* series, so their distribution in Poland is still not sufficiently known, which makes it harder to draw definitive conclusions regarding their phytogeography. A less numerous group is made up of species with their western limits in the Bardo Mts: *R. capricollensis*, *R. bifrons* (at least in Poland), *R. wimmerianus* and maybe *R. lucentifolius* (tentatively counted here, but requires further observation). The extents of the communities of four bramble species that are sub-endemic to Poland coincided with the southern fringe of their range distribution: *R. chaerophylloides*, *R. ostroviensis*, *R. siemianicensis* and *R. posnaniensis*.

In the vertical distribution almost all bramble species were found in areas situated below 500–600 m (lowland–submontane). The altitudinal optima of six brambles also encompass the lower part of the lower-montane zone (lowland–lower-montane species): *R. hirtus*, *R. koehleri*, *R. lucentifolius*, *R. nessensis*, *R. pedemontanus* and *R. salisburgensis*. *R. guentheri* has its optimum in the lower-montane belt and *R. idaeus* occurs regardless of altitude across the entire vertical spectrum.

Rare and very rare taxa (occurring in no more than 25% of all localities) are the most numerous (80% of bramble flora), whereas frequent and common species (above 25% of localities) were few in number (20% of bramble flora). Although the latter group consists only of 10 species, their participation in all records reaches 65%, and hence they are of the greatest importance in the plant cover of this area. Species with the lowest frequency are among the most valuable but also the most vulnerable elements of the bramble flora. Of these the following were marked out as endangered: *R. austroslovacus*, *R. bifrons*, *R. chaerophylloides*, *R. franconicus*, *R. gothicus*, *R. graecensis*, *R. macrophyllus* and *R. parthenocissus*. This was based not only on the frequency of *Rubus* species in the Bardo Mts, but also took into account their distribution in neighbouring regions. The short period of observation did not allow to determine their dynamics and some of them may be in the phase of expansion subsequent to colonization, e.g. *R. franconicus*.

The distribution of bramble species in the study area is uneven (Fig. 4). They are concentrated in the areas situated to the north-east of the main ridge of the Bardo Mts: the Grochów Massif, the mountain areas in the vicinity of the Bardo Gorge and the Otmuchów Depression. In the first case (the Grochów Massif) there is a specific geological composition (serpentinite rock), which may directly or indirectly (e.g. by suppressing other species) favour the spread of some brambles. The next two areas, although not standing out geologically, encompass the most fertile habitats with the potential occurrence of beech and oak-hornbeam forests (*Dentario enneaphyllidis-Fagetum* and *Galio sylvatici-Carpinetum*). This pattern can also be partly explained by the above-mentioned migration of some southern species from the south-east, along the Sudetian fault line. A second important factor that strongly modifies the distribution of brambles is the type of land use. While moderate human impact seems to favour the spread of brambles, intensive cultivation leads to a distinct fall in the number of species. For this reason farmland was the poorest area in this respect (Fig. 4). On the other hand, shady fertile broadleaved forests and the poor acid soils of natural pine or oak forest do not provide sufficient amounts of light or sustenance respectively. Consequently, more species were found in areas with many small wooded islands and in coniferous monocultures planted on fertile soils (or in broadleaved stands with a considerable admixture of coniferous trees). Therefore the abundance of brambles may serve also as

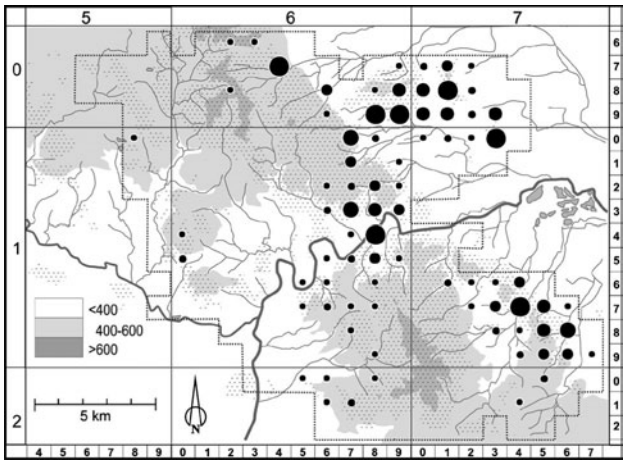

Fig. 3. Concentration of species reaching the northern limit of their ranges within the study area (diameters of circlets depending on the number of localities in spatial units): 1 – 1; 2 – 2; 3 – 3; 4 – 4; 5 – 5; 6 – 6–13

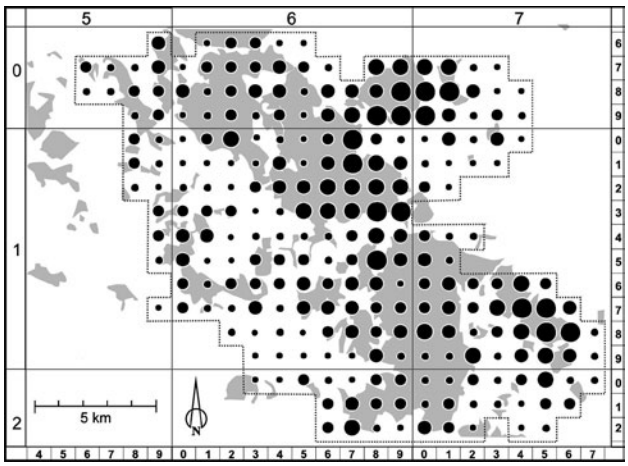

Fig. 4. Concentration of *Rubus* species against a background of forested areas (diameters of circlets depending on the number of species per grid square): 1 – 1–4; 2 – 5–8; 3 – 9–12; 4 – 13–16; 5 – 17–20; 6 – 20–30

good indicator of habitat incompatibility of some coniferous forests.

Scheme of classification

Genus ***Rubus***
- Subgenus ***Idaeobatus***
  - *Rubus idaeus*
- Subgenus ***Rubus***
  - Section ***Rubus***
    - Subsection ***Rubus***
      - Series ***Nessenses***
        - *Rubus nessensis*
      - Series ***Rubus***
        - *Rubus graecensis*
        - *Rubus sulcatus*
        - *Rubus constrictus*
        - *Rubus plicatus*
      - Series ***Allegheniense***s
        - *Rubus allegheniensis*
    - Subsection ***Hiemeales***
      - Series ***Discolores***
        - *Rubus bifrons*
        - *Rubus armeniacus*
        - *Rubus montanus*
        - *Rubus grabowskii*
        - *Rubus henrici-egonis*
        - *Rubus crispomarginatus*
        - *Rubus austroslovacus*
        - *Rubus flos-amygdalae*
        - *Rubus parthenocissus*
        - *Rubus guttiferus*
        - *Rubus pericrispatus*
      - Series ***Rhamnifolii***
        - *Rubus gracilis*
      - Series ***Sylvatici***
        - *Rubus wimmerianus*
        - *Rubus angustipaniculatus*
        - *Rubus macrophyllus*
      - Series ***Sprengeliani***
        - *Rubus capricollensis*
      - Series ***Micantes***
        - *Rubus silesiacus*
        - *Rubus tabanimontanus*
        - *Rubus gliviciensis*
        - *Rubus chaerophylloides*
      - Series ***Radulae***
        - *Rubus radula*
        - *Rubus salisburgensis*
      - Series ***Pallidi***
        - *Rubus posnaniensis*
      - Series ***Hystrices***
        - *Rubus koehleri*
        - *Rubus apricus*
      - Series ***Glandulosi***
        - *Rubus ostroviensis*
        - *Rubus siemianicensis*
        - *Rubus pedemontanus*
        - *Rubus lucentifolius*
        - *Rubus hercynicus*
        - *Rubus guentheri*
        - *Rubus hirtus*
    - Section ***Corylifolii***
      - Subsection ***Sepincoli***
        - Series ***Subrectigeni***
          - *Rubus orthostachys*
        - Series ***Subthyrsoidei***
          - *Rubus wahlbergii*
          - *Rubus kuleszae*
          - *Rubus gothicus*
        - Series ***Subsilvatici***
          - *Rubus camptostachys*
        - Series ***Subcanescentes***
          - *Rubus mollis*
          - *Rubus fasciculatus*
        - Series ***Subradulae***
          - *Rubus fabrimontanus*
        - Series ***Hystricopses***
          - *Rubus dollnensis*
    - Section ***Caesii***
      - *Rubus caesius*
- Nothosubgenus ×***Idaeorubus***
  - *Rubus ×pseudoidaeus*

List of species

******Rubus allegheniensis* **PORTER (Fig. 5)**

A North American species formerly under cultivation and locally feral in W Poland. A species not reported from here, found in a thicket on the S slope of Mt Kostra near Wojciechowice (distant from the nearest buildings), where it seemed to be naturalized.

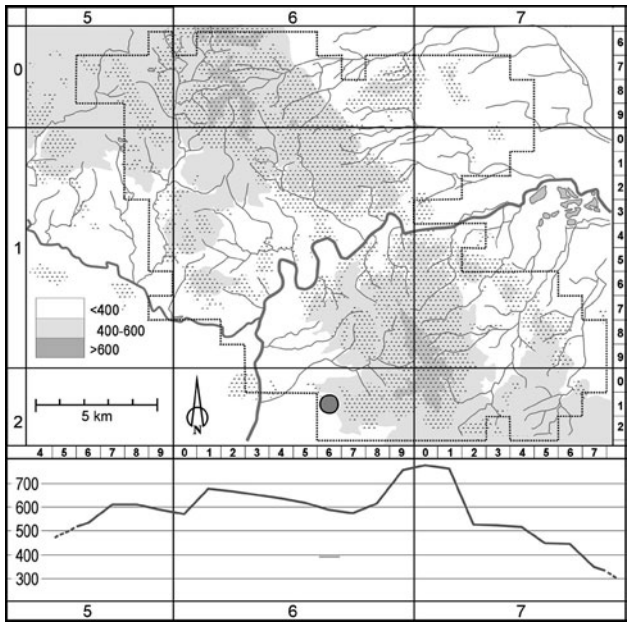

Fig. 5. Distribution of *R. allegheniensis* in the Bardo Mts.

1. *Rubus angustipaniculatus* HOLUB (Fig. 6)

A regional Central European species occurring in the Czech Republic and in the SW part of Poland, transitional in the study area, lowland–submontane, moderately frequent (41.5% and 26% of squares and records respectively). So far it has been found only on Mt Łysa near Grochów (Kinscher *s.n.*, 1904, WRSL). Almost all its localities were situated below 600 m, and the highest one at 630 m (Mt Wilcza, near Żdanów). On the whole it was found relatively numerously on gentle slopes and ridges, slightly preferring E and above 500 m – S aspects. It grows in forest margins, clearings, wayside and balk thickets and less numerously in the undergrowth of light beech forest and coniferous monocultures. Not endangered.

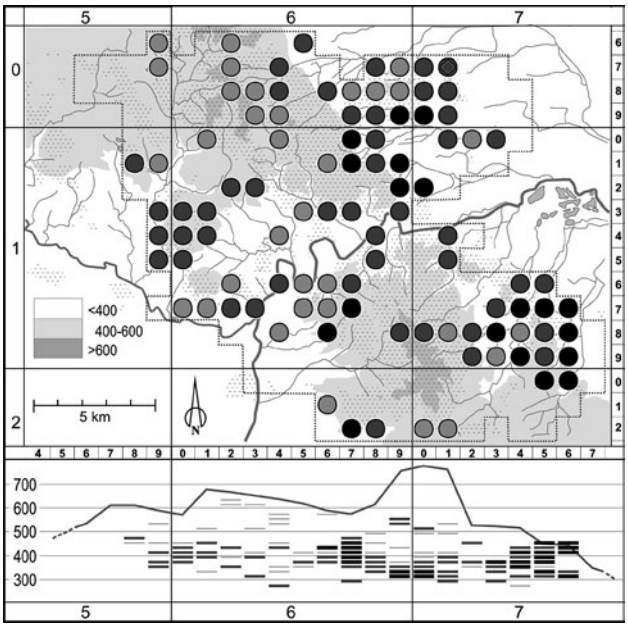

Fig. 6. Distribution of *R. angustipaniculatus* in the Bardo Mts.

2. *Rubus apricus* WIMM. (Fig. 7)

A species of Central European distribution, known from Germany, the Czech Republic (Moravia) and Poland (SW part: Lower Silesia, rarer in Greater and Lesser Poland), transitional in the study area, lowland–submontane, rare (15.04% of squares and 6.81% of records), not reported previously. *R. apricus* distinctly prefers gentle SE slopes, where it grows relatively numerously in forest margins and clearings of light fertile beech forest, and in coniferous plantations. The species has its altitudinal optimum below 500 m and reaches its maximum elevation (625 m) on the E slopes of Mt Grodziska, 2 km from Wojciechowice. Not endangered.

****Rubus armeniacus* FOCKE (Fig. 8)**

A species of probably Caucasian origin (Armenia), introduced to Europe in the middle of the 19th century (Germany), cultivated for fruit and naturalized in W Poland. It was found for the first time in the area, in roadside thickets, in the immediate proximity of gardens (from where it probably escaped), in the vicinity of Mąkolno village (290 m).

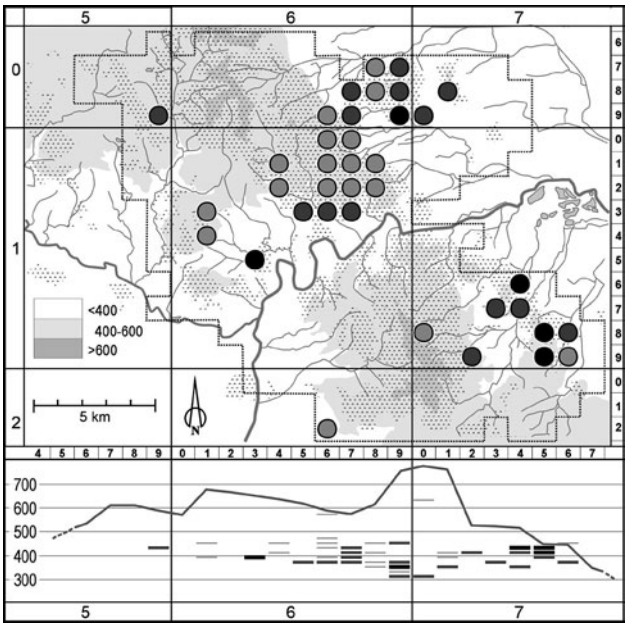

Fig. 7. Distribution of *R. apricus* in the Bardo Mts.

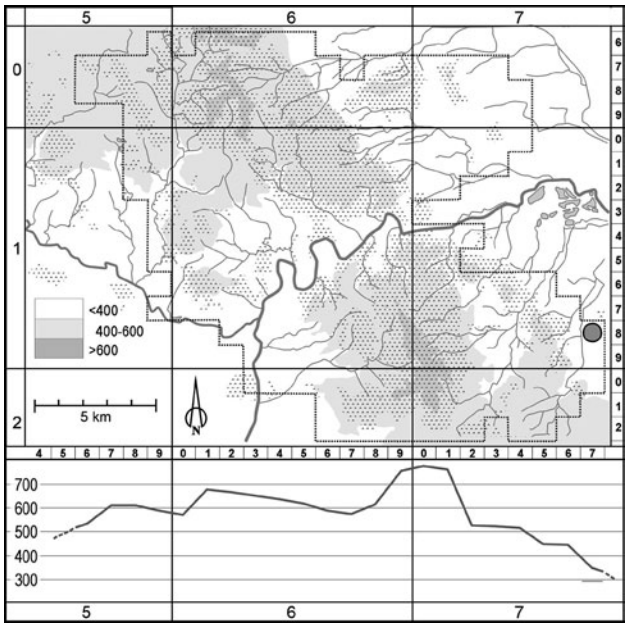

Fig. 8. Distribution of *R. armeniacus* in the Bardo Mts.

3. *Rubus austroslovacus* TRÁVN. (Fig. 9)

A recently described bramble species of the Central European type of distribution: besides the Czech Republic and Slovakia, where it is the most common, it is known from several localities in Lower Austria, SE Germany and S Poland (scattered in a few poor stands in the S part of Opole Province); in the study area it is at its N limit, lowland–submontane, sporadic (0.81% of squares and 0.52% of records). The

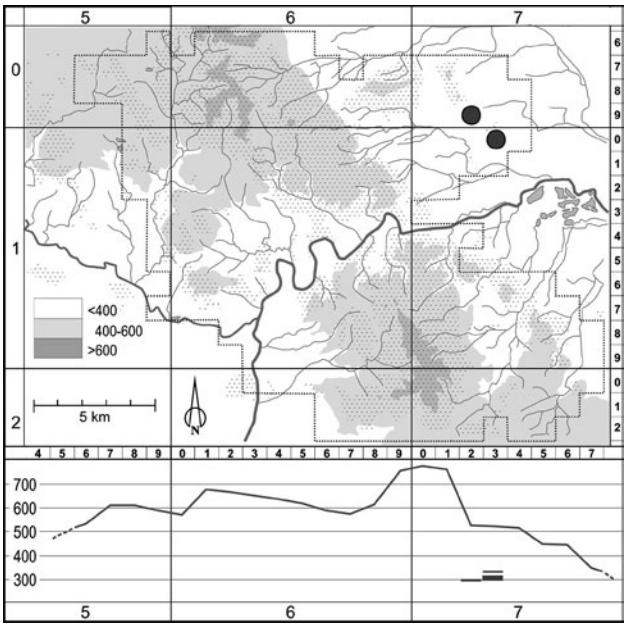

Fig. 9. Distribution of *R. austroslovacus* in the Bardo Mts.

bramble was observed in a pine monoculture on the S, gentle slopes of Mt Bukowczyk near Bardo (295–300 m) and on the neighbouring Mt Stróżnik (in a wayside thicket). Locally endangered.

4. *Rubus bifrons* VEST (Fig. 10)

A Central European species (from France and the Netherlands to Slovenia and Hungary), in Poland almost exclusively in the SE and isolated in Greater Poland. Its relatively small population was observed in pine plantations on the S slope of Mt Stróżnik (385 m) near Braszowice. The species has been not reported from the study area and this stand is so far the most W one in Poland. Endangered because of occurring on one relatively poor stand.

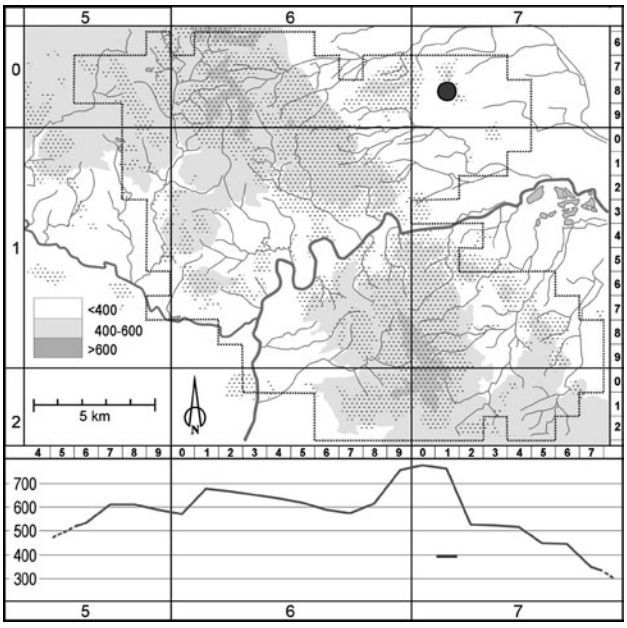

Fig. 10. Distribution of *R. bifrons* in the Bardo Mts.

5. *Rubus caesius* L. (Fig. 11)

A species of Euro-Siberian type of distribution (Europe and the W Asia), in Poland common throughout the country, in the Bardo Mts transitional, lowland–submontane, moderately frequent (29.67% of squares and 13.49% of records). It occurs on the lowest situated areas, avoiding main mountain massif, having altitudinal optimum below 400 m (in 80% of cases) and reaching a maximum elevation (600 m) on SE slopes of Mt Ostróg near Srebrna Góra. *R. caesius* prefers flat or concave terrains where it grows mostly in synanthropic habitats (roadside ditches, railway embankments, balks, field margins) and riparian forest. Not threatened.

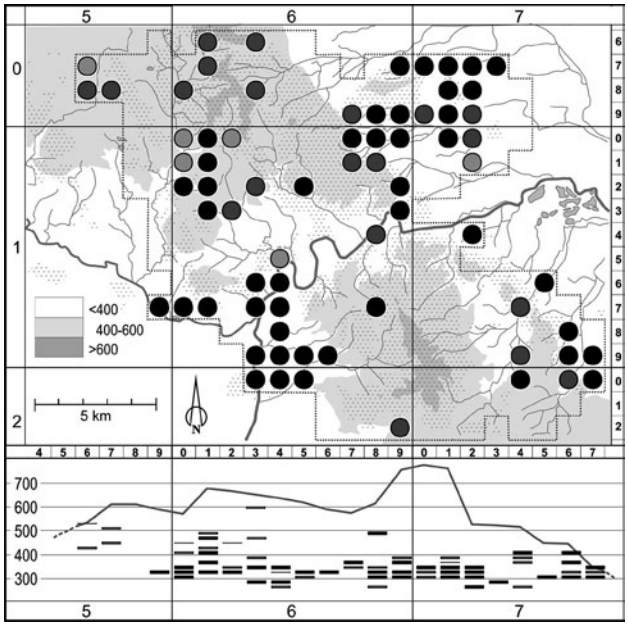

Fig. 11. Distribution of *R. caesius* in the Bardo Mts.

6. *Rubus camptostachys* G. BRAUN (Fig. 12)

A Central and North European species (from the S Sweden and Belgium to the Czech Republic); in Poland mainly in the SW, in the Bardo Mts transitional, lowland–submontane, moderately frequent (26.82% of squares and 17.95% of records), found for the first time, but already known from the nearest vicinity in the foothill zone. It has the highest concentration of localities in the lowest NE part of the study area (Otmuchów Depression) and in only a few cases was able to get across the Nysa Kłodzka Gorge to the Kłodzko Basin. *R. camptostachys* prefers flat areas or gentle slopes, more often facing to the E, where it usually grows in synanthropic habitats (roadside ditches, railway embankments and balks), sometimes in forest margins and small woods among fields. More then 85% of its stands lies below 400 m and it reaches maximum altitude (540 m) on the SE slope of Mt Warowna near Srebrna Góra. Not threatened.

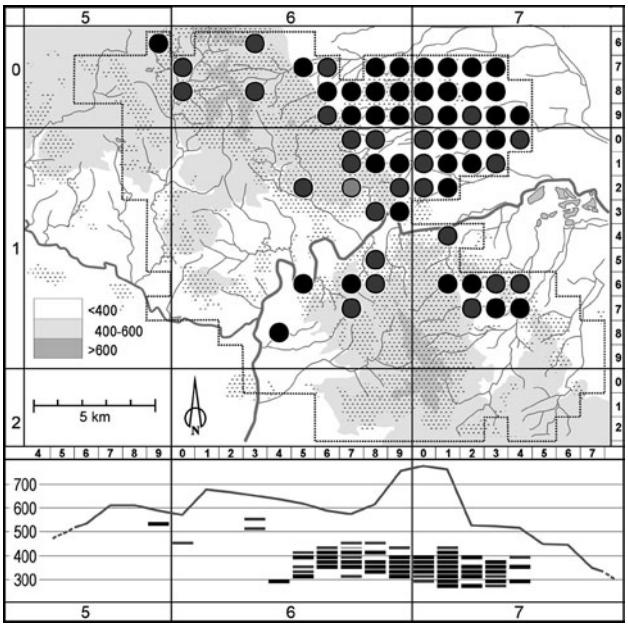

Fig. 12. Distribution of *R. camptostachys* in the Bardo Mts.

7. *Rubus capricollensis* (Sprib.) Sprib. (Fig. 13)

This regional species has a Central European type of distribution, encompassing SW Poland and the Czech Republic; in the Bardo Mts attains NW limit of its range, lowland–submontane, rare (7.31% of squares and 2.62% of records), not reported previously. *R. capricollensis* occurs almost exclusively E from Nysa Kłodzka River and reaches its maximum elevation (495 m) on the SW slope of Mt Kostra near Wojciechowice. It grows mostly in light places (margins and clearings of beech and oak-hornbeam forest, coniferous plantations). The species regenerates well on its stands, where it is relatively abundant; most frequent in the neighbouring the E Sudetes (Kosiński 2007). Not endangered.

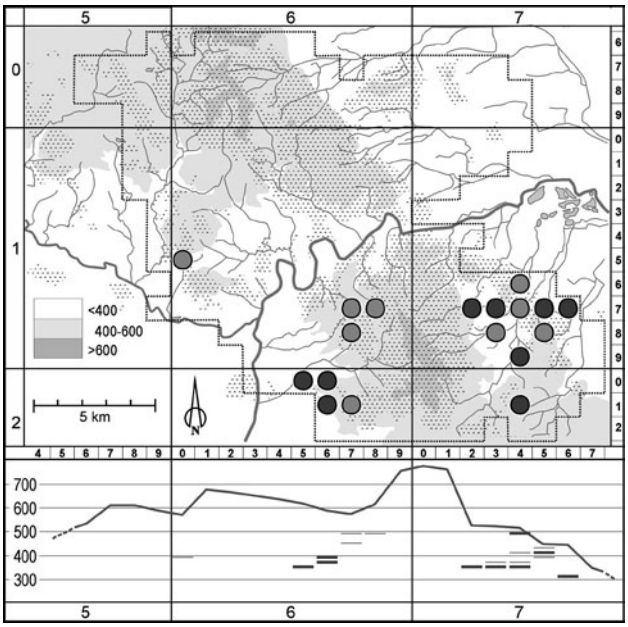

Fig. 13. Distribution of *R. capricollensis* in the Bardo Mts.

8. *Rubus chaerophylloides* Sprib. (Fig. 14)

A regional species probably endemic to Poland, its well-spaced range encompasses the S of Greater Poland and the E part of Lower Silesia; in the Bardo Mts reaches SW limit of its range, lowland–submontane, sporadic (0.4% of squares and 0.52% of records). It was found by Kinscher in surroundings of Boguszyn near Kłodzko (1905, WU 2750), where it was not confirmed, while it was observed on the E and NE slopes of Mt Olchówka (fourth sites, 310–400 m) near Mąkolno village. It is endangered because of a small number of relatively poor stands.

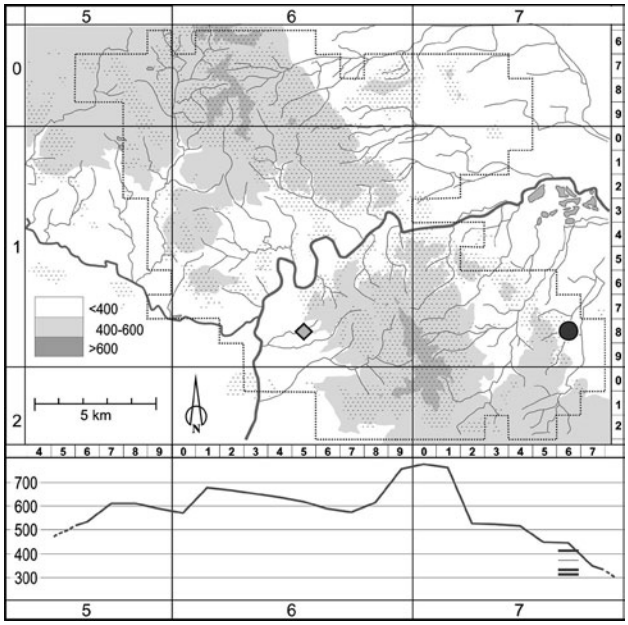

Fig. 14. Distribution of *R. chaerophylloides* in the Bardo Mts.

9. *Rubus constrictus* P.J. Müll. & Lefèvre (Fig. 15)

A Central European species (from Belgium and France in the W, to Ukraine in the E, and Slovenia in the S); in Poland chiefly scattered in the S; in the Bardo Mts transitional, lowland–submontane, very rare (4.87% of squares and 2.22% of records). It was reported from two stands by Kinscher (1906, 1908; PRc) from the Brzeźnica Massif, where it was confirmed in many localities in the course of study and where it is the most frequent indeed. *R. constrictus* was found outside the main mountain massif and reaches its maximum altitude (460 m) on the S slope of Mt Podzamecka Kopa near Podzamek village. It was observed on the edges of fertile forest, frequently among many other bramble species. Not endangered.

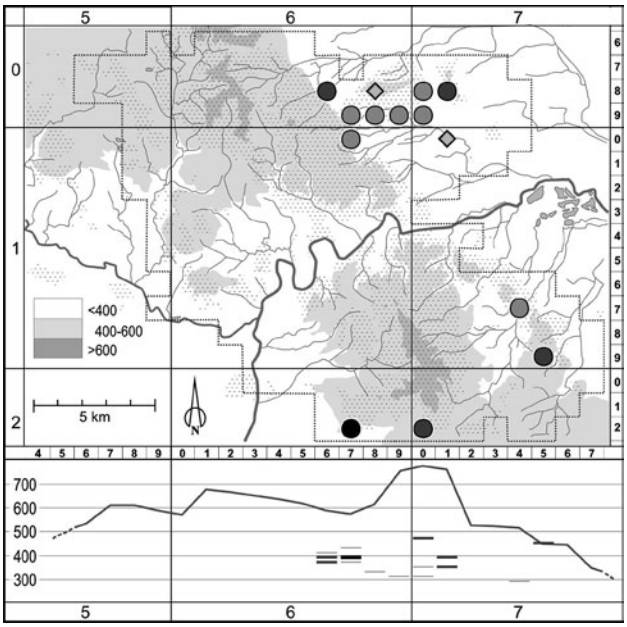

Fig. 15. Distribution of *R. constrictus* in the Bardo Mts.

10. *Rubus crispomarginatus* HOLUB (Fig. 16)

A species native to Central Europe scattered in the S part of Poland, the Czech Republic, W Slovakia, and in the SE fringe of Germany; in the Bardo Mts transitional, lowland–submontane, moderately frequent (26.82% of squares and 15.33% of records). Until now it was collected in four localities by Buchs (Mt Brzeźnica, 1913, WRSL; Opolnica, 1913, WRSL), Kinscher (Mt Brzeźnica, 1908, PR, PRc) and Schoepke (Czerwieńczyce, 1910, WRSL). *R. crispomarginatus* gets its maximal elevation (545 m) on the SW slope of Mt Ostra near Wojciechowice, and on the W slope of Mt Borek near Nowa Wieś Kłodzka. Number of localities of the bramble is relatively high in comparison with areas situated more S and E, where it is considerably more scattered (Zieliński et al. 2004; Kosiński 2007). It occurs mainly in small numbers, slightly preferring slopes facing to the S or the E, growing in sunny places in clearings and margins of hornbeam and beech forest, in coniferous monocultures on fertile habitats, as well as in wayside thickets, balks, and field edges. Not endangered.

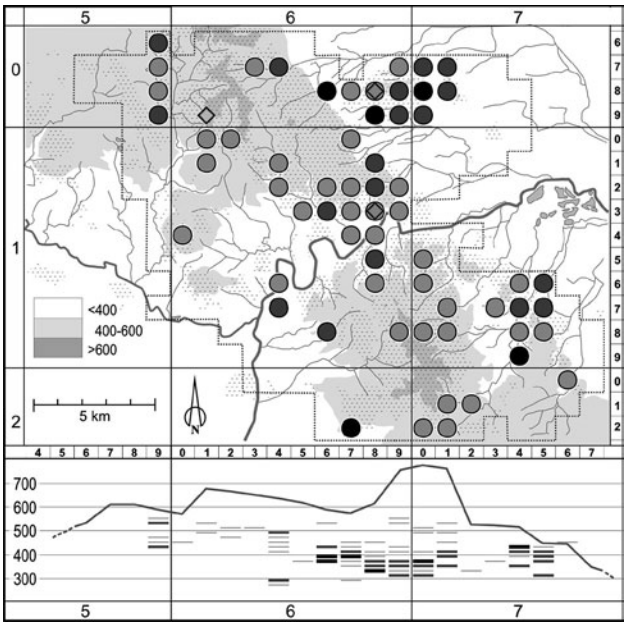

Fig. 16. Distribution of *R. crispomarginatus* in the Bardo Mts.

11. *Rubus dollnensis* SPRIB. (Fig. 17)

A Central European species distributed in S Germany, Austria, the Czech Republic, Slovakia, and Poland (SE Lower Silesia and few localities in S Greater Poland); in the Bardo Mts transitional, lowland–submontane, frequent (59.75% of squares and 38.79% of records; fifth in terms of number of localities), common in low-lying locations. It was reported from two stands by Kinscher (Dębówka, 1907) and Schoepke (Słupiec, 1910, WRSL). *R. dollnensis* reaches its maximum altitude (664 m) on Mt Stróża near Srebrna Góra. It is distinctly synanthropic species, without special preferences towards relief, inclination, or aspects, growing usually in large numbers in wayside thickets, balks, forest margins, and loose woods. Not endangered.

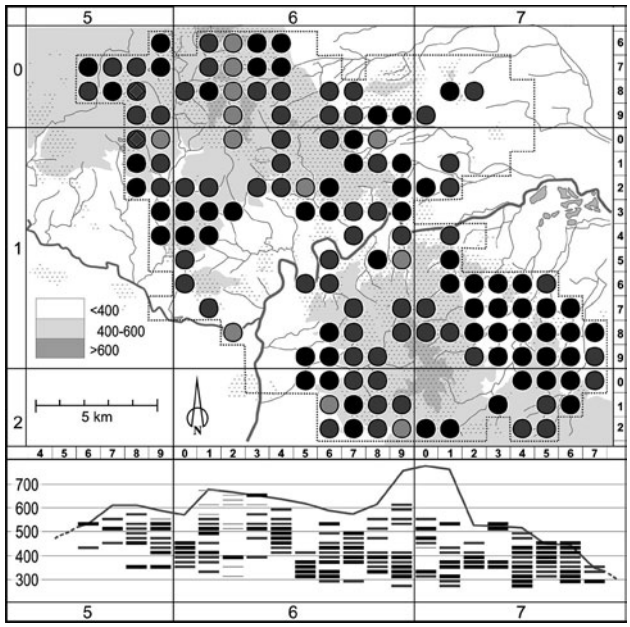

Fig. 17. Distribution of *R. dollnensis* in the Bardo Mts.

12. *Rubus fabrimontanus* (SPRIB.) SPRIB. (Fig. 18)

A Central European species occurring in Poland (mainly SE and central part), Germany, S Denmark, and insularly in the Czech Republic and S Sweden; in the Bardo Mts transitional, lowland–submontane, rare (6.09% of squares and 2.22% of records), not recorded to date. It gets its maximal elevation (550 m) in the spruce forest on the pass between Wielka

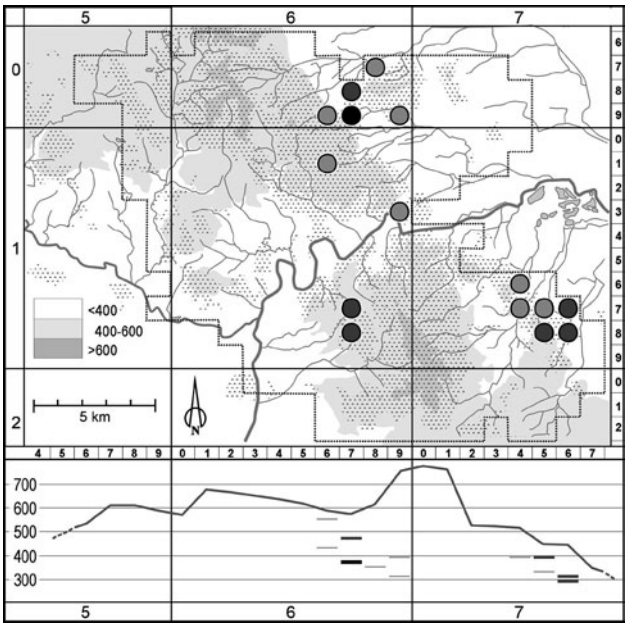

Fig. 18. Distribution of *R. fabrimontanus* in the Bardo Mts.

Cisowa Góra and Wilcza Mts. In the area the bramble grows relatively abundantly, mainly in the undergrowth of the spruce, birch, riparian, or hornbeam forests. Not endangered.

13. *Rubus fasciculatus* P.J. MÜLL. (Fig. 19)

A Central and North European species occurring in Poland (mainly in the S part, Greater Poland, and a few isolated stands in the W Pomerania), the Czech Republic, Germany, Denmark, and S Sweden; in the Bardo Mts transitional, lowland–submontane, rare (9.34% of squares and 3.8% of records), reported for the first time. It reaches its maximal altitude (540 m) on the SE slope of Mt Warowna near Stoszowice village. *R. fasciculatus* grows usually in large numbers, on

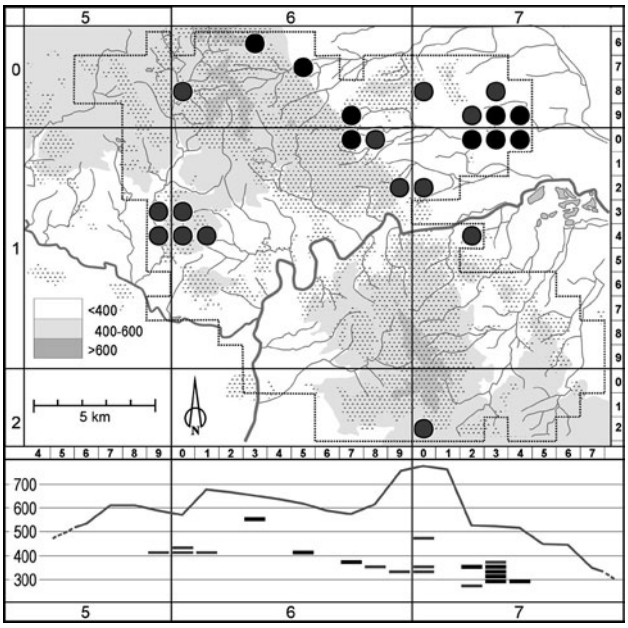

Fig. 19. Distribution of *R. fasciculatus* in the Bardo Mts.

gentle slopes and flat areas, mainly at the base of the mountains, especially in the NE part, and the Brzeźnica Massif (foothills of the Sudetes), in the wayside thickets and forest margins. Not endangered.

14. *Rubus flos-amygdalae* TRÁVN. & HOLUB (Fig. 20)

A recently described bramble species of the Central European type of distribution: besides the Czech Republic (mainly the N and E) it is known from several localities in Slovakia, Austria, Germany and S Poland, where it has been found in the E Sudetes, Opole Province and in the foothills of the E part of the Carpathians (Kosiński 2007; Kosiński and Bednorz 2003; Oklejewicz 2006; Zieliński et al. 2004); in the Bardo Mts it probably reaches its N (or NW) limit, lowland–submontane, rare (12.6% of squares and 6.55% of records), not reported previously. *R. flos-amygdalae* was found outside the main mountain massif and its localities clusters on hills in the NE part of the area and on slopes along the Bardo Gorge. About 72% of them are between 300–399 m and the most elevated (445 m) is in the pine monoculture on the E slope of Mt Cisowa near Brzeźnica village. It preferred convex relief forms and gentle slopes, where it grows usually individually or in small groups in forest margins and on waysides, in loose beech and hornbeam forest, and rarer in the undergrowth of coniferous monocultures on fertile soils. Not endangered.

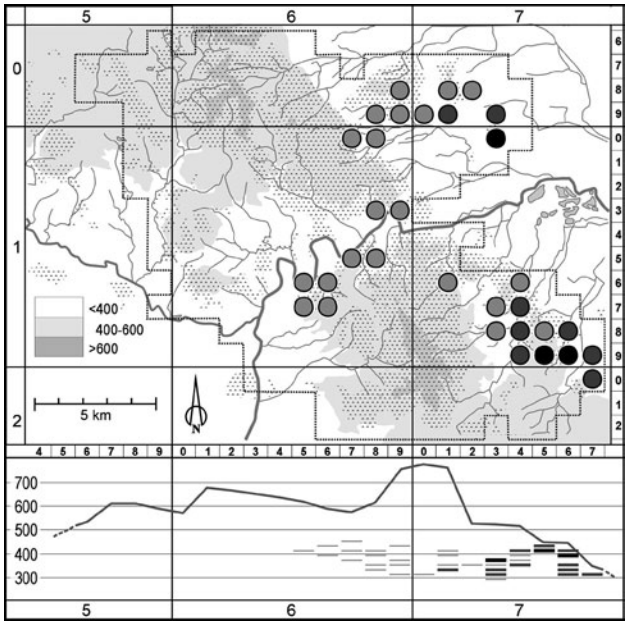

Fig. 20. Distribution of *R. flos-amygdalae* in the Bardo Mts.

15. *Rubus franconicus* H.E. WEBER (Fig. 21)

A Central European species with disjunctive range, occurring mainly in Germany and the Czech Republic, and isolated stands in Austria and Poland (Lower Silesia); in the Bardo Mts transitional, lowland–submontane, very rare (1.62% of squares and 0.52% of

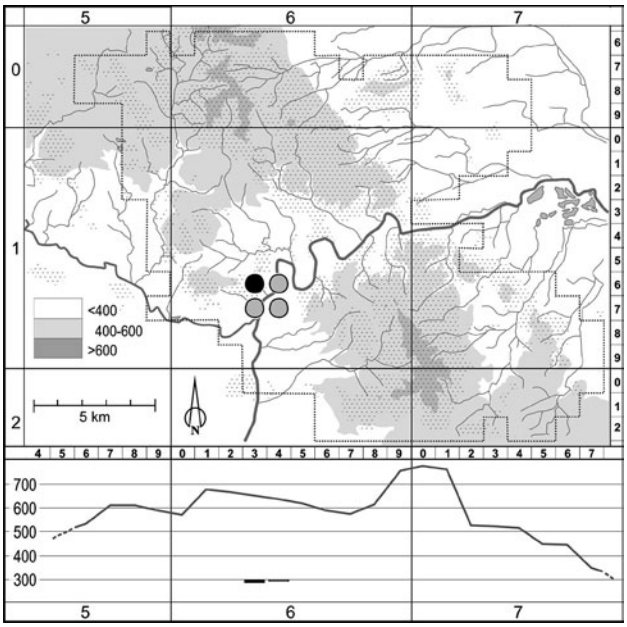

Fig. 21. Distribution of *R. franconicus* in the Bardo Mts.

records). The species has not been reported in the study area. Its quite large population was observed in the vicinity of Ścinawica village, on the SW slopes of Nysa Kłodzka valley (Mt Kopiec), on the border of four ATPOL squares (285–295 m). *R. franconicus* seems to extend its range in the area, however is endangered on account of only one place of occurrence.

16. *Rubus gothicus* Frid. & Gelert ex E.H.L. Krause (Fig. 22)

A Central and North European species occurring in S Scandinavia, Denmark, Germany, the Czech Republic and W Poland; in the study area transitional, found in one locality in beech forest on the E slope of Mt Kalwaria above Bardo (575 m), along a tourist trail. Locally endangered.

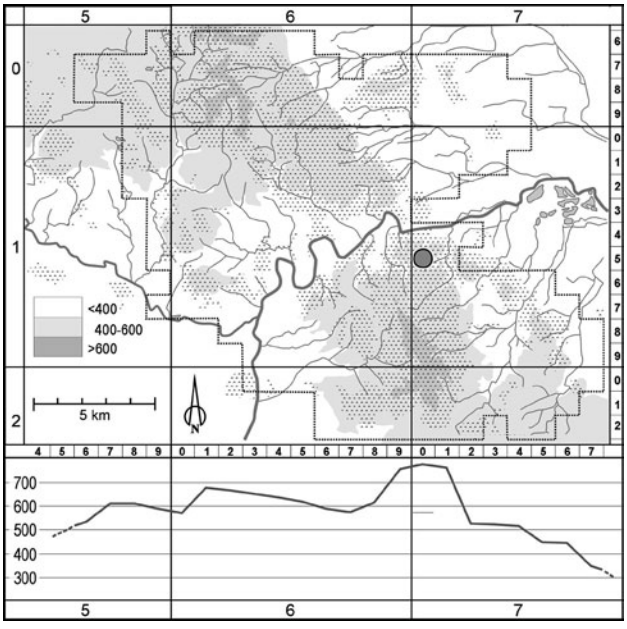

Fig. 22. Distribution of *R. gothicus* in the Bardo Mts.

17. *Rubus grabowskii* Weihe (Fig. 23)

A Central and North European species occurring from Belgium and S Sweden in the N, to Austria and Romania in the S, in Poland almost exclusively in SW half of the country; in the Bardo Mts transitional, lowland–submontane, moderately frequent (24.79% of squares and 13.23% of records), and very frequent in the NE part of the study area, not reported until now. It reaches its maximal altitude (500 m) on the S slope of Mt Głownia between Wilcza and Żdanów villages. *R. grabowskii* prefers sunny flat places or gentle slopes facing oftener to the SE, where it grows singly or in small numbers at the forest margins, wayside thickets, and in clearings of hornbeam and beech forest, as well as coniferous monocultures on fertile substrates. Not endangered.

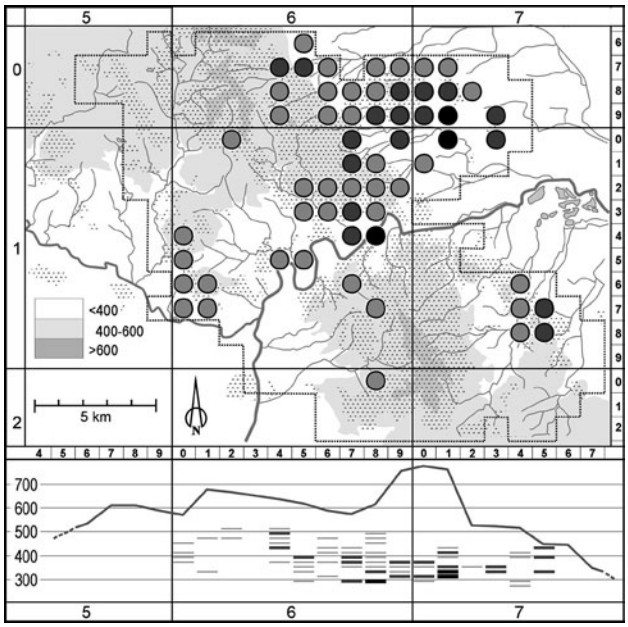

Fig. 23. Distribution of *R. grabowskii* in the Bardo Mts.

18. *Rubus gracilis* J. Presl & C. Presl (Fig. 24)

A Central European species distributed in Germany, the S half of Poland, the Czech Republic, Slovakia, as well as on isolated stands in Austria and the W Ukraine; in the Bardo Mts transitional, lowland–submontane, rare (9.75% of squares and 5.37% of records), not reported previously. It avoids the main mountain massif and was found mainly on hills situated in the NE part (i.e. in direct connexion with lowland areas). The species reaches its maximum elevation (465 m) on the S slope of Mt Kłapacz above Wojciechowice village (near Kłodzko). It prefers gentle slopes and ridges facing to the SE, where grows usually in small numbers in the undergrowth of coniferous monocultures on fertile soils, as well as in mar-

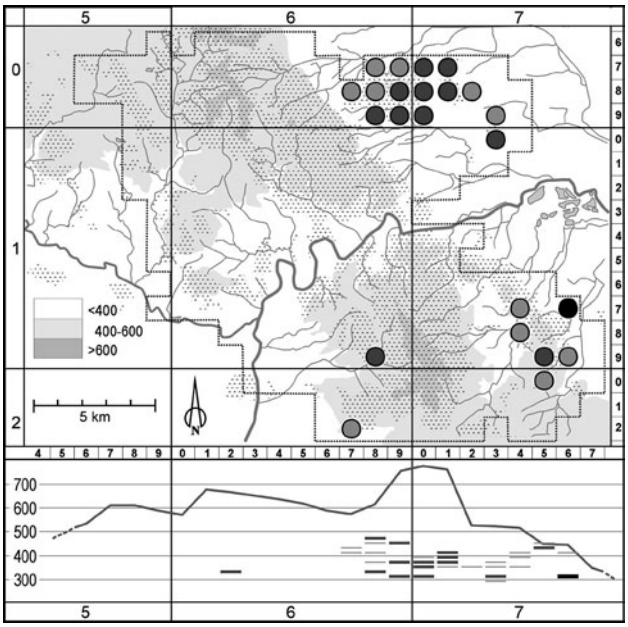

Fig. 24. Distribution of *R. gracilis* in the Bardo Mts.

gins, clearings and on waysides of fertile deciduous forests. Not endangered.

19. *Rubus graecensis* W. MAURER (Fig. 25)

A Central European species occurring in Austria, the Czech Republic and Poland (currently confirmed only in the study area), in the Bardo Mts it is at its N limit of distribution, lowland–submontane, very rare (2.03% of squares and 0.91% of records), known from a few stands on the slopes of the Mt Olchówka (Kosiński 1999). In the course of study the bramble was found on two other localities: the SW slope of Mt Goliniec (445 m) near Huberek, where it reaches its maximum altitude, and the E slope of Mt Grochowiec near Grochów. *R. graecensis* grows usually in small numbers, in clearings and on waysides of deciduous forest or in the undergrowth of light pine monocultures on fertile soils. Endangered because of the small number of poor stands.

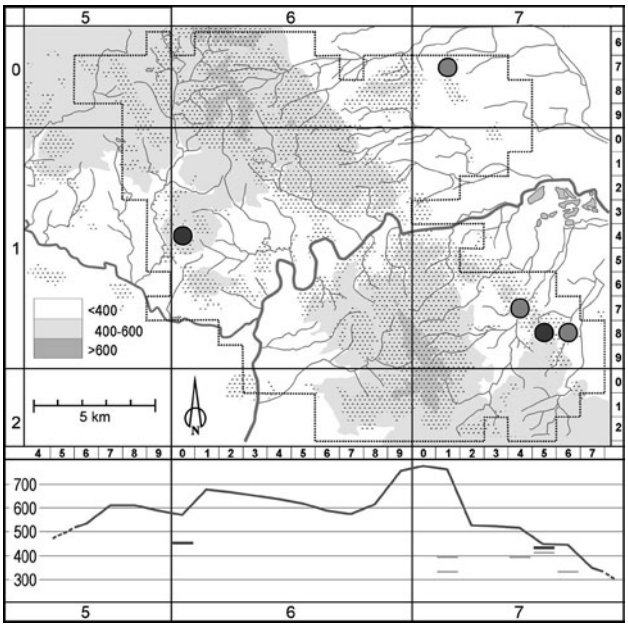

Fig. 25. Distribution of *R. graecensis* in the Bardo Mts.

20. *Rubus guentheri* WEIHE (Fig. 26)

The species has a Central European distribution and occurs in the S Germany, the N Czech Republic, Austria (Tirol) and in the SW Poland (chiefly Sudetes); in the Bardo Mts transitional, lower-montane, moderately frequent (21.95% of squares and 12.18% of records), not reported previously. The distribution of *R. guentheri* coincides quite distinctly with mountain areas. It has altitudinal optimum above 500 m and reaches its maximal altitude (675 m) in a spruce forest on the S slope of Mt Kortunał near Wilcza village. The bramble grows usually at least quite numerously, almost exclusively in anthropogenic spruce monocultures planted on beech forest habitats, on medium inclined ridges and slopes. Not endangered.

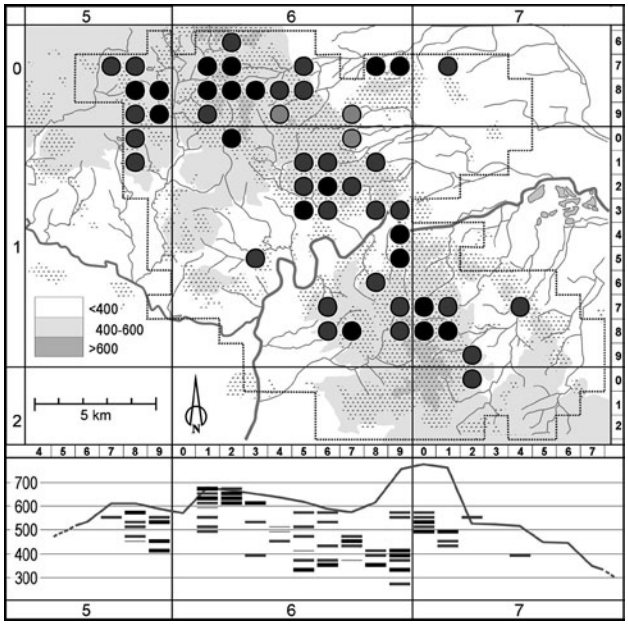

Fig. 26. Distribution of *R. guentheri* in the Bardo Mts.

21. *Rubus guttiferus* TRÁVN. & HOLUB (Fig. 27)

A recently described bramble species of the Central European type of the distribution occurring in the Czech Republic and in several localities in Slovakia, Austria and the S Poland, where it was found for the first time in the E Sudetes (Kosiński and Bednorz 2003; Kosiński 2007) and later in the Bardo Mts (Kosiński 2006). In the study area it is lowland–submontane and rare species (8.13% of squares and 2.75% of records) and probably reaches there its N limit. The bramble was found chiefly in NE part of the area. Its most elevated stands (460 m) are located on

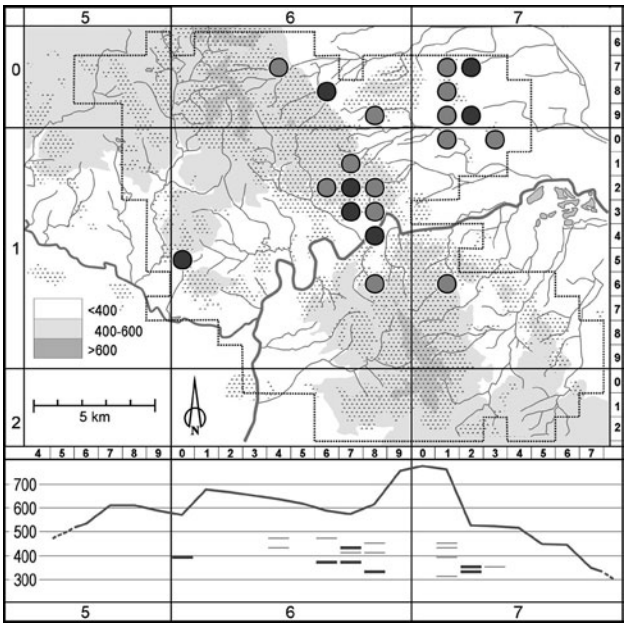

Fig. 27. Distribution of *R. guttiferus* in the Bardo Mts.

the E slope of Mt Ostróg near Srebrna Góra, and on the S slope of Mt Klimek near Brzeźnica village. It prefers gentle slopes facing oftener to the SE or E, where grows usually individually or in small groups in the undergrowth of coniferous monocultures, in forest margins and thickets along ways and among fields. Locally not endangered.

22. *Rubus henrici-egonis* HOLUB (Fig. 28)

A Central European species occurring in the Czech Republic, Slovakia, Germany and in several localities in SW Poland; in the Bardo Mts it is at its N limit of distribution, lowland–submontane, rare (12.6% of squares and 7.86% of records), not found previously. It reaches the highest elevation at 500 m in a spruce monoculture on the S slope of Mt Kłapacz near Wojciechowice village. The bramble was found oftener NW from the main mountain ridge. It prefers slightly gentle slopes facing to the SE and grows usually singly or in small groups in forest margins, wayside thickets and balks, as well as in the undergrowth of coniferous monocultures. Locally not endangered.

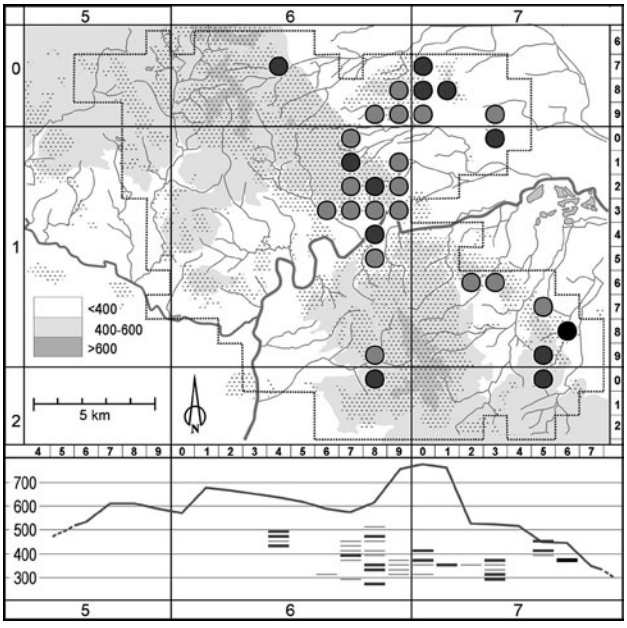

Fig. 28. Distribution of *R. henrici-egonis* in the Bardo Mts.

23. *Rubus hercynicus* G. BRAUN (Fig. 29)

A Central European species occurring in S Germany, the E Czech Republic and SW Poland; in the Bardo Mts it attains its N limit, lowland–submontane, very rare (4.06% of squares and 1.96% of records), not found previously. The species is scattered on the study area and reaches its maximum elevation (625 m) on the S slope of Mt Ostróg near Srebrna Góra. *R. hercynicus* grows usually quite numerously on gentle slopes or concave places preferring slightly S aspect, in the undergrowth of coniferous plantations or forest margins. Not endangered.

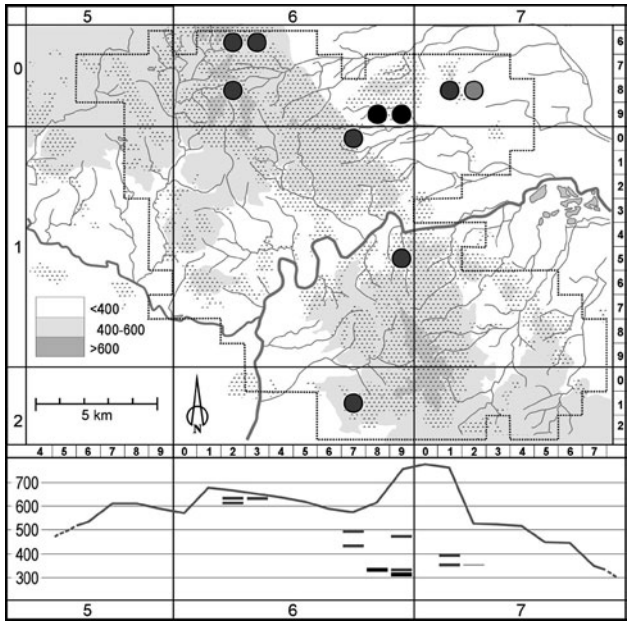

Fig. 29. Distribution of *R. hercynicus* in the Bardo Mts.

24. *Rubus hirtus* WALDST. & KIT. agg. (Fig. 30)

A collective species occurring mainly in mountainous areas of the Central Europe; in the Bardo Mts lowland–lower-montane, very frequent (71.95% of squares and 56.09% of records; third in respect of frequency), collected by Kinscher from Mt Brzeźnica (1906, WRSL). It reaches its maximum elevation (765 m) on the summit of Mt Kłodzka Góra. The species grows usually very abundantly in the undergrowth of spruce monocultures, regardless of topographic conditions. Expansive species, not endangered.

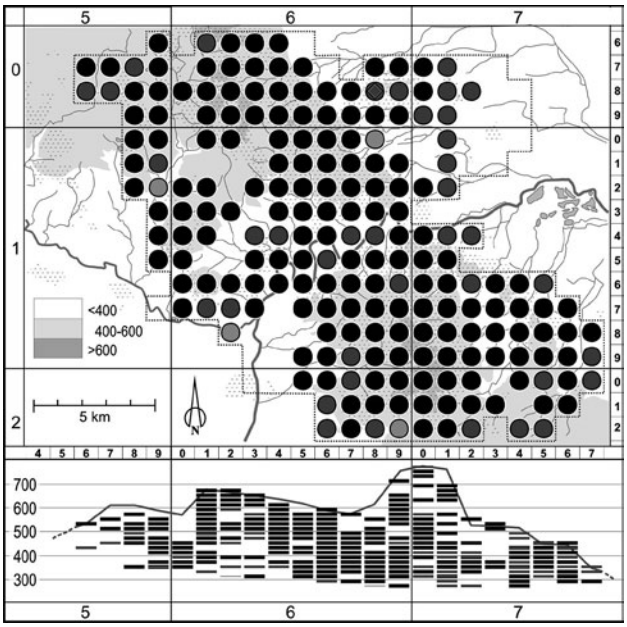

Fig. 30. Distribution of *R. hirtus* agg. in the Bardo Mts.

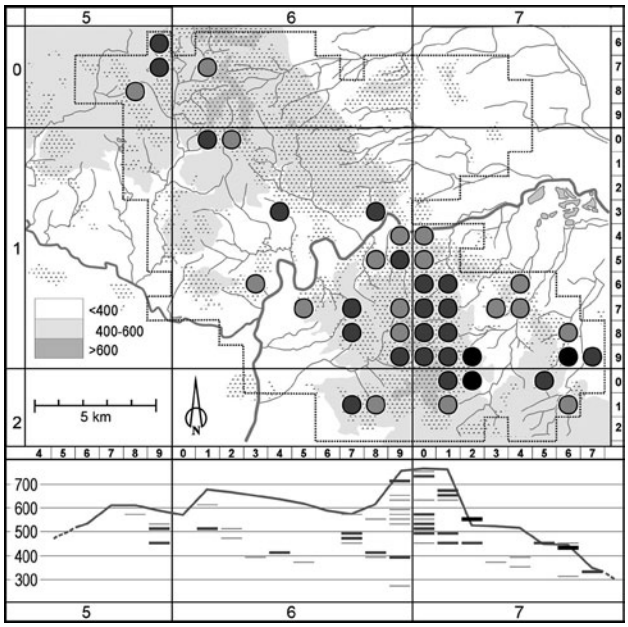

Fig. 32. Distribution of *R. koehleri* in the Bardo Mts.

25. *Rubus idaeus* L. (Fig. 31)

A species of circumboreal distribution; in the Bardo Mts transitional, lowland–montane, the most common (98.37% of squares and 94.23% of records), ubiquitous, growing regardless of topographic conditions, usually very numerously, not endangered.

26. *Rubus koehleri* WEIHE (Fig. 32)

A Central European species occurring in Germany, the Czech Republic and SW Poland (Lower Silesia, S Greater Poland and few stands in Lesser Poland); in the Bardo Mts transitional, lowland–lower-montane, rare (18.69% of squares and 9.04% of records), not reported previously. The most of its localities concentrates in the SE part of the mountains. It reaches its maximal altitude (740 m) on the S slope of Mt Ostra Góra near Laskówka. *R. koehleri* grows usually in small numbers on slopes or ridges (preferring slightly E aspect), in the undergrowth of spruce monocultures or in light places of deciduous forest (margins, waysides and clearings). Not endangered.

27. *Rubus kuleszae* ZIEL. (Fig. 33)

A Central European species occurring in the S half of Poland, the Czech Republic, E Germany and Austria; in the Bardo Mts transitional, lowland–submontane, very frequent (62.6% of squares and 37.35% of records), not reported previously. It reaches its maximal altitude (635 m) between the Słup and Wilcza

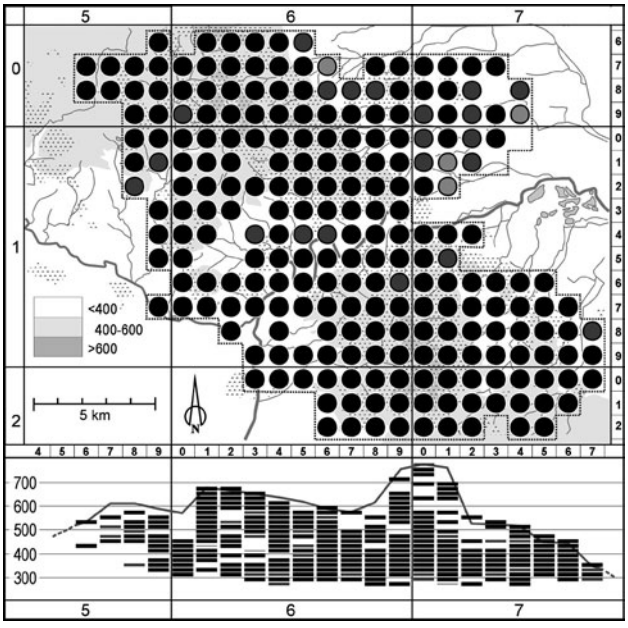

Fig. 31. Distribution of *R. idaeus* in the Bardo Mts.

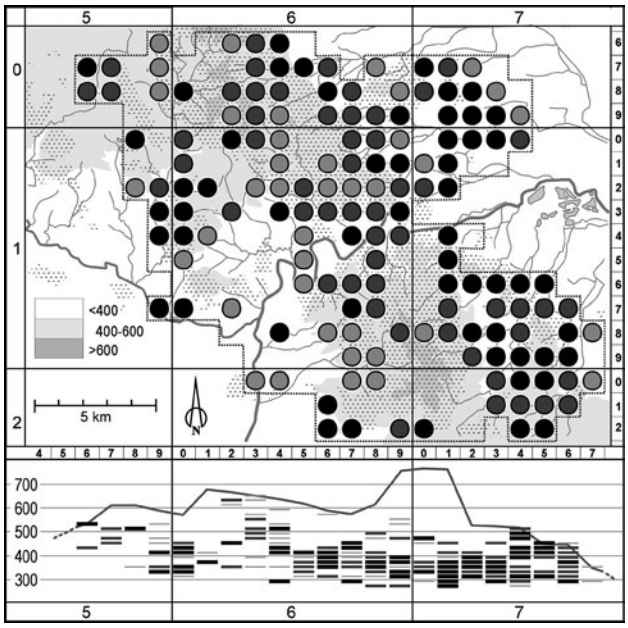

Fig. 33. Distribution of *R. kuleszae* in the Bardo Mts.

Mts near Wilcza village. *R. kuleszae* was found mainly in wayside thickets and balks, forest margins and clearings of deciduous forest, coniferous plantations, and on fertile moderately wet soils, regardless of topographic conditions. Not endangered.

28. *Rubus lucentifolius* ZIEL. & KOSIŃSKI (Fig. 34)

Recently described species, known so far from the Opole Province and the Bardo Mts (Zieliński et al. 2004a, 2004b). In the course of the study it was found in many new localities; however it is rare (15.44% of squares and 6.81% of records). *R. lucentifolius* is a lowland–lower-montane species, which reaches its maximal elevation (630 m) on the top of a hill near Mt Wilcza above Żdanów village. Its distribution is limited to the NE part of the mountains and only in a few cases (in the vicinity of Kłodzko) the bramble crosses the massif. The species was usually found at medium abundance in spruce forest, more frequently on SE facing slopes. Not endangered.

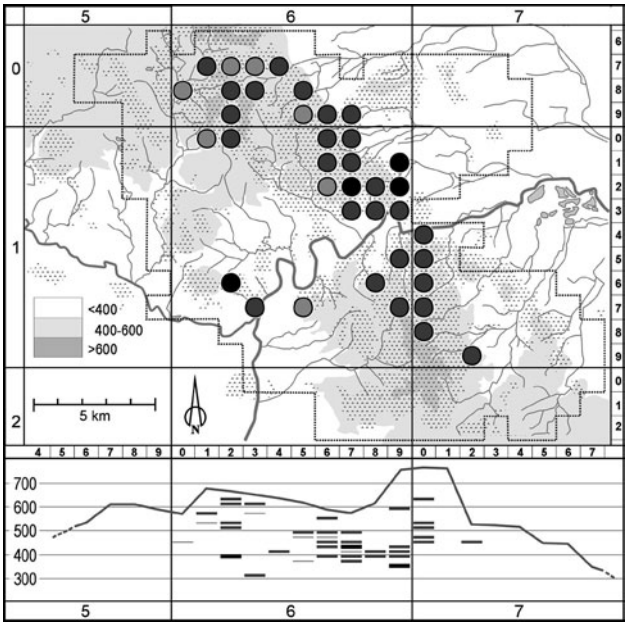

Fig. 34. Distribution of *R. lucentifolius* in the Bardo Mts.

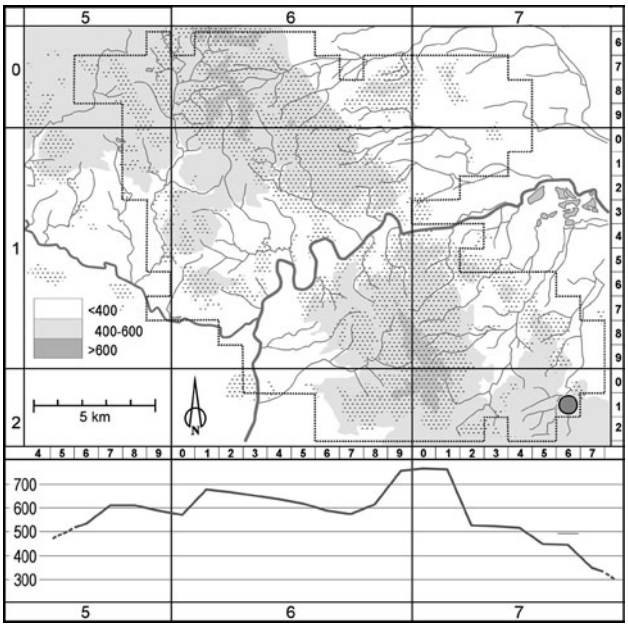

Fig. 35. Distribution of *R. macrophyllus* in the Bardo Mts.

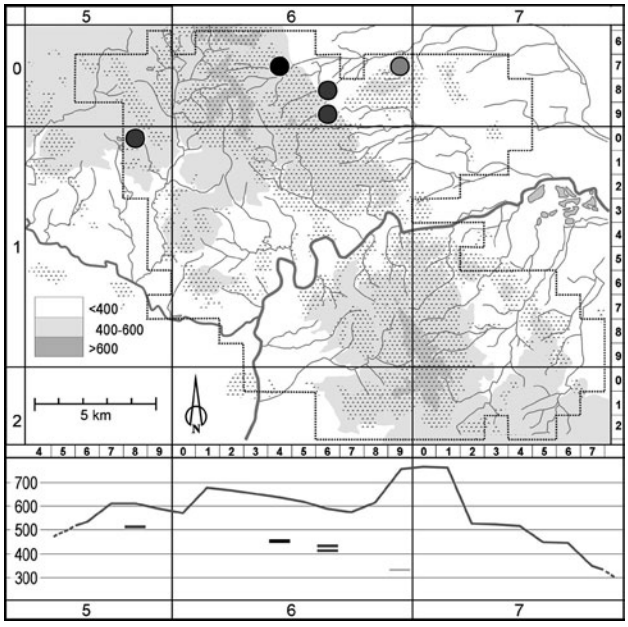

Fig. 36. Distribution of *R. mollis* in the Bardo Mts.

29. *Rubus macrophyllus* WEIHE & NEES (Fig. 35)

A Central European species distributed from the S England to Italy, in Poland in the SW regions; in the Bardo Mts transitional, lowland–submontane. It was found in only one locality in the vicinity of the Kłodzko Pass, in a loose spruce monoculture. Locally endangered.

30. *Rubus mollis* J. PRESL & C. PRESL (Fig. 36)

A Central European species distributed in S Germany, the Czech Republic, W Slovakia and Poland (almost exclusively in surroundings of Kłodzko County, Lower Silesia); in the Bardo Mts on its N limit, lowland–submontane, very rare (2.03% of squares and 0.65% of records), not found previously. *R. mollis* is scattered in the N part of the area, where it grows in wayside thickets and margins of coniferous forest. It reaches its maximum altitude (500 m) on the W slope of Mt Czajka near Straszków. Not endangered.

31. *Rubus montanus* LIB. ex LEJ. (Fig. 37)

A Central European species occurring from France and the Netherlands in the N, to S Italy, Hungary and Romania in the S, in Poland in the S; in the Bardo Mts transitional, lowland–submontane, frequent (45.12% of squares and 31.32% of records), so far it has been found in Srebrna Góra, Bardo and

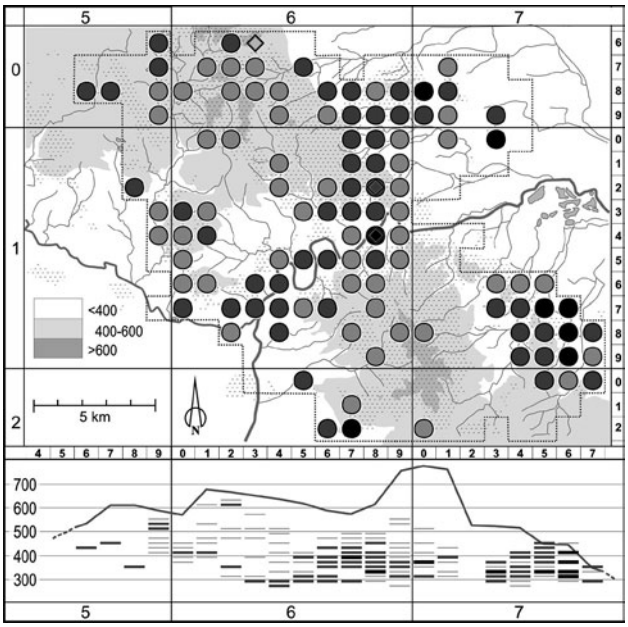

Fig. 37. Distribution of *R. montanus* in the Bardo Mts.

Opolnica (Kinscher, 1904, WRSL; col. ign., 1967, SZUB; Ziesché, 1904, KRAM 143336, PRC, WRSL). It reaches its maximal altitude (620 m) on the E slope of Mt Wilcza near Żdanów village. *R. montanus* prefers sunny flat places or gentle slopes facing slightly oftener to the SE, where grows singly or in small numbers in forest margins, wayside thickets and clearings of hornbeam and beech forest, as well as in coniferous monocultures on fertile substrates. Not endangered.

32. *Rubus nessensis* W. Hall (Fig. 38)

A species with a broad European distribution, occurring throughout Poland (although locally seems to

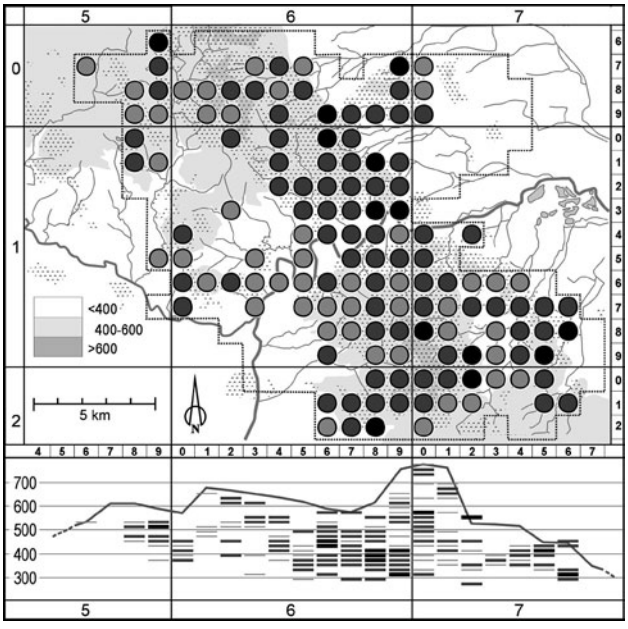

Fig. 38. Distribution of *R. nessensis* in the Bardo Mts.

be rarer); in the Bardo Mts transitional, lowland–lower-montane, frequent (56.09% of squares and 35.77% of records), not reported previously. It reaches its maximal altitude (765 m) on the top of Mt Kłodzka Góra. The bramble grows usually at medium abundance, mostly in forests on quite wet soils (coniferous monocultures, clearings and margins of deciduous forest) and in thickets along roads and balks, preferring slightly slopes facing to the SE and E. Not endangered.

33. *Rubus orthostachys* G. Braun (Fig. 39)

A Central European species distributed from the W France, through Germany, to the Czech Republic and Poland (the centre and south); in the Bardo Mts transitional, lowland–submontane, moderately frequent (22.76% of squares and 13.76% of records), not reported previously. *R. orthostachys* was found mainly NE from the main mountain ridge. It reaches its maximum altitude (625 m) on the S slope of Mt Ostróg near Srebrna Góra. The species grows usually at medium abundance, mainly in wayside thickets and balks, forest margins and clearings of deciduous forest, coniferous plantations, preferring slightly slopes and concave

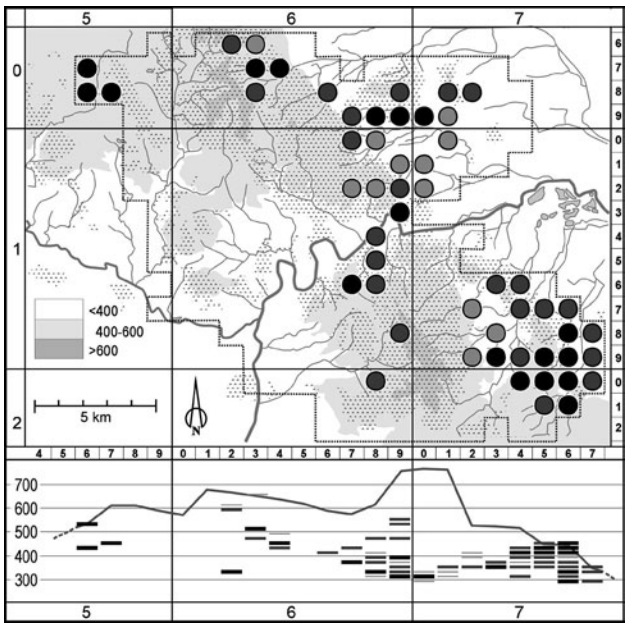

Fig. 39. Distribution of *R. orthostachys* in the Bardo Mts.

places facing to the E. Not endangered.

34. *Rubus ostroviensis* Sprib. (Fig. 40)

A regional Central European species probably endemic to Poland (concentrated in the south of Greater Poland and scattered in Lower Silesia); the Bardo Mts represent its SW limit of distribution, lowland–submontane, rare (5.28% of squares and 2.35% of records), not reported previously. *R. ostroviensis* occurs in three centres lying NE from the main mountain

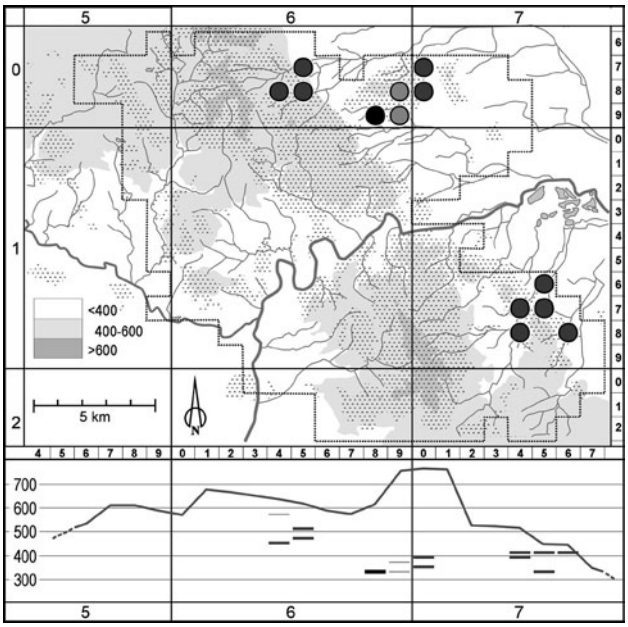

Fig. 40. Distribution of *R. ostroviensis* in the Bardo Mts.

ridge (the surroundings of Srebrna Góra, the Brzeźnica Massif and Olchówka Depression). It reaches its maximum altitude (560 m) on the S slope of Mt Żdanka near Żdanów. The species grows usually at medium abundance, mainly in sunny places in forest margins and clearings, preferring gentle south-east facing slopes and ridges. Not endangered.

35. *Rubus parthenocissus* TRÁVN. & HOLUB (Fig. 41)

A recently described bramble species of the Central European type of distribution: besides the Czech Republic it is known from several localities in Slovakia, Austria, Germany and S Poland (Kosiński and Bednorz 2003; Trávníček and Zázvorka 2005; Kosiński and Oklejewicz 2006); in the Bardo Mts at its N limit of distribution, lowland–submontane, very rare (1.21% of squares and 0.78% of records). It reaches its altitudinal maximum (340 m) on the S slope of Mt Brzeźnica near Budzów village. It occurs on flat areas or gentle slopes facing to the south, where it grows in wayside thickets and forest margins. Endangered because of the small number of poor stands.

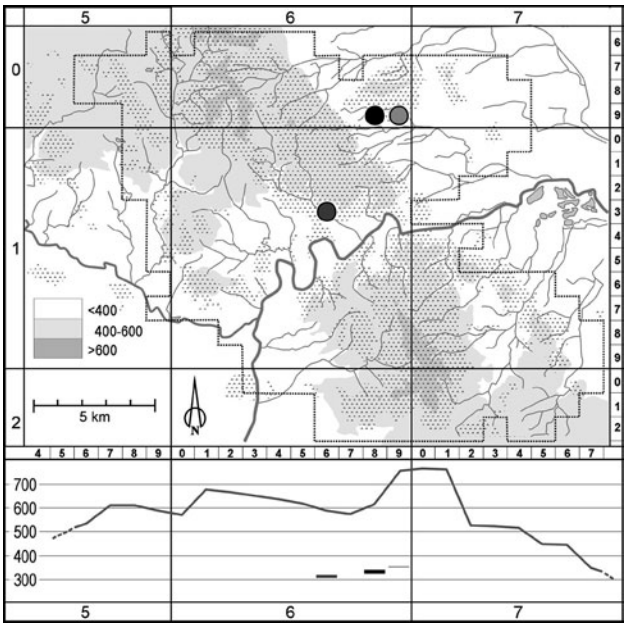

Fig. 41. Distribution of *R. parthenocissus* in the Bardo Mts.

36. *Rubus pedemontanus* PINKW. (Fig. 42)

A species with broad European distribution, in Poland from Lower Silesia to Roztocze and in Pomerania; in the Bardo Mts transitional, lowland–lower-montane, frequent (57.31% of squares and 46.13% of records; sixth in respect of frequency), not reported previously. It reaches its maximum elevation (750 m) on the summit of Mt Ostra near Laskówka. The species grows usually quite numerously to commonly in the undergrowth of spruce monocultures (most abundantly) and rarer in light places (clearings and margins) of deciduous forest, preferring slightly ridges and slopes facing to the SE. Not endangered.

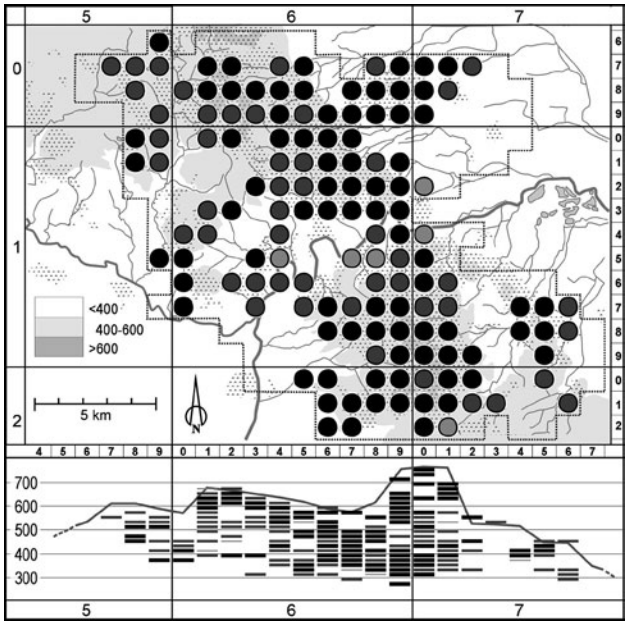

Fig. 42. Distribution of *R. pedemontanus* in the Bardo Mts.

37. *Rubus pericrispatus* HOLUB & TRÁVN. (Fig. 43)

A recently described bramble species of the Central European type of distribution, occurring in the Czech Republic, Slovakia, Austria, Germany, France and S Poland: several localities in the SE part of Lower Silesia and the E part of the Polish Carpathians (Oklejewicz 2006; Zieliński et al. 2004; Trávníček and Zázvorka 2005; Royer 2009); in the Bardo Mts it probably reaches its N limit, lowland–submontane, rare (8.13% of squares and 3.01% of records), not reported previously. The bramble occurs chiefly in the NE part of the area (surroundings of the Brzeźnica

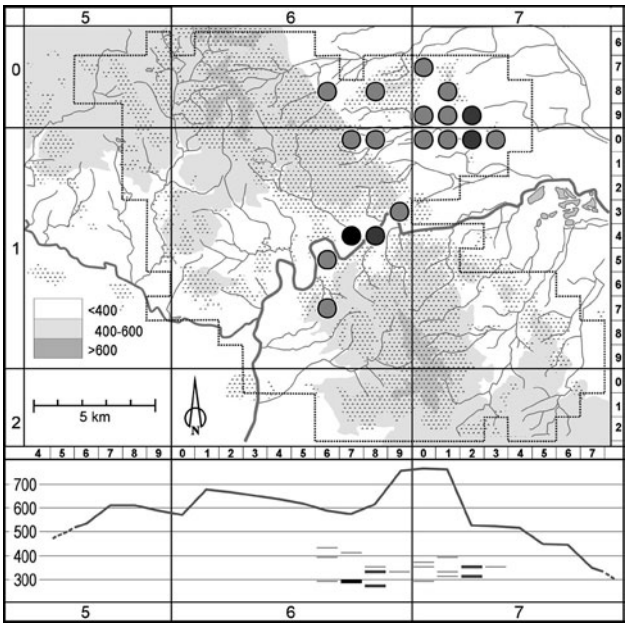

Fig. 43. Distribution of *R. pericrispatus* in the Bardo Mts.

Massif) and slopes along the Bardo Gorge, and reaches its maximum elevation (435 m) on the W slope of Mt Dębowa near Bardo, in a wayside thicket. *R. pericrispatus* grows mostly on gentle slopes facing to the SW or NW, usually individually or in small groups, in thickets along waysides and among fields, in forest margins and in the undergrowth of pine monocultures. Locally not endangered.

38. *Rubus plicatus* WEIHE & NEES (Fig. 44)

A species with broad European distribution, in Poland one of the commonest brambles (rare only in the SW and the NE); in the Bardo Mts transitional, lowland–submontane, rare (17.88% of squares and

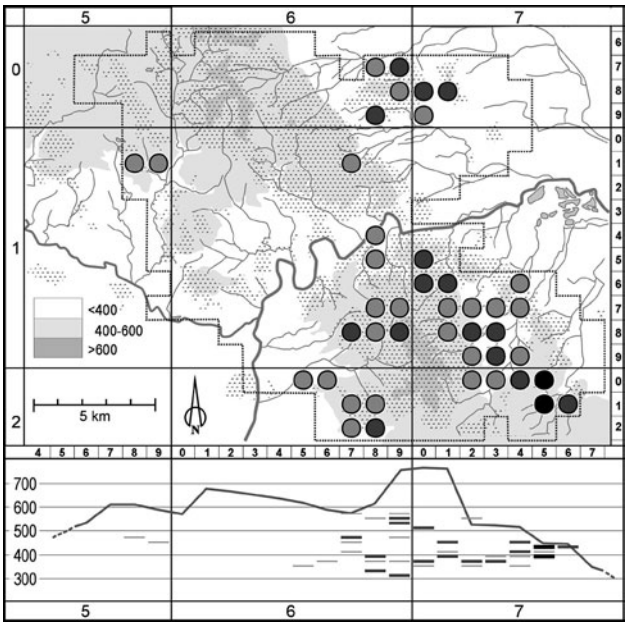

Fig. 44. Distribution of *R. plicatus* in the Bardo Mts.

7.33% of records), not reported previously. *R. plicatus* was found mainly in the SE part of the study area and in the Brzeźnica Massif. It reaches its maximum elevation (566 m) on the W ridge of Mt Jedlak near Podzamek village. The species grows usually in small numbers in light places, usually most abundantly in wayside thickets and balks, and less numerously in loose coniferous forests, in clearings and at margins of deciduous forest, preferring convex relief forms regardless of aspect. Not endangered.

39. *Rubus posnaniensis* SPRIB. (Fig. 45)

A regional Central European species occurring in Poland (in SE Greater Poland and E Lower Silesia) and in several stands in the NE of the Czech Republic; in the Bardo Mts it reaches its W limit of distribution, lowland–submontane, very rare (4.06% of squares and 1.44% of records), reported by Kinscher from Wojbórz (1905, PR). *R. ostroviensis* is scattered outside the main mountain ridge and reaches its maximum altitude (500 m) on the NW slope of Mt Kłapacz near Wojciechowice. The species grows usually at

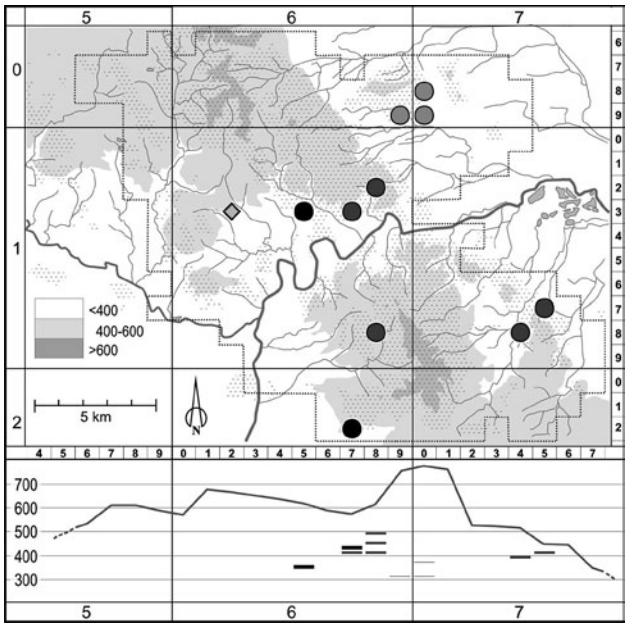

Fig. 45. Distribution of *R. posnaniensis* in the Bardo Mts.

medium abundance, mainly in sunny places in loose coniferous forests and in clearings and margins of deciduous forest, preferring gentle slopes and ridges facing to the SE. Locally not endangered.

40. *Rubus* ×*pseudoidaeus* (WEIHE) LEJ. (Fig. 46)

A hybrid of *R. caesius* and *R. idaeus* (subgen. *Rubus* × subgen. *Idaeobatus*), occurring within the range of both parental species, in Poland mainly in the south and west; in the course of the study it was found at only one locality near Brzeźnica village (310 m), in wayside thickets.

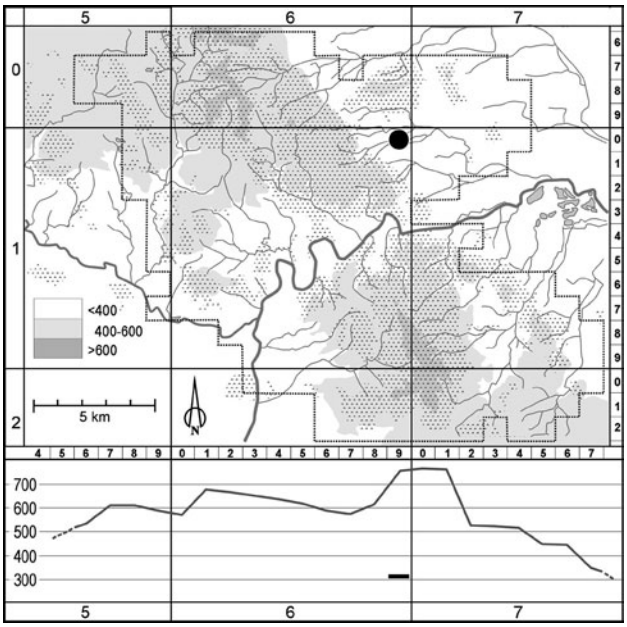

Fig. 46. Distribution of *R.* ×*pseudoidaeus* in the Bardo Mts.

41. *Rubus radula* Weihe (Fig. 47)

A species with broad European distribution, in Poland mainly in the S and W; in the Bardo Mts transitional, lowland–submontane, moderately frequent (28.45% of squares and 17.56% of records), previously collected by Kinscher in one stand in the Brzeźnica Massif (1904, WRSL). *R. radula* reaches its maximum elevation (625 m) on the SW slope of Mt Ostróg near Srebrna Góra. It grows mostly on gentle slopes or ridges, most frequently in the undergrowth of pine monocultures, rarer in other coniferous plantations, along forest margins and waysides. Not endangered.

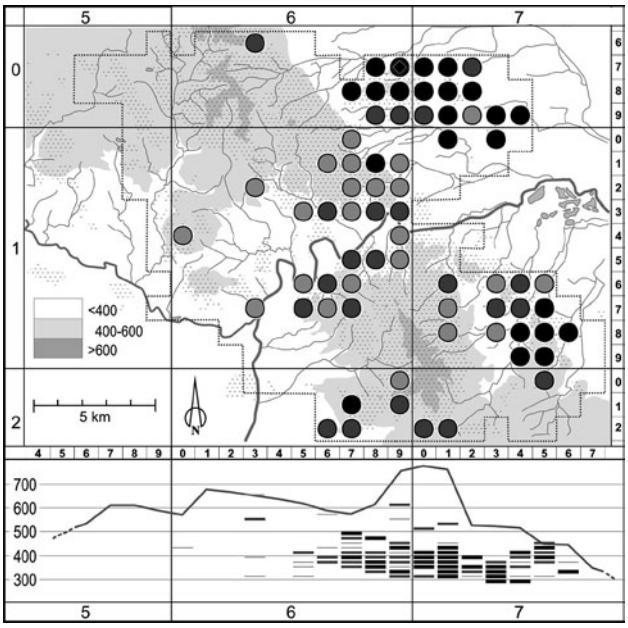

Fig. 47. Distribution of *R. radula* in the Bardo Mts.

42. *Rubus salisburgensis* Focke ex Caflisch (Fig. 48)

A species of Central European distribution, known from Germany, the Czech Republic, Austria and Poland (almost exclusively in the SE of Lower Silesia); in the Bardo Mts transitional, lowland–lower-montane, frequent (51.62% of squares and 35.91% of records), previously collected by Kinscher from one stand in the vicinity of Bardo (1908, W). It has an uneven distribution in the study area, being distinctly less frequent in the NE part. The species reaches its maximum elevation (765 m) on the top of Mt Kłodzka Góra. *R. salisburgensis* grows usually in the undergrowth of coniferous monocultures, as well as in forest margins and clearings, rarer in wayside thickets and balks. Not endangered.

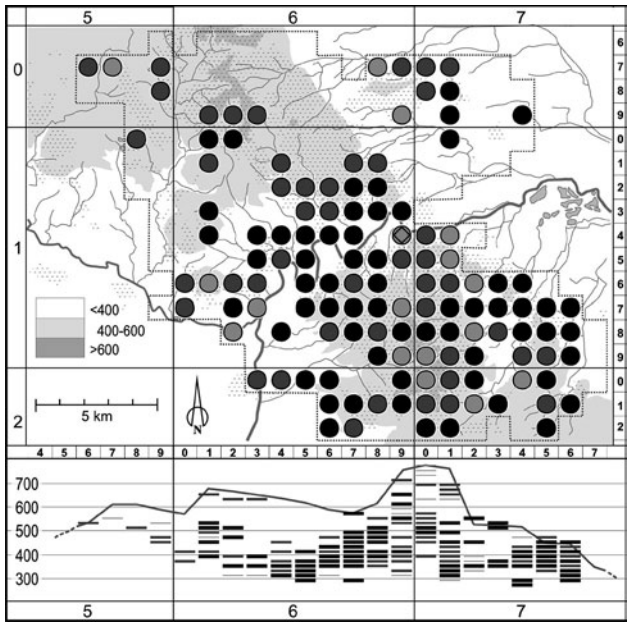

Fig. 48. Distribution of *R. salisburgensis* in the Bardo Mts.

43. *Rubus siemianicensis* Sprib. (Fig. 49)

A regional Central European species known mainly from Poland (the S of Greater Poland and the E part of Lower Silesia) and a few stands in the Czech Republic; in the Bardo Mts at its W limit of distribution, lowland–submontane, rare (11.78% of squares and 5.76% of records). So far it has been found by Kinscher in one stand in the vicinity of Grochowa village (1905, PR & W). *R. siemianicensis* occurs mainly in the central part of the area, in a belt stretching from Kłodzko to Brzeźnica Massif. It reaches its maximum elevation (615 m) on the S slope of Mt Wilcza near Wilcza village. The species grows usually with medium abundance, mainly in sunny places in the undergrowth of loose coniferous monocultures, in forest margins and clearings, deforested places, preferring slightly gentle slopes facing to the NW. Not endangered.

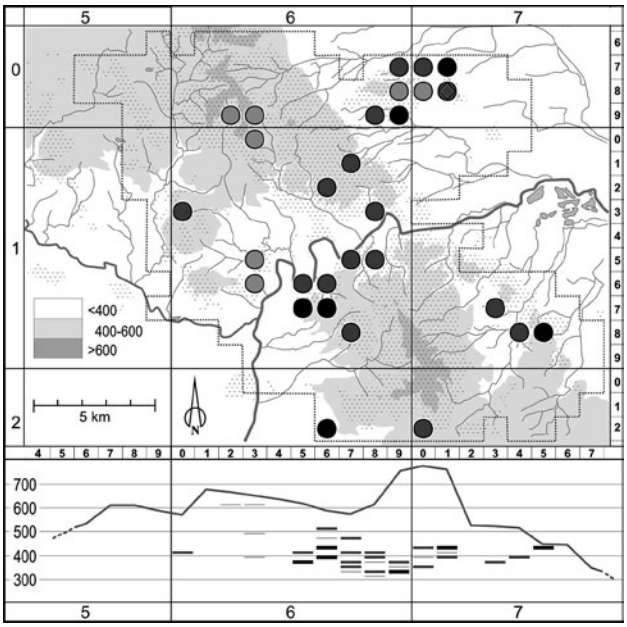

Fig. 49. Distribution of *R. siemianicensis* in the Bardo Mts.

44. *Rubus silesiacus* WEIHE (Fig. 50)

A Central European species distributed in Austria, the Czech Republic and Poland (Lower Silesia); in the Bardo Mts transitional, lowland–submontane, moderately frequent (76.01% of squares and 59.76% of records, second in respect of frequency), reported so far from Mt Bukowczyk near Braszowice (1904, Kinscher, WRSL) and from the vicinity of Bardo (1967, col. ign. SZUB). *R. silesiacus* occurs practically everywhere, a bit rarer in the most elevated areas. It reaches its maximum altitude (745 m) beneath the top of Mt Kłodzka Góra. The species grows usually with medium abundance in the undergrowth of loose coniferous forest, in forest margins and clearings, on deforested places, rarer in wayside thickets. Not endangered.

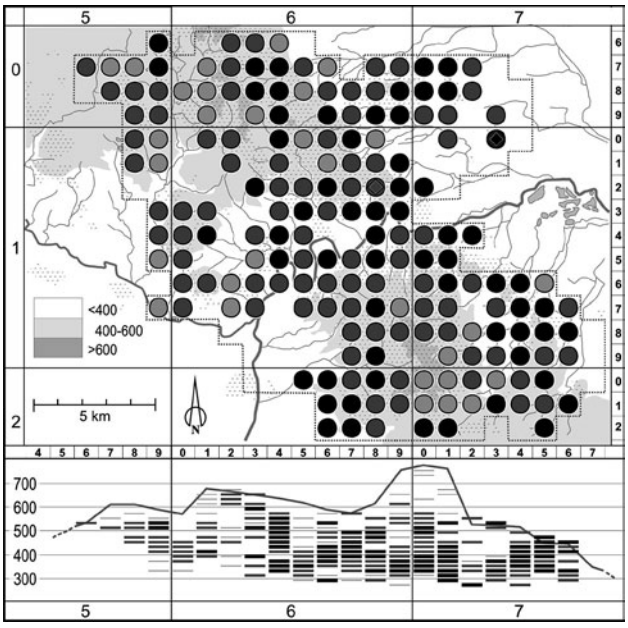

Fig. 50. Distribution of *R. silesiacus* in the Bardo Mts.

45. *Rubus sulcatus* VEST (Fig. 51)

A species with broad European distribution, occurring from the S Scandinavia to the N Italy, and from the S England to Kaliningrad Oblast (Russia), in Poland mainly in S regions; in the Bardo Mts transitional, lowland–submontane, moderately frequent (30.08% of squares and 14.94% of records), not reported previously. It reaches its maximal elevation (740 m) on the S slope of Mt Ostra above Laskówka village. *R. sulcatus* grows usually individually or in small numbers, mainly at margins and clearings of deciduous forest, in the undergrowth of coniferous plantations and sometimes in the wayside thickets and balks, preferring slightly SE aspect. Not endangered.

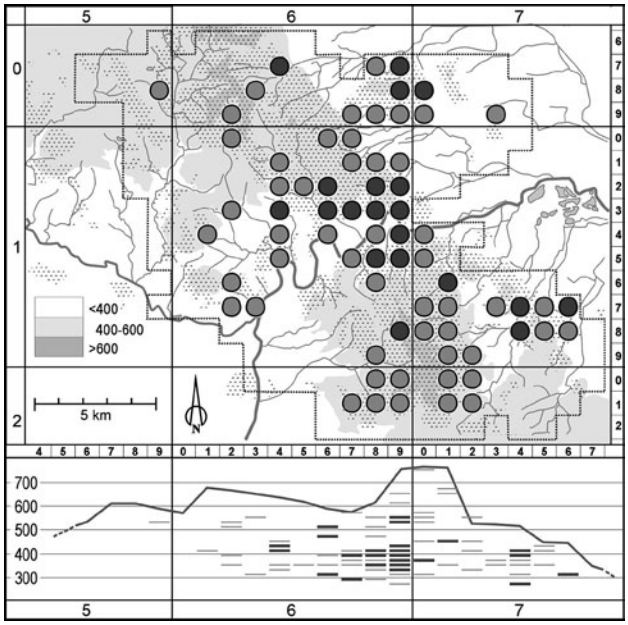

Fig. 51. Distribution of *R. sulcatus* in the Bardo Mts.

46. *Rubus tabanimontanus* FIGERT (Fig. 52)

A Central European species occurring in Germany, Slovakia, the Czech Republic and Poland (scattered in the SW); in the Bardo Mts transitional, lowland–submontane, moderately frequent (35.77% of squares and 19.13% of records), not reported previously. It reaches its maximum elevation (610 m) in the spruce forest, along the touristic trail, on the S slope of Mt Jedlak above Podzamek village. *R. tabanimontanus* grows usually individually or in small numbers, preferring slopes and ridges facing to the SW, mainly along margins, ways and in clearings of coniferous and mixed forest, rarely in deciduous forest and in wayside thickets, balks and small woods among fields. Not endangered.

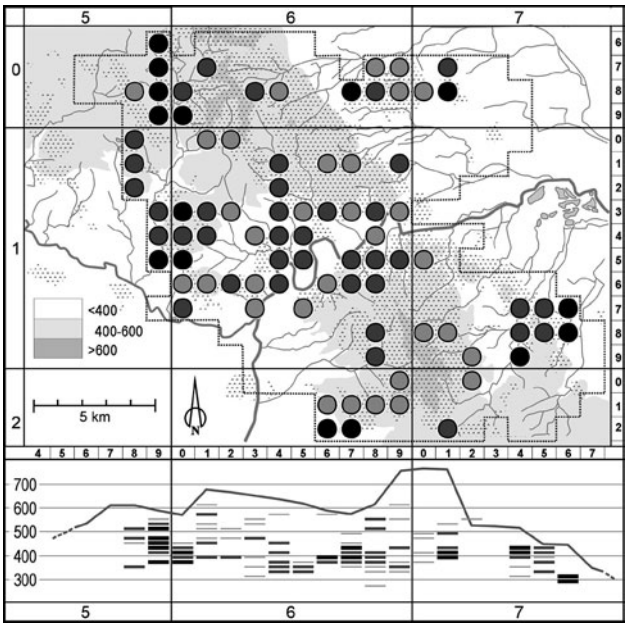

Fig. 52. Distribution of *R. tabanimontanus* in the Bardo Mts.

47. *Rubus wahlbergii* ARRH. (Fig. 53)

A North and Central European species occurring mainly in Scandinavia and Denmark, scattered in the Czech Republic and SW Poland; in the Bardo Mts transitional, lowland–submontane, very rare (2.43% of squares and 0.91% of records), not reported until now. The bramble was found only in seven localities, mainly in the vicinity of the Nysa River. It reaches its maximum altitude (405 m) in a quarry 1 km E from Święcko village near Kłodzko. *R. wahlbergii* grows usually with medium abundance, on SW and S facing slopes, in wayside thickets. Not endangered.

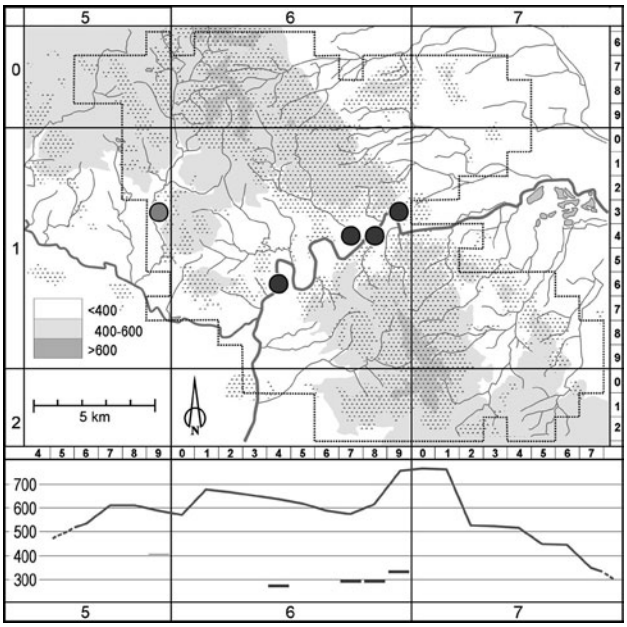

Fig. 53. Distribution of *R. wahlbergii* in the Bardo Mts.

48. *Rubus wimmerianus* (SPRIB. ex SUDRE) SPRIB. (Fig. 54)

A Central European species occurring in the Czech Republic and Poland, and known also from a few localities in Ukraine and Austria; in the Bardo Mts it is at its W limit of distribution, lowland–submontane, very rare (2.03% of squares and 1.04% of records), not reported previously. The bramble was found mainly in the SE fringe of the study area. It reaches its maximum altitude (425 m) in the E slope of hill in the vicinity of Kolonia Laski village. *R. wimmerianus* grows individually to numerously, more often on SE facing slopes, in forest margins and wayside thickets. Not endangered.

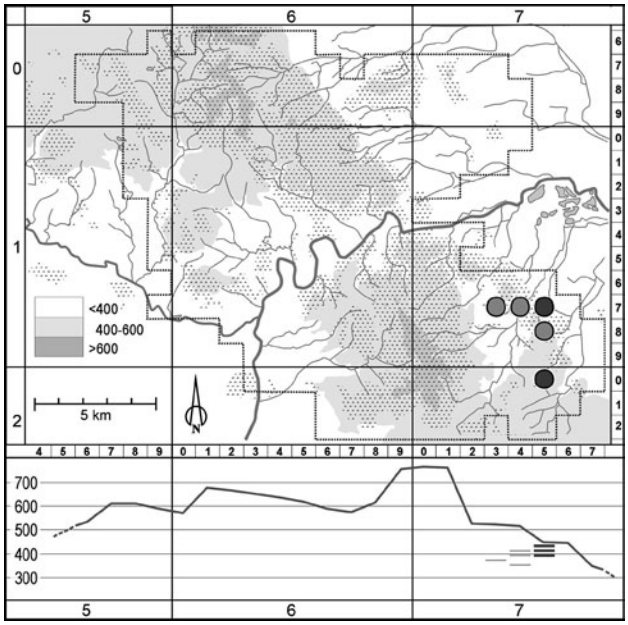

Fig. 54. Distribution of *R. wimmerianus* in the Bardo Mts.

Acknowledgements

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