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**Investigations on Scale Insects (*Homoptera, Coccoidea*)
of the Pieniny Klippen Belt**

[with 5 text-figs.]

Badania nad czerwami (*Homoptera, Coccoidea*) Pienińskiego Pasa Skalicowego

Исследования кокцид (*Homoptera, Coccoidea*) Скалистой Полосы Пенин

The paper concerned with the scale insects of the Pieniny Mountains (ŻAK-OGAZA & KOTEJA, 1964) discussed the scale insect fauna in the area between Czorsztyn and Szezawnicza, i.e. the Pieniny proper. The present paper presents the results of investigations carried out in the remaining sections of the Pieniny Klippen Belt.

DESCRIPTION OF THE REGION

The region investigated was the area in the Pieniny Klippen Belt westward of Czorsztyn between the line connecting the villages of Gronków, Nowa Biała, Krempachy, Frydman, Falsztyn, Czorsztyn (northern boundary) and the line connecting the villages of Groń, Trybsz, Dursztyn, Łapsze Niżne and Niedzica (southern boundary) (Fig. 1). The most westerly point is the rock Cisowa Skała (685 m above sea level). These territories thus embrace the sections of the western part (from Gronków to Dursztyn) and of the central part (Branisko-Hombark range) of the Pieniny Klippen Belt¹.

In the section situated eastward from Szezawnicza the investigations carried out covered part of the Pieninki (Bystrzyk, Kacze) and the Małe Pieniny (Little Pieniny). This area is bounded on the south by the valleys of the Grajcerek and the Biała Woda. The easternmost point is Wierchliczka (955 m above sea level).

¹ The division and names of the Pieniny are given according to SMÓLSKI (1955).

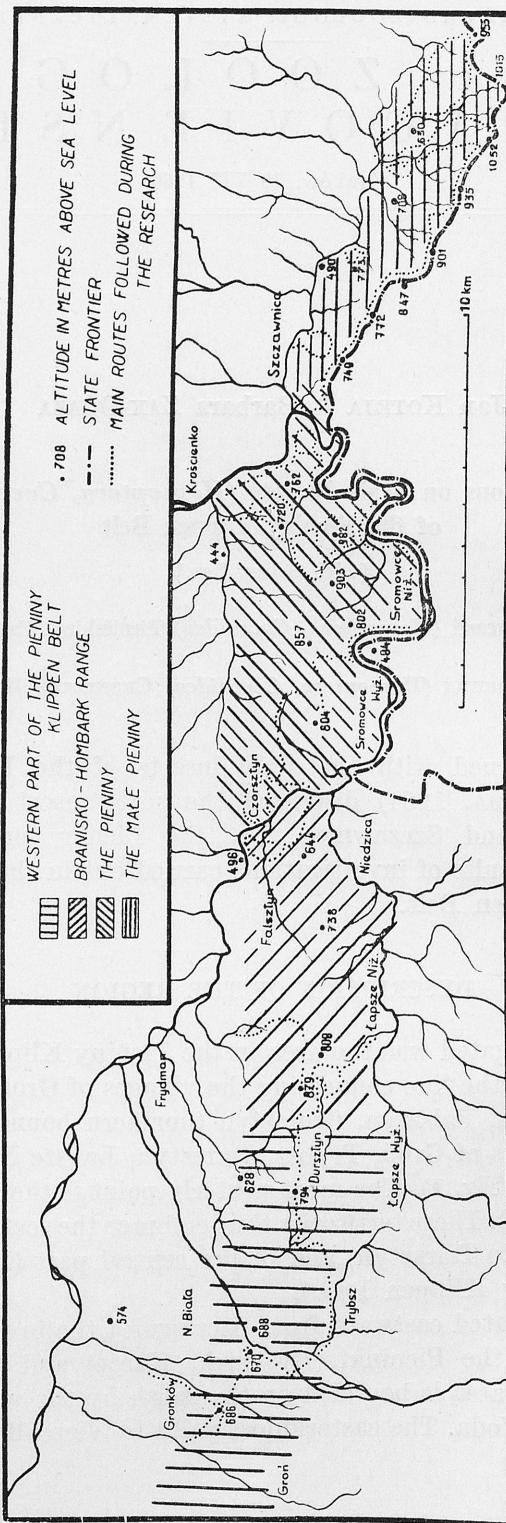


Fig. 1. The Pieniny Klippen Belt. The borders of the investigated territories

The Pieniny Zachodnie (Western Pieniny) consists of rocks of various size protruding from the flisch cover. The following rocks in the investigated area should be mentioned, Cisowa Skała (686 m above sea level), Obłazowa (670 m above sea level), Kramnica (688 m above sea level) and numerous small rocks such as Faśnymbrowe, Krzysztoforowe, Rafaczowe, and Lorencowe Skałki. The highest one situated in the latter group is Czerwona Skała (794 m above sea level)¹.

The Branisko—Hombark range (the Pieniny Spiskie) is a uniform mountain ridge towering 200 m above the surrounding undulating territory. The highest points are Branisko (879 m above sea level), Hombark (808 m above sea level) and Złatne (788 m above sea level). Steep exposed rocks occur only in the group of Zielone Skałki (547 m above sea level) by the river Dunajec. The main ridge of the Małe Pieniny consists of sandstone, marl and conglomerates in which single limestone klippen are set (Szafranówka, Rabsztyn, Wysokie Skałki, 750 m, 775 m, 1052 m above sea level respectively); the side ridge, situated in Czechoslovakia, has not been investigated. Besides the summit rocks, exposed limestone occurs also in the vicinity of the Homole and Biała Woda streams, where they form steep cliffs. In the north parallel to the main ridge there is a line of domelike hills (Palenica, Jarmuta, Krupianka, 722 m, 773 n, 708 m above sea level respectively).

The climate of the discussed region differs somewhat from the climate of the Pieniny proper. The western areas are under the influence of the specific continental climate of the Nowy Targ valley (Table I), whereas the Małe Pieniny (the valley of the stream Grajcerek) have the warmest and mildest climate in the whole Podhale region (SMÓLSKI, 1955).

The plant cover of the western part of the Pieniny Klippen Belt and the Branisko—Hombark range is the impoverished counterpart of the vegetation of the Pieniny proper². As in the Pieniny the mountain elements occur here with xerothermic vegetation.

On the rocks grow communities with *Festuca pallens* Host and *Calamagrostis varia* (SCHRAD.) Host. *Pinus silvestris* L. often occurs here. The rock rubble is covered by a community in which *Origanum vulgare* L. dominates (up to 60%). The foot of the rocks are surrounded by meadows with *Trifolium montanum* L. and *Anthyllis vulneraria* L. These communities, like the fallow with *Alecto-rolophus* ALL., are overgrown successively by *Prunus spinosa* L., *Rubus idaeus* L., *Cornus mas* L., and *Picea excelsa* (LAM.) LK.

Most of the area surrounding the rocks is cultivated. The meadows belong to the order *Arrhenatheretalia*, the pastures to the association *Lolio-Cynosuretum* (mountain subassociation).

¹ The division and the names of the rocks are given according to BIRKENMAJER (1958).

² The plant cover of the discussed region has not been hitherto described. The above characterization is based on scant notes (WALAS, 1936) and oral information of dr K. GRODZIŃSKA.

Table I

Some climatological data from the Pieniny Mountains and their surroundings

Place	Krynica	Szezawnica	Nowy Targ	Zakopane
Altitude in metres above sea level	550	450—500	550—600	800—900
Average diurnal temperature in January	4	3.3	4.9	4
Average diurnal temperature in July	16.1	16.4	16	14.8
Average diurnal temperature in a year	6.3	6.9	5.9	5.4
Number of frosty days	22	19.4	39.2	38.6
Average annual rainfall in mm	901.9	854.4	774.7	1118.2
Average diurnal relative humidity in a year in %	80	83.6	—	78.9
Number of days with firm snow cover	115.6	94.2	112.8	116.2
Number of fine days (degree of over-casting > 2)	54	57	67.8	43.8

The data are taken from the work by FABIJANOWSKI (1957); the measurements concern the years 1949—1953.

In the western part of the Pieniny Klippen Belt, northward from the village of Trybsz, small areas are covered by woods. Larger woods occur on the mounts of Branisko, Hombark and Zlate. They are damaged and consists almost entirely of spruce (planted?) with a slight admixture of fir. In some parts (northern slopes of Branisko) *Fagetum carpaticum* undergrowth has been preserved.

On the rocks of the Małe Pieniny there grow communities with *Festuca pallens* Host, *Calamagrostis varia* (SCHRAD.) Host and *Sessleria varia* (JACQ.) WETTST., the latter only in the Homole gorge (KULCZYŃSKI, 1928). Pastures, pastured fallow, and meadows occupy a large area. The higher the more barren they become. In the lower parts there are communities with *Agrostis vulgaris* WIRTH., and in higher with *Deschampsia flexuosa* (L.) TRIN. and *Nardus stricta* L. (KULCZYŃSKI, 1928). These pastures are being overgrown by *Juniperus communis* L., *Corylus avellana* L., *Alnus incana* (L.) MNCH. and *Picea excelsa* (LAM.) LK. Thus large alder scrub has developed on Hulina, Palenica and the western slopes of the Jarmuta (KULCZYŃSKI, 1928; FABIJANOWSKI, 1957). Beside alder bushes there also occur here spruce forests (on Wysokie Skałki, natural forests), fir forests and „acid“ beeches, so called *Fagetum myrtillorum* (KULCZYŃSKI, 1928) or *Luzulo-Fagetum* (FABIJANOWSKI, 1962). All the forests, except those on steep inaccessible slopes, have been seriously damaged by felling and grazing.

THE FAUNA OF SCALE INSECTS

38 species of scale insects were determined in the region discussed in this paper. All of them are new for this region as no research on scale insects has hitherto been carried out here.

Out of these 38 species 1 is new to science and has been described as *Luzulaspis pieninica* sp. n., 8 are new for the Polish fauna and 6 are new for the Pieniny Klippen Belt. Besides 13 species were collected which could only be identified as genera, i.e. *Trionymus* BERG — 3 species, *Atrococcus* GOUX — 1 species, *Balanococcus* WILLIAMS — 3 species, *Phenacoccus* CKLL. — 2 species, *Helicoccuss* ŠULC — 1 species, *Acanthococcus* SIGN. — 2 species, and *Lecanopsis* TARG. — 1 species. They are most probably species new to science; further detailed research is necessary for their identification.

37 species were reported from the Pieniny proper (ŽAK-OGAZA & KOTEJA, 1964), 12 of them were not determined in the region covered by the present investigations. Of the 37 species 3 must be discounted, i.e. 1) *Luzulaspis grandis* BORCHS., 2) *Greenisca inermis* (GREEN), and 3) *Brevennia tetrapora* GOUX. *Luzulaspis grandis* BORCHS., proved to be a species new to science and was described as *L. pieninica* sp. n. (it occurs in the Pieniny proper and in the western part of the Pieniny Klippen Belt), *Greenisca inermis* (GREEN) is also a new species and was described as *G. brachypodii* BORCHS. & DANZ. (DANZIG, 1964) (it occurs only in the Pieniny proper), *Brevennia tetrapora* GOUX, wrongly determined by the authors, is in fact *Heterococcus variabilis* SCHMUTTERER (it occurs both in the Pieniny proper and in the region discussed at present). Thus the number of 37 species from the Pieniny proper remains unchanged.

The total number of scale insects from the whole Pieniny Klippen Belt amounts to 50 species (Table II). About 80 species from the territory of Poland are now known including the species given in the present paper but not counting glass house species. As can be seen the fauna of scale insects of the Pieniny Klippen Belt appears to be very rich. This is caused by the great variety of habitats in the investigated territory. To some extent, however, this abundance is only apparent and results on the one hand from the fact that research on other territories in Poland is still very incomplete, especially concerning scale insects from the families *Pseudococcidae* and *Eriococcidae*. On the other hand it should be remembered that some species collected in various territories in Poland have not been hitherto reported (oral information by Professor Z. KAWECKI) and therefore not accessible.

AN ATTEMPT TO ASSOCIATE THE OCCURRENCE OF SCALE INSECTS WITH PARTICULAR HABITATS

Observations carried out in the investigated area enabled the determination of several habitat groups. It should be stressed that the interpretation of the dependence of scale insects on particular plant communities is rather difficult

Table II

List of species and their distribution

Species	Localities				
	W. P.	B.-H.	P.	M. P.	Others
<i>Xylococcus filiferus</i> LÖW			+		+
<i>Porphyrophora polonica</i> (L.)			+		+
<i>Newsteadia floccosa</i> DE GEER	+	+	+	+	+
<i>Ortheziola vejvodskyi</i> ŠULC		+	+	+	
<i>Arctorthelia cataphracta</i> (OLAF.)				+	+
<i>Phenacoccus aceris</i> (GEOFFR.)			+	+	+
<i>Paroudablis piceae</i> (LÖW)	+	+	+	+	+
<i>P. interruptus</i> (GREEN)			+		
<i>Heterococcus borkhsenii</i> (MORR.)			+	+	
<i>H. variabilis</i> SCHMUTT.	+		+	+	
<i>Helioecoccus radicicola</i> GOUX			+		
<i>Ceroputo pilosellae</i> ŠULC	+	+	+	+	+
<i>Spinococcus calluneti</i> (LNDGR.)	+				
<i>Allococcus vovae</i> (NASS.)				+	+
<i>Trionymus aberrans</i> GOUX				+	
<i>T. newsteadi</i> (GREEN)				+	
<i>Atrococcus cracens</i> WILLIAMS	+	+		+	
<i>Rhodania occulta</i> SCHMUTT.		+	+	+	
<i>Acanthococcus aceris</i> SIGN.			+	+	+
<i>A. greeni</i> (NEWST.)			+	+	
<i>Rhizococcus insignis</i> (NEWST.)	+	+	+	+	+
<i>Rh. herbaceus</i> DANZIG			+	+	+
<i>Rh. agropyri</i> BORCHS.				+	
<i>Greenisca glyceriae</i> (GREEN)	+		+	+	
<i>G. brachypodii</i> BORCHS. & DANZIG			+		
<i>Fonscolombia fraxini</i> (KALT.)			+	+	+
<i>Cryptococcus fagisuga</i> LNDGR.			+	+	+
<i>Luzulaspis luzulae</i> (DUF.)	+	+	+	+	+
<i>L. nemorosa</i> KOTEJA				+	
<i>L. montana</i> SCHMUTTERER			+		
<i>L. pieninica</i> sp. n.	+		+		
<i>Parafairmairia bipartita</i> (SIGN.)			+		
<i>Eriopeltis festucae</i> (FONSC.)	+		+	+	+
<i>E. rastinae</i> BORCHS.			+	+	
<i>Pulvinaria betulae</i> (L.)			+	+	+
<i>Sphaerolecanium prunastri</i> (FONSC.)		+	+	+	+
<i>Lecanium corni</i> BOUCHE	+		+	+	+
<i>L. coryli</i> (L.)			+	+	+
<i>L. ciliatum</i> (DOUGL.)			+	+	+
<i>L. sericeum</i> LNDGR.			+		
<i>L. graniforme</i> (WÜNN)			+		
<i>Physokermes piceae</i> (SCHRK.)	+	+	+	+	+
<i>Ph. hemicyrus</i> (DALM.)	+	+	+	+	+
<i>Dynaspidiotus abietis</i> (SCHRK.)			+		

Table II continued

Species	Localities				
	W. P.	B.-H.	P.	M. P.	Others
<i>Diaspidiotus bavaricus</i> (LNDGR.)	+				+
<i>Quadraspidiotus ostraeformis</i> (CURT.)			+		+
<i>Syngenaspis parlatoriae</i> ŠULC	+		+	+	
<i>Leucaspis loewi</i> COLVÉE	+				+
<i>Lepidosaphes ulmi</i> (L.)		+	+	+	+
<i>Chionaspis salicis</i> (L.)	+	+	+	+	+

W. P. = western Part of the Pieniny Klippen Belt

B.-H. = Branisko—Hombark range

P = the Pieniny

M. P. = the Male Pieniny (Little Pieniny)

Others = other localities published from Poland

because of the great distortion of natural relations caused by human interference. Plant associations are mostly of an undefined character, and the populations of scale insects are in many cases meagre.

I. Besides cultivated areas proper, which were not taken into consideration in this research, the greater part of the Pieniny Klippen Belt consists of meadows, clearings in woods, and pastures. In numerous cases, especially in the Małe Pieniny, they are overgrown by hazel, slow, alder, juniper, and spruce. It was on the herbaceous plants of this habitat that the greatest number, i.e. 14 species, were stated, of which the following seem to be the most characteristic: *Ortheziola vejdovskyi* ŠULC, *Heterococcus borkhsenii* MORR., *H. variabilis* SCHMUTTERER, *Ceroputo pilosellae* ŠULC, *Greenisca glyceriae* (GREEN), *Rhizococcus insignis* (NEWST.), *Luzulaspis luzulae* (DUF.) and *Eriopeltis festucae* (FONSC.). On the bushes and trees 8 species were collected, of which the most interesting are: *Phenacoccus aceris* (GEOFFR.), *Acanthococcus aceris* SIGN., *Sphaerolecanium prunastri* (FONSC.), *Lecanium ciliatum* (DOUGL.), and *L. coryli* (L.).

II. Spruce forests. Natural spruce forests occur in the Pieniny Klippen Belt only in small fragments in the region of Wysokie Skałki (KULCZYŃSKI, 1928). The remaining spruce stands developed as the result of the destruction of the lower montane forests (partly planted). The characteristic species for these forests are the following: *Paroudablis piceae* (LÖW), *Physokermes piceae* (SCHRK.), and *Ph. hemicyrhpus* (DALM.). In the undergrowth of these forests occur *Newsteadia floccosa* de GEER, *Spinococcus calluneti* (LNDGR.), and *Diaspidiotus bavaricus* (LNDGR.). The secondary character of the spruce stands is proved by the absence of *Lecanium slavum* KAWEKI and *Phyllostroma myrtilli* (KALT.), i.e. scale insects connected with the undergrowth of natural spruce forest.

III. Lower montane forests. We classify spruce and fir forests, carpathian beech and alder trees under this heading. In the Pieniny Klippen Belt, with

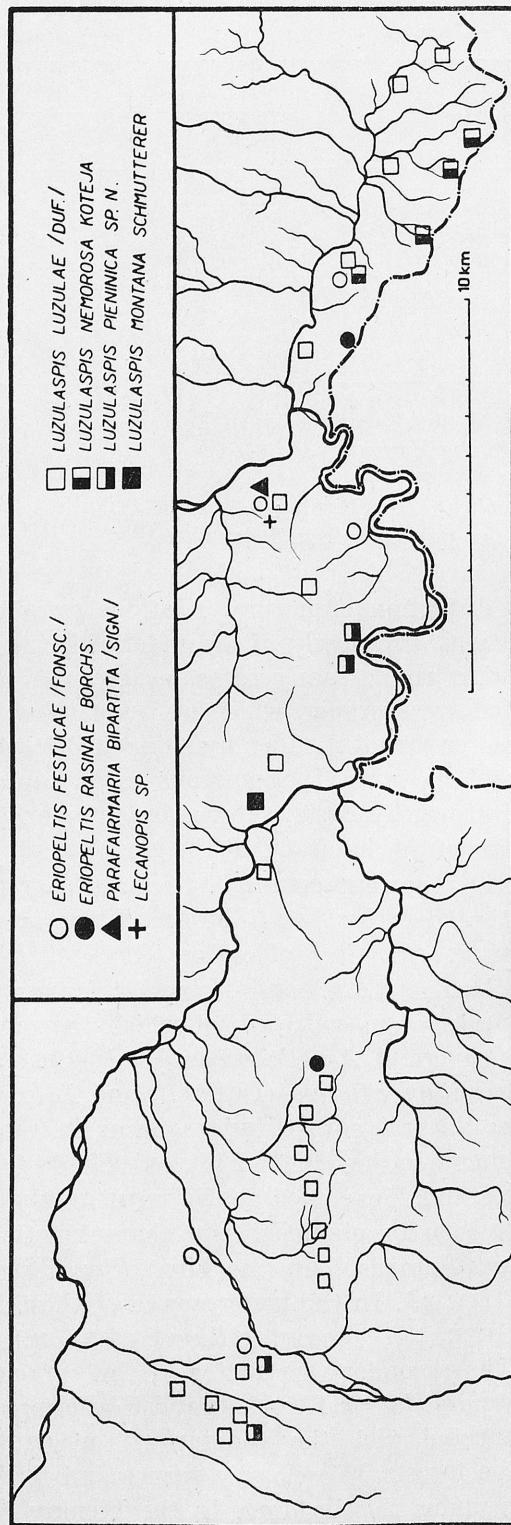


Fig. 2. The Pieniny Klippen Belt. Distribution of species of the subfamily *Filippiinae*

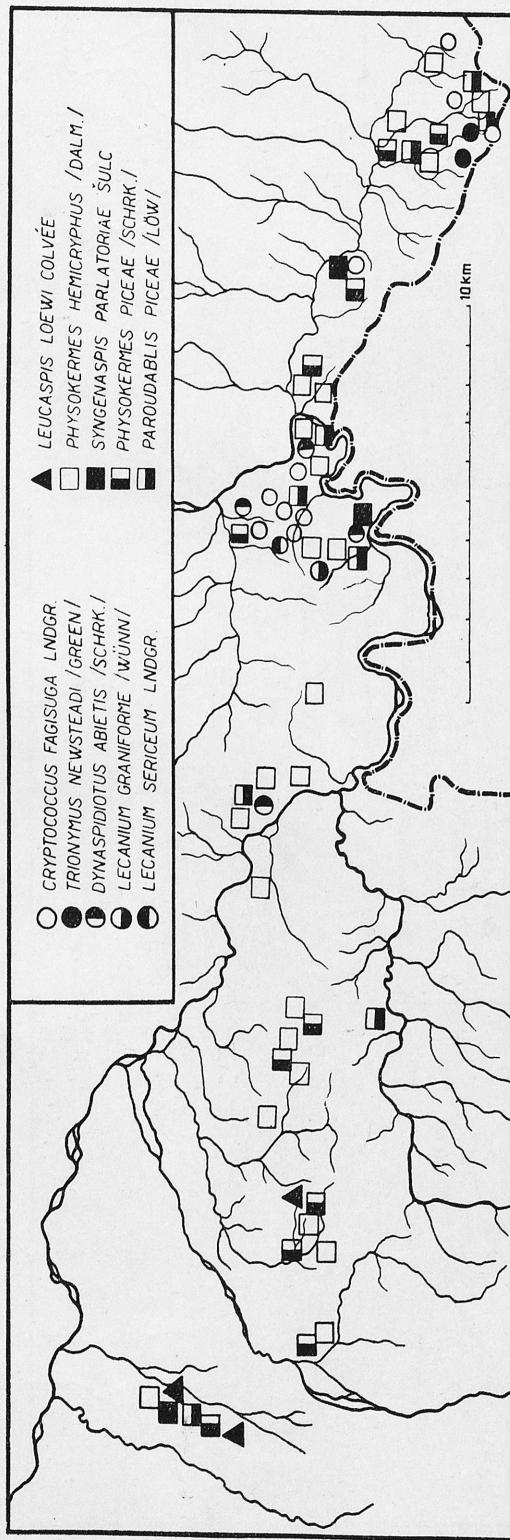


Fig. 3. The Pieniny Klippen Belt. Distribution of some species from beech and conifers

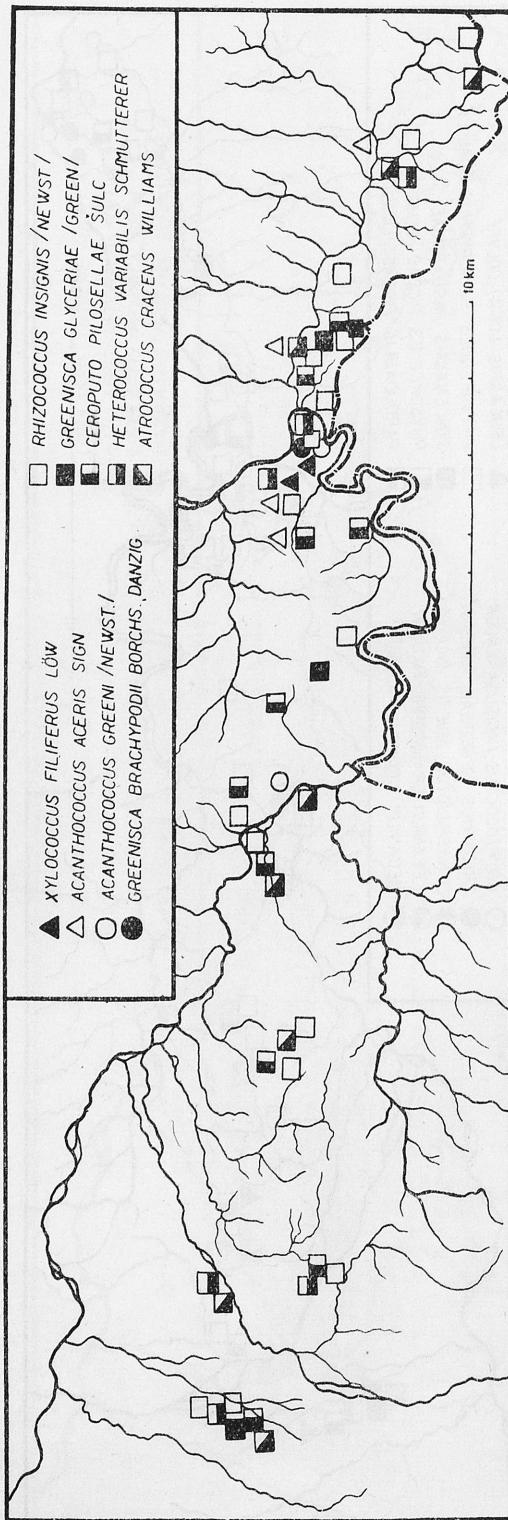


Fig. 4. The Pieniny Klippen Belt. Distribution of some thermophilous and pasture species

the exception of the Pieniny proper, these forests have been badly damaged. The characteristic species for this habitat occurring in rare localities are: *Lecanium sericeum* LNDGR., *L. graniforme* (WÜNN), and *Trionymus newsteadi* (GREEN). The only common species is *Cryptococcus fagisuga* LNDGR. *Luzulaspis nemorosa* KOTEJA occurs in the undergrowth of the „acid“ habitat.

IV. Saxatile vegetation. The species unquestionably characteristic for the lime trees growing on the rocks exposed to the sun is *Xylococcus filiferus* Löw. Seven indentified species and most of the unidentified species were found on saxatile grass and rock rubble. *Arctorthezia cataphracta* (OLAF.) among others was collected in damp places, and *Acanthococcus greeni* (NEWST.), *Greenisca brachypodii* BORCHS. & DANZ., and *Luzulaspis pieninica* sp. n. in dry places.

V. The last group consists of the scale insects occurring both in some of the above mentioned habitats and in scrub growing in the fields, by the roads etc. Here should be classified primarily *Phenacoccus aceris* (GEOFFR.), *Lecanium corni* BOUCHÉ, *Pulvinaria betulae* (L.), *Lepidosaphes ulmi* (L.), and *Chionaspis salicis* (L.).

The distribution of some species occurring in particular habitats is shown on figs. 2, 3 and 4.

Below are listed the main features of the fauna of scale insects of the Pieniny Klippen Belt:

a) The largest number of species, i.e. 24, were found only in 1—2 localities though many similar habitats were investigated. 20 species were found in 3—10 localities and 6 in a great number of localities.

b) In general the number of specimens occurring in particular localities is small. Only *Cryptococcus fagisuga* LNDGR., *Luzulaspis nemorosa* KOTEJA, *Physokermes hemicyrphus* (DALM.) and *Chionaspis salicis* (L.) occur in large populations. In but few localities also *Sphaerolecanium prunastri* (FONSC.) and *Lecanium corni* BOUCHÉ were found in large number.

c) The scarcity of scale insects of the family *Diaspididae* is striking. 7 species were collected but all with the exception of *Chionaspis salicis* (L.) and *Lepidosaphes ulmi* (L.) only in single localities.

d) The lack of some species may be explained by the absence of host plants or suitable habitats; there is also the lack of such antropophilous species as *Orthezia utricae* (L.). Some species occur in small populations, for instance *Quadraspidiotus ostreaeformis* (CURT.) on planted poplars (in the village Sromowce Nizne), *Sphaerolecanium prunastri* (FONSC.), *Lecanium corni* BOUCHÉ and *Phenacoccus aceris* (GEOFFR.).

LIST OF SPECIES

Species new for the Pieniny Klippen Belt or for Poland are marked with one or two asterisks, respectively. Geographic distribution and more important publications concerning the remaining species were given in the paper by ŻAK-OGAZA & KOTEJA (1964). The geographic names are given according to

the photogrammetric maps „Pieniny“ (1:20 000), „Zakopane“ (1:100 000) and „Krościenko—Piwniczna“ (1:100 000). The names of host plants are given according to the key „Rośliny Polskie“ by SZAFER, KULCZYŃSKI, PAWŁOWSKI (1953). Where the material was collected by the authors the name of the collector is omitted. The data concerning particular species of scale insects are given in the following order: host plant, locality, date of collection, and stage of development.

Abbreviations: loc.: locality; host — host plant; W. P. — western part of the Pieniny Klippen Belt, B.-H. — Branisko—Homark range, M. P. — the Małe Pieniny (Little Pieniny).

Family: *Ortheziidae*

1. *Newsteadia floccosa* DE GEER

host: *Musci* (underground parts)

- * loc.: Kacze (Pieninki), 9 June 1964 — ♀♀, the stream Czerwonka (W. P.), 30 July 1964 — ♀♀ and larvae; the Homole gorge and the neighbourhood (M. P.), 1 Aug. 1964 — ♀♀; Zielone Skałki (B.-H.), 25 Aug. 1964 — ♀♀; Łapsze Niżne (B.-H.), 18 Aug. 1965 — ♀♀.

In the whole investigated area the species occurs in turf, on the edges of woods, in alder scrub, and on pastures.

2. *Ortheziola vejdovskyi* ŠULC

host: *Musci, Gramineae* (underground parts)

- loc.: Hulina, Groń (M. P.), 22 July 1964 — ♀♀; Kacze, Biała Skała (the Pieninki); 9 July 1964 — ♀♀; Zamek Niedzica, Zielone Skałki (B.-H.), 25 Aug. 1964 — ♀♀; Jarmuta (M. P.), 26 Aug. 1964 — ♀♀.

This species occurs in turf as does *Newsteadia floccosa* DE GEER but in dry localities, often xerothermic.

*** 3. *Arctorthezia cataphracta* (OLAFS.)**

host: *Musci, Gramineae* (underground parts)

- loc.: the Homole gorge (M. P.), 1 Aug. 1965 — 1♀.

The only locality of this species was stated in an association of *Sesleria varia* (JACQ.) WETTST. on the lowest ledge in the Homole gorge (together with *Newsteadia floccosa* DE GEER). It should be stressed that in the Biała Woda valley, 4 km distant from the Homole gorge, the only localities outside the Tatra Mountains of two plants — glacial relicts — *Dryas octopetala* L. and *Crepis Jacquinii* TSCH. were found (KORNĄŚ, 1958). The occurrence of this species reported before from the Tatra (KAWECKI, 1938) and the Karkonosze Mountains (OBENBERGER, 1952) would confirm the opinion of other authors (NEWSTEAD, 1901—1903; BORCHSENIUS, 1950; MORRISON, 1952; TEREZNYKOVA, 1961; DANZIG 1962; CHADŽIBEJLI, 1963) as to its borealpine character.

Family: Pseudococcidae

4. *Phenacoccus aceris* (GEOFFR.)

host: *Tilia platyphyllos* SCOP., *Prunus domestica* L., *Corylus avellana* L.

loc.: Szczawnica Niżna (M. P.), 22 June 1964 — ♀♀ after oviposition; the Homole gorge (M. P.), 23 June 1964 — ♀♀ after oviposition; Durbaszka, Wysokie Skałki (M. P.), 10 July 1964 — ♀♀ as above.

In lower localities the species occurs in large populations, in higher it was always collected singly.

5. *Paroudablis piceae* (LÖW).

host: *Picea excelsa* (LAM.) LK.

loc.: the Homole gorge, Wysokie Skałki (M. P.), 23 June 1964 — second instar larvae and young ♀♀; the stream Czerwonka (W. P.), 30 July 1964 — young ♀♀; Łapsze Niżne (B.-H.), 18 Aug. 1965 — first instar larvae and old ♀♀; Zaskalskie (M. P.) 19 Aug. 1965 — ♀♀ after oviposition.

The species is always connected with spruce forests, it occurs both in sunny places (the edge of roads passing through woods) and in shady ones (in the depth of forests).

6. *Heterococcus borkhsenii* MORR.

host: *Briza media* L. and other Gramineae (in leaf sheaths)

loc.: the Homole gorge (M. P.), 23 June 1964 — ♀♀ after oviposition; Bystrzyk (M. P.), 9 July 1964 — ♀♀ as above.

This species is reported from Poland as well as the European part of the U. S. S. R. (DANZIG, 1964) and Hungary (ŻAK-OGAZA, 1966, in print).

**** 7. *Heterococcus variabilis* SCHMUTTERER**

host: *Agrostis vulgaris* WITH., *Agrostis* sp., other Gramineae (in leaf sheaths)

loc.: clearing under Ociemny Wierch (the Pieninki), 7 June 1964 — ♀♀; Obłazowa, Cisowa Skała (W. P.), 30 July 1964 — ♀♀; forest between the villages Trybsz and Dursztyn (W. P.), 31 July 1964 — ♀♀; the Homole gorge (M. P.), 1 Aug. 1965 — ♀♀ after oviposition.

The species is new for Poland. It was described from Germany (the Alps) where it was collected on *Agrostis alba* L. and *A.* sp. It has also been reported from Holland (SCHMUTTERER, 1958).

8. *Ceroputo pilosellae* ŠULC

host: *Hieracium* sp., *Vicia* sp., *Thymus* sp.

loc.: Hulina (M. P.), 22 June 1964 — ♀♀ before parturition; Łażne Skałki (M. P.), 31 July 1964 — ♀♀ after parturition; Trybsz (W. P.), 31 July 1964 — ♀♀ as above; Zielone Skałki (B.-H.) 25 Aug. 1964 — larvae; Cisowa Skała (W. P.), 17 Aug. 1965 — larvae; Branisko (B.-H.), 18 Aug. 1965 — larvae.

The species is very common on pastures.

**** 9. *Spinococcus calluneti* (LNDGR.)**

host: *Calluna vulgaris* (L.) SALISB.

loc.: the stream Czerwonka (M. P.), 30 July 1964 — larvae.

The species is new for Poland. It was also collected in Ludźmierz near Nowy Targ (leg. J. KOTEJA) and Jędrzejów (leg. ŻAK-OGAZA). The species is typical for pine and spruce forests and for high peat bogs. These insects feed on heather stalks in the layer of moss where the humidity is probably about 100%.

The recorded locality by the stream Czerwonka, though it lies within the boundaries of the investigated area, belongs actually in its botanical aspect to the Nowy Targ valley.

The species is widespread in Europe. It has been reported on heather as stated above and also on a number of plants of the family *Ericaceae* (LINDINGER, 1912; SCHMUTTERER, 1952; ZAHRADNÍK, 1959; DANZIG, 1960).

*** 10. *Allococcus vovae* (NASSONOV)**

host: *Juniperus communis* L.

loc.: Groń (M. P.), 22 June 1964 — larvae and young ♀♀.

This species has been found in one locality only, in spite of intensive search carried out by the authors over the whole investigated area. It has been reported from Poland from the neighbourhood of Warsaw, the neighbourhood of Kielec and Mszana Dolna (KAWECKI, 1948), the neighbourhood of Cracow (ŻAK-OGAZA, 1961), and has been also collected on the Leskowiec mount (leg. J. KOTEJA). Outside Poland it has been found in Austria (LINDINGER, 1912), Germany (SCHMUTTERER, 1955), France, Czechoslovakia (ZAHRADNÍK, 1956), the European part of the U. S. S. R. and in Armenia (BORCHSENIUS, 1949; DANZIG, 1964).

**** 11. *Atrococcus cracens* WILLIAMS**

host: *Taraxacum officinale* WEB., *Leontodon hispidus* L., *Vicia* sp., *Gramineae* and other not determined herbaceous plants (on above ground parts)

loc.: Hulina (M. P.), 22 June 1964 — ♀♀; Obłazowa and Cisowa Skała (W. P.), 30 July 1964 — ♀♀; Zielone Skałki (B.-H.), 25 Aug. 1964 — ♀♀; Homole gorge (M. P.), 1 Aug. 1965 — ♀♀; Branisko (B.-H.), 18 Aug. 1965 — ♀♀; Zaskalskie (M. P.), 19 Aug. 1956 — ♀♀.

This species is new for Polish fauna. It was reported from England in 1962 where it was collected on numerous plants of the family *Compositae* and on various grasses. It was separated by WILLIAMS out of *Pseudococcus pallidinus* GREEN (WILLIAMS, 1962).

**** 12. *Trionymus aberrans* GOUX**

host: *Festuca pratensis* Huds.; *Briza media* L. (in leaf sheaths)

loc.: Palenica (M. P.), 22 June 1964 — ♀♀ after oviposition.

This species is new for Poland. It was reported from France, the European part of the U. S. S. R. (BORCHSENIUS, 1949), from Germany (SCHMUTTERER, 1952a) and Hungary (ŽAK-OGAZA, 1966, in print).

**** 13. *Trionymus newsteadi* (GREEN)**

host: *Fagus silvatica* L.

loc.: Wysokie Skałki (M. P.), 23 June 1964 — ♀♀ during oviposition; Durbaszka (M. P.), 10 July 1964 — ♀♀ during and after oviposition.

The species is new for Poland. The localities mentioned above, 2 km distant from each other, are situated 900—950 m above sea level. Old beeches on which the scale insect was found have the refugium character. They grow on clearings (pastures) at a distance of a few hundred metres from the woods on the summit of Wysokie Skalki (High Rocks).

Outside Poland the species lives in England from where it was reported (GREEN, 1917), Holland, Germany (SCHMUTTERER, 1952), Armenia (BORCHSENIUS, 1949) and Czechoslovakia (ZAHRADNÍK, 1956).

**** 14. *Rhodania occulta* SCHMUTTERER**

host: *Festuca* sp., *Agrostis vulgaris* WITH. (in leaf sheaths)

loc.: Sromowce Wyżne (the Pieniny Czorsztyńskie), 19 Sept. 1963 — larvae and ♀♀; Jar-muta (M. P.), 28 Aug. 1964 — ♀♀; Branisko (B.-H.), 18 Aug. 1965 — ♀♀; Zaskalskie (M. P.), 19 Aug. 1965 — ♀♀.

The species is new for Poland. It was described in 1952 from Germany where it was collected on *Agrostis vulgaris* WITH. Also reported from Holland (SCHMUTTERER, 1952a).

Family: Eriococcidae

15. *Acanthococcus aceris* SIGN.

host: *Acer pseudoplatanus* L.

loc.: Jaworki (M. P.), 23 June 1964 — ♀♀ during oviposition; Szczawnica (M. P.), 26 Aug. 1964 — old ♀♀ and first instar larvae.

As it appears from the author's observation the species is thermophilous. Its nearest localities outside the Pieniny are in Żegiestów (KAWECKI, 1957) and Maków Podhalański (leg. J. KOTEJA).

16. *Rhizococcus insignis* (NEWST.).

host: *Agrostis vulgaris* WITH., *Gramineae*, *Juncaceae*, fragments of not identified plants¹

¹ Females before oviposition wander about and form ovisacs on various plants. The proper host for this species is probably *Agrostis vulgaris* WITH.

loc.: in the years 1964—1965 numerous localities in the western part of the Pieniny Klippen Belt were found (the stream Czerwonka, Cisowa Skała, Trybsz) and also in the Branisko—Hombark range (Branisko, Hombark, Zielone Skałki) and in the Małe Pieniny (Hulina, Groń, Łażne Skałki, Jarmuta, Homole, Wierchliczka).

This species like *Luzulaspis luzulae* (DUF.) is common in pastures, meadows and in scrub, but it does not occur in great number anywhere.

17. *Rhizococcus herbaceus* DANZIG

host: not identified fragment of a plant

loc.: between the Homole gorge and Krupianka (M. P.), 1 Aug. 1965 — 1 ♀ during oviposition.

This species, unlike *Rh. insignis* (NEWST.) is very rare. In the Pieniny it was collected in three localities. It always occurs singly.

**** 18. *Rhizococcus agropyri* BORCHS.**

host: *Agrostis vulgaris* WITH. (on leaves)

loc.: Łażne Skałki (M. P.), 9 July 1964 — ♀♀ in ovisac during oviposition.

The species is new for Polish fauna. It has been reported from numerous localities in the U. S. S. R. (DANZIG, 1962a), Sweden (OSSIANNILSSON, 1959) and Hungary (KOSZTARAB, 1959).

Unlike the two species discussed above this insect occurs in colonies consisting of several specimens on one leaf of its host plant. It has been collected on *Agropyron repens* (L.) P. B. and other grasses.

19. *Greenisca glyceriae* (GREEN)

host: *Festuca rubra* L., *F.* sp., *Agrostis alba* L., *Anthoxanthum odoratum* L. (in leaf sheaths)

loc.: Palenica (M. P.), 22 June 1964 — older instar larvae and young ♀♀; Łażne Skałki (M. P.), 9 July 1964 — ♀♀; Cisowa Skała (W. P.), 30 July 1964 — ♀♀ in ovisac after oviposition.

Though the species has been reported from only one locality in the Pieniny proper, it is supposed that it is more common there.

20. *Fonscolombia fraxini* (KALT.)

host: *Fraxinus excelsior* L.

loc.: Jaworki (M. P.), 23 June 1964 — larvae.

The species is comparatively rare in the whole Pieniny Klippen Belt.

21. *Cryptococcus fagisuga* LNDGR.

host: *Fagus silvatica* L.

loc.: Wysokie Skałki (M. P.), 23 June 1964 — ♀♀; Jarmuta (M. P.), 26 Aug. 1964 — first instar larvae and ♀♀; Zaskalskie and the area of Wierchliczka (M. P.), 8 Aug. 1965 — first instar larvae.

A locality specially abundant in this species was recorded in Jarmuta, where the insects literary covered the whole bark of the beeches.

Family: Lecaniidae

22. *Luzulaspis luzulae* (DUF.)

host: *Luzula campestris* (L.) DC., *L. pilosa* (L.) WILLD.¹

loc.: in the years 1964—1965 the species was reported from numerous localities in the whole Pieniny Klippen Belt.

The insect is common in the meadows, pastures, the edge of woods, banks of roads, in alder and hazel bushes. In some places it occurs in great number. In Poland it also lives in the ranges of the Beskid Wyspowy (KAWECKI, 1938), and the Beskid Średni (leg. J. KOTEJA) and also on the sea coast (leg. Z. KAWECKI).

In Europe it occurs in England (NEWSTEAD, 1903), Germany (JAAP, 1909), and the U. S. S. R. (TEREZNYKOVA, 1960; DANZIG, 1959). Other localities require confirmation because of the revision of the species being carried out (KOTEJA, 1966, in print).

*** 23. *Luzulaspis nemorosa* KOTEJA²**

host: *Luzula nemorosa* (POLL.) E. MEY

loc.: Wysoki Wierch, Wysokie Skalki (M. P.), 9 Oct. 1964 — third instar larvae and young ♀♀; Jarmuta (M. P.), 28 Aug. 1964 — ♀♀ during oviposition.

As it results from observations carried out in other localities in Poland the species occurs in leafy and mixed woods of various types, mostly of acid character. The only recorded locality where this species occurs out of shelter of woods was on Wysoki Wierch, but there is no doubt that the summit had been covered by a forest in the past, probably by „acid“ beech (oral information of Professor J. FABIJĀNOWSKI).

Unlike *L. luzulae* (DUF.) this species always occurs in large colonies, sometimes scores of specimens on one plant.

It should be stressed that the species occurs only in the highest, easternmost part of the Pieniny Klippen Belt. Its nearest localities outside the Pieniny were recorded in the Tatra Mts. (KAWECKI, 1938)³, the Beskid Sądecki range (leg. E. PANCER-KOTEJA), the Gorce, the neighbourhood of Cracow and the Sudeten Mountains (KOTEJA, 1964).

Outside Poland the species occurs in England (GREEN, 1926), Germany (SCHMUTTERER, 1952), France (BALACHOWSKY, 1932) and Czechoslovakia (ŘEHÁČEK, 1954). Other localities require confirmation.

¹ Ovisacs of this species have been collected on a number of other plants, however, as laboratory experiments have proved, its proper host plants are *Luzula* sp. sp., especially *Luzula campestris* (L.) DC.

² The species separated from *Luzulaspis luzulae* (DUF.) (KOTEJA 1966, in print).

³ In that paper as well as in the others given as *L. luzulae* (DUF.).

**** 24. *Luzulaspis pieninica* sp. n.**

In their paper of 1964 the authors reported *Luzulaspis grandis* BORCHS. from the Pieniny. The comparison of material from the Pieniny with the type *L. grandis* BORCHS. established that the species is a new one, similar to *L. grandis* BORCHS. and *L. caucasica* BORCHS.

Adult female (Fig. 5).

Slim body, gently tapering at the anterior and posterior ends. Dorsal surface convex. Length 6.8—7.8 mm, width of ventral surface near anterior spiracular setae ca. 1.3 mm, length of the arch round the dorsal surface at this point about 2 mm.

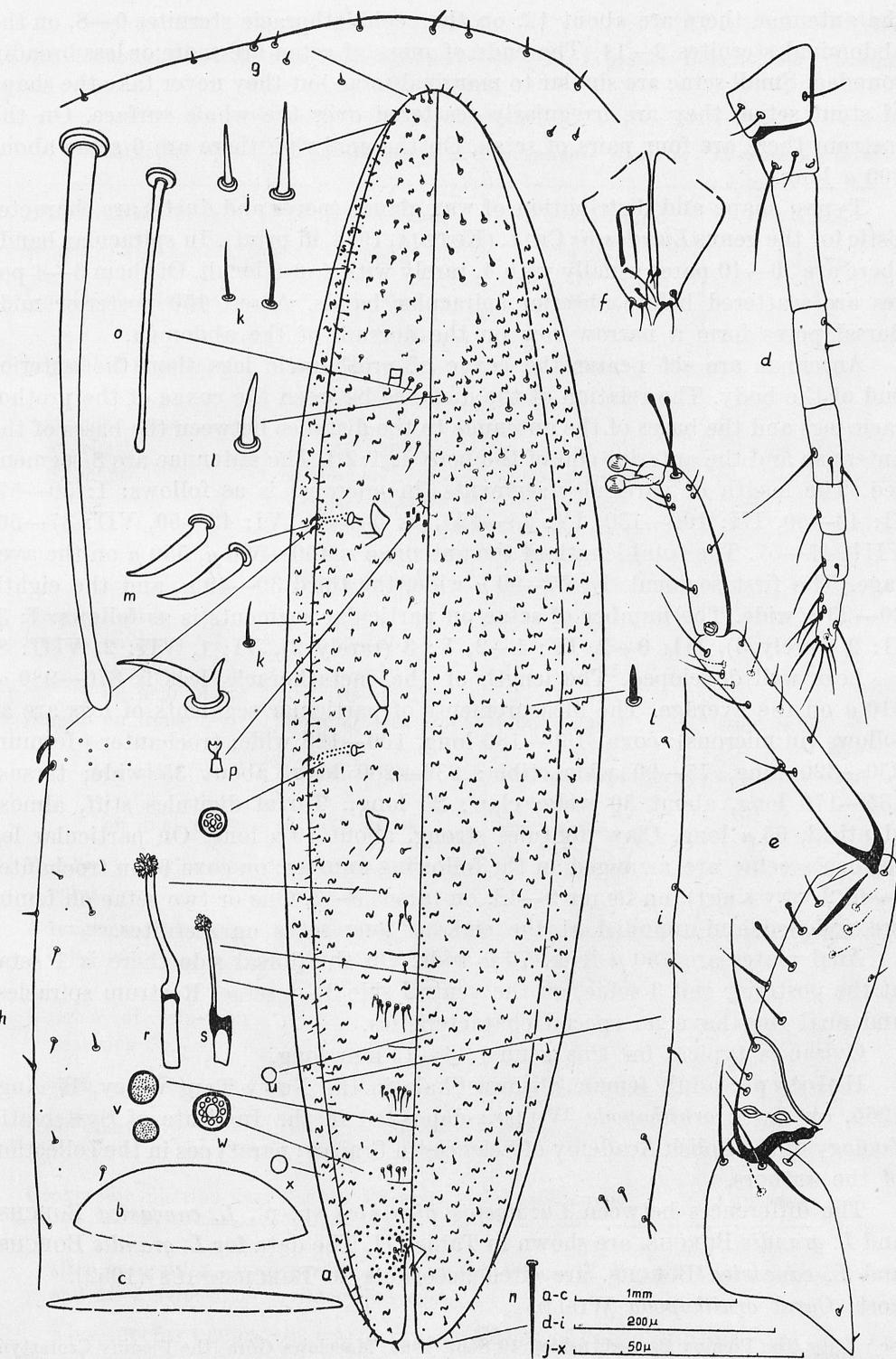
Distinct acicular setae are set at the frontal margin of the body; the thickness and length of the setae gradually diminish in the posterior parts. At the edge of the body they are shaped like needle, sometimes bent like an arch. Towards the anal plates their thickness increases again, they are shaped rather like sharp spines. The thickness of the setae in individual specimens varies. The setae at the edge of the body are fixed in two, sometimes in three, irregular rows. The number of setae (total of all the rows) on half of the body amounts to: from the middle of the frons to the anterior spiracular setae 36—55, between anterior and posterior spiracular setae 32—35, from the posterior spiracular setae to the anal cleft 60—80. The length of the marginal setae at the edge of the body (in microns) is as follows: in the middle of the frons 17—25, at the sides 5—10, at the end of anal lobes 10—22. The space between the marginal setae at the respective points is (in microns): 20—100, 50—125, 25—75.

The spiracular setae of medium thickness, equally narrow, arched towards the back (in one case forked) are 17—25 long. At the end of each spiracular depression there are two setae, in rare cases one.

On the dorsum acicular setae are arranged. The stoutest and longest occur on the frons, above the base of the antennae. Towards the anterior and posterior the size of setae diminishes but they never lose the character of acicular setae; they are 7—15 μ long. On each tergite there are between ten and twenty irregularly arranged setae.

On the ventral side the setae are of two types i.e. large and small. Large setae (up to 125 μ long) are arranged in horizontal rows on each sternite. Between

Fig. 5. *Luzulaspis pieninica* sp. n., adult female. a. dorsal and ventral aspects, b. trans-section through the female before the preparation, c. trans-section through the female after the preparation, d. antenna, e. hind leg, f. anal plates, g. frontal margin of the body, h. marginal part of the body between the spiracular setae, i. marginal part of the body on the abdomen, j. marginal setae (spines) on the frontal margin, k. marginal and submarginal setae, l. dorsal setae (spines), m. spiracular setae (spines), n. marginal setae on the anal lobes, o. large sternal setae, p. „double acting“ glands, r. ventral tubular ducts, s. dorsal tubular ducts, t. spiracular disc pores, u. dorsal minute disc pores, v. posterior mid-dorsal pores, w. multilocular pores, x. marginal (ventral) disc pores



the antennae there are about 12, on the cephalothoracic sternites 0—8, on the abdominal sternites 2—14. The ends of most of setae are more or less broadly rounded. Small setae are similar to marginal setae but they never take the shape of stout setae, they are irregularly scattered over the whole surface. On the rostrum there are four pairs of setae. On the anal ring there are 6 setae about 200 μ long.

Types, shape and distribution of wax glands (pores and ducts) are characteristic for the genus *Luzulaspis* CKLL. (KOTEJA, 1966, in print). In spiracular bands there are 30—40 pores usually with 4, rarely with 4 or 6 loculi. Of them 3—4 pores are scattered before anterior spiracular bands. About 150 posterior mid-dorsal pores form a narrow row on the dorsum of the abdomen.

Antennae are set nearer the coxae of prothoracic legs than the anterior end of the body. The relation of the distance between the coxae of the prothoracic legs and the bases of the antennae to the distance between the bases of the antennae and the anterior end of the body is 1:2·1. The antennae are 8-segmented. The length of particular segments (in microns) is as follows: I: 50—57, II: 45—50, III: 100—130, IV: 75—125, V: 50—80, VI: 42—50, VII: 37—50, VIII: 47—57. The total length of the antennae is 450—590 μ , 550 μ on the average. The first segment is 75—90 μ wide, the third 30—40 μ , and the eighth 20—23 μ wide. The number of setae on particular segments is as follows: I: 3, II: 2 (rarely 3), III: 0—2, IV: 1—2, V: 3 (rarely 2), VI: 1, VII: 2, VIII: 8.

Legs well developed. The length of the metathoracic legs is 870—980 μ , 910 μ on the average. The measurements of particular segments of legs are as follows (in microns): coxa: 150—180 long, 100—125 wide; trochanter+fermum: 250—320 long, 75—90 wide; tibia: 230—280 long, about 35 wide; tarsus: 135—170 long, about 30 wide; claw: 25 long;. Tarsal digitules stiff, almost identical, 65 μ long. Claw digitules strong, about 40 μ long. On particular leg segments setae are arranged in the following number: on coxa 6, on trochanter 4—6 (2 very short), on femur 9—13, on tarsus 5—7. One or two setae on femur are widened and rounded at the end, as long setae on sternites.

Anal plates are 150 μ long, 70 μ wide. On the dorsal side there is 1 seta, at the posterior end 3 setae, on the ventral side 3—4 setae. Rostrum spiracles, and anal ring have no special characteristics.

Ovisac is typical for this genus, 14—15 mm long.

Holotype: adult female, Cisowa Skała in the Nowy Targ valley, 17 Aug. 1965, on *Carex ornithopoda* WILLD.; deposited in the Institute of Systematic Zoology of the Polish Academy of Sciences in Cracow; paratypes in the collection of the authors.

The differences between *Luzulaspis pieninica* sp. n., *L. caucasica* BORCHS. and *L. grandis* BORCHS. are shown in Table III. The data for *L. grandis* BORCHS. and *L. caucasica* BORCHS. are cited according to BORCHSENIUS (1952).

host: *Carex ornithopoda* WILLD.

loc.: Kąty (the Pieniny Czorsztyńskie), 19 Sept. 1963; Macelowa Góra (the Pieniny Czorsztyńskie), 7 Oct. 1963 — dead ♀♀, ovisacs with eggs; Obłazowa (W. P.), 30 July 1964 — ♀♀

Table III

Some characteristics of a female *Luzulaspis pieninica* sp. n., *L. grandis* BORCHS. and *L. caucasica* BORCHS.

Character	<i>L. pieninica</i> sp. n.	<i>L. grandis</i> BORCHS.	<i>L. caucasica</i> BORCHS.
Length of the body	6.8—7.8 mm	9.5—10.7 mm	7.4 mm
Width of the body	1.3 mm	2 mm	1.1 mm
Length of antennae	450—590 av. 550 μ	690 μ	540 μ
Length of hind legs	870—980 av. 910 μ	1250 μ	900 μ
Spiracular setae			
a) length	17—25 μ	45 μ	21—30 μ
b) shape	medium stout almost equally narrow, strongly curved posteriorly sometimes forked	stout, sharply tapered at end, strongly curved sharply tapered posteriorly	slender slightly curved
Marginal setae			
length: on frons	17—25 μ	40—45 μ	18—25 μ
on sides	5—10 μ	12 μ	12—15 μ
on anal plates	10—12 μ	15—30 μ	—
shape: on frons	more or less stout spines	stout setae	stout setae
on sides	needlelike setae	needlelike spiniform setae	needlelike setae
on anal plates	slender spines	stout setae	—
Number of spiracular pores	30—40	51—70	29—36
Arrangement of spiracular pores	— in spiracular bands — 3—4 pores before anterior bands	— in spiracular bands — in groups before the spiracles	— in spiracular bands
Number of setae on anal ring	6	6 or 8	8
Length of ovisac	10—15 mm	20—30 mm	12 mm
Host plant	<i>Carex ornithopoda</i> WILLD.	<i>Carex</i> sp.	<i>Gramineae</i>
Geographic distribution	Central Europe	Eastern Asia	Caucasus

after oviposition, ovisacs with eggs; Cisowa Skała (W. P.), 17 Aug. 1965 — ♀♀ during and after oviposition, ovisacs with eggs.

The species occurs on warm grassy slopes of rocks and on edge of a wood (Macelowa Góra) on rocks.

Outside Poland the species occurs probably in Slovakia, from where it has been reported by ŘEHÁČEK (1956, 1960) under the name of *Luzulaspis frontalis* GREEN, and later reidentified by that author as *L. grandis* BORCHS. (information in a letter from Dr. J. ŘEHÁČEK). It probably occurs also in Germany from where it has been reported as *Luzulaspis grandis* BORCHS. (SCHMUTTERER, 1955a)¹.

25. *Eriopeltis festucae* (FONSC.)

host: *Festuca* sp., *Nardus stricta* L.

loc.: Obłazowa (W. P.), 30 July 1964 — ♀♀ during oviposition; Nowa Biała (W. P.), 13 Aug. 1964 — ♀♀ before oviposition (leg. E. PANCER-KOTEJA); Jarmuta (M. P.), 6 Aug. 1964 — ♀♀ after oviposition.

This species occurs usually in warm localities in colonies consisting of several specimens.

**** 26. *Eriopeltis rasinae* BORCHS.**

host: *Agrostis vulgaris* WITH.

loc.: Szafranówka (M. P.), 9 July 1964 — ♀♀ parasite infected in ovisacs; Hombark (B.-H.), 18 Aug. 1965 — ♀♀ after oviposition.

This species is new for Poland. In both localities it was collected in the ridge areas, on fallow used as pastures. Outside the Pieniny it has been collected in Skawce and the Leskowiec mount (leg. J. KOTEJA).

Outside Poland it has been reported from the Leningrad region and Latvia (DANZIG, 1959), and from Sweden (OSSIANNILSSON, 1959). Also *Agrostis tenuis* and *Deschampsia flexuosa* (L.) TRIN. are known as its hosts plants.

27. *Pulvinaria betulae* (L.)

host: *Alnus incana* (L.) MNCH., *Corylus avellana* L., *Salix* sp., *Ribes grossularia* L.

loc.: Szczawnica, Groń (M. P.), 22 June 1964 — ♀♀ with eggs; the Homole gorge and the clearing below Wysokie Skałki (M. P.), 23 June 1964 — ♀♀ as above; Bystrzyk and Biała Skała (the Pieninki), 9 July 1964 — ♀♀ after oviposition.

This species has not been found in the western part of the Pieniny Klippen Belt or in the Branisko—Hombark range. Rare localities in the Małe Pieniny were always poor in specimens.

28. *Sphaerolecanium prunastri* (FONSC.)

host: *Prunus spinosa* L.

loc.: Zaskalskie (M. P.), 9 July 1964 — dead ♀♀ and first instar larvae; Zamek Niedzicki (M. P.), 25 Aug. 1964 — first instar larvae; the Homole gorge (M. P.), 1 Aug. 1965 — old ♀♀.

This species occurs only sporadically in the areas mentioned.

¹ In his paper of 1956 SCHMUTTERER supposed that this scale insect had been misidentified and that it was probably a new species.

29. *Lecanium corni* BOUCHÉ, MARCHAL (♀ nec ♂)

host: *Prunus domestica* L., *P. spinosa* L., *Sorbus aucuparia* L., *Corylus avellana* L., *Ribes grossularia* L.

loc.: Szczawnica (M. P.), 22 June 1964 — ♀♀; Kacze and Bystrzyk (the Pieninki), 9 July 1964 — first instar larvae and old ♀♀; Łazne Skalki and Cyrle (M. P.), 9 July 1964 — as above; Zamek Niedzicki and Zielone Skalki (B.-H.), 25 Aug. 1964 — second instar larvae; the Homole gorge (M. P.), 1 July 1965 — old ♀♀.

First instar larvae of this species have also been found on grass on Palenica. In none of the recorded localities did it occur in large populations.

30. *Lecanium coryli* (L.) sensu MARCHAL nec ŠULC

host: *Acer pseudoplatanus* L., *Corylus avellana* L., *Pyrus* sp., *Vaccinium myrtillus* L.

loc.: Wysokie Skalki, Jaworki (M. P.), 23 June 1964 — ♀♀ with eggs and one scale of the male on *Vaccinium myrtillus* L.; Bystrzyk (the Pieninki), 9 July 1964 — old ♀♀; Zaskalskie in the region of Wierchliczka (M. P.), 19 Aug. 1965 — old ♀♀.

Like *Lecanium corni* BOUCHÉ it appears in small populations.

***31. *Lecanium ciliatum* (DOUGL.)**

host: *Alnus incana* L.

loc.: Szczawnica and Groń (M. P.), 22 June 1964 — ♀♀; the Homole gorge (M. P.), 23 June 1964 — ♀♀; Zielone Skalki (B.-H.), 25 Aug. 1964 — dead ♀♀; Jarmuta (M. P.), 26 Aug. 1965 — dead ♀♀ and second instar larvae; Łapsze Niżne (B.-H.), 17 Aug. 1965 — dead ♀♀ and first instar larvae.

The species has not yet been reported from the Pieniny, but it may be assumed that it appears there. In Poland it lives also on oaks. It always occurs in small populations with a majority of males. It has often been recorded from Europe.

32. *Physokermes piceae* (SCHRK.)

host: *Picea excelsa* (LAM.) LK.

loc.: the stream Czerwonka, Skalki Lorencowe, Trybsz, Dursztyn (W. P.); Branisko, Hombark (B.-H.); Palenica, Jarmuta, Homole, Bukowiny (M. P.).

This species occurs more rarely than *Ph. hemicyryphus* (DALM.) but in big populations. It secretes „honeydew“ plentifully and is frequently visited by ants.

33. *Physokermes hemicyryphus* (DALM.)

host: *Picea excelsa* (LAM.) LK. and in one instance *Abies alba* MILL.

loc.: in the whole investigated area.

This species is the most common of all scale insects in the whole investigated area. It was observed both in young woods and in old forests. It exudes rather less honeydew than *Ph. piceae* (SCHRK.). It appears from the authors' obser-

vations that it is visited much less frequently by ants thus it may be of greater importance for beekeeping.

Family: *Diaspididae*

* 34. *Diaspidiotus bavaricus* (LNGR.)

host: *Calluna vulgaris* (L.) SALISB.

loc.: Gronków (W. P.), 17 Aug. 1965 — old ♀♀ and first instar larvae.

This species has not been yet reported from the Pieniny. In spite of intensive research over the whole investigated area only this one not very rich locality has been recorded. It has been reported from Poland from the ranges of Beskid Wyspowy, Beskid Średni, the Góry Świętokrzyskie (KAWECKI, 1948) and the neighbourhood of Cracow (ŻAK-OGAZA, 1961). It lives on plants of the family *Ericaceae*. It is widespread in Europe.

35. *Sygenaspis parlatoriae* ŠULC

host: *Picea excelsa* (LAM.) LK.

loc.: the stream Czerwonka (W. P.), 30 July 1964 — young ♀♀ and ♂♂; Jarmuta (M. P.), 26 Aug. 1964 — ♀♀ with eggs.

This species occurs in big colonies but only in single localities.

36. *Leucaspis loewi* COLVÉE

host: *Pinus silvestris* L.

loc.: the stream Czerwona Skała and Czerwona Skała (W. P.), 30 July and 31 July 1964 — first instar larvae and old ♀♀; Gronków (W. P.), 17 June 1965 — second instar larvae.

The species, relatively common in the Nowy Targ valley, has not yet been collected in the Pieniny. The recorded localities in the western part of the Pieniny Klippen Belt seem to be the extension of its occurrence in the Nowy Targ valley. It is known in Poland from many localities and is widespread in Europe.

37. *Lepidosaphes ulmi* (L.)

host: *Cornus mas* L., *Prunus domestica* L.

loc.: Zielone Skałki (B.-H.), 25 June 1964 — ♀♀ with eggs; Szczawnica Niżna (M. P.), 22 June 1964 — ♀♀.

Very rare species in the investigated area.

38. *Chionaspis salicis* (L.)

host: *Fraxinus excelsior* L., *Acer pseudoplatanus* L., *Alnus incana* (L.) MNCH., *Populus tremula* L., *Tilia platyphyllos* SCOP., *Corylus avellana* L., *Cornus mas* L., *Salix* sp., *Vaccinium myrtillus* L., *V. vitis idaea* L.

loc.: recorded in the years 1964—1965 in the whole investigated area.

The species is very common in the investigated area, second after *Physokermes hemicyphus* (DALM.) in frequency of occurrence.

The research was carried out in the Department of Zoology of the Cracow College of Agriculture.

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STRESZCZENIE

Fauna czerwów Pienin właściwych została omówiona w publikacji z 1964 r. (ŽAK-OGAZA & KOTEJA). Obecnie autorzy przedstawiają wyniki badań na pozostałych odcinkach Pienińskiego Pasa Skalicowego, tj. na zachód od Czorsztyna aż po Cisową Skałę i na wschód od Szczawnicy aż po Wierchliczkę w Małych Pieninach. Granice badanego terenu zostały przedstawione na mapce (fig. 1). Na tych terenach stwierdzono występowanie 38 gatunków czerwów. Jeden z nich został opisany jako nowy — *Luzulaspis pieninica* sp. n. Diagnoza gatunku podana jest w tekście angielskim. Rysunek samicy — fig. 5. Różnice pomiędzy gatunkami pokrewnymi (*L. grandis* BORCHS. i *L. caucasica* BORCHS.) zamieszczone w tabeli III.

8 gatunków okazało się nowymi dla fauny Polski, a 6 dla całego Pienińskiego Pasa Skalicowego. Gatunkami nowymi dla Polski są: *Heterococcus variabilis* SCHMUTTERER, *Spinococcus calluneti* (LNDGR.), *Trionymus aberrans* GOUX, *T. newsteadi* (GREEN), *Atrococcus cracens* WILLIAMS, *Rhodania occulta* SCHMUTTERER, *Rhizococcus agropyri* BORCHS., *Eriopeltis rasinae* BORCHS. Gatunkami nowymi dla Pienińskiego Pasa Skalicowego są: *Arctorthelia cataphracta* (OLAF.), *Allococcus vovae* (NASS.), *Luzulaspis nemorosa* KOTEJA, *Lecanium ciliatum* (DOUGL.), *Diaspidiotus bavaricus* (LNDGR.) i *Leucaspis loewi* COLVÉE. Ponadto zostało zebranych 13 gatunków, które oznaczono tylko do rodzajów, są to prawdopodobnie gatunki nowe dla wiedzy i opracowanie ich wymaga dodatkowych badań.

Z Pienin właściwych podano dotychczas 37 gatunków. Dwunastu z nich nie udało się zebrać na obecnie przebadanych terenach. Z listy tych gatunków skreślono obecnie trzy. *Luzulaspis grandis* BORCHS. — został obecnie opisany jako *L. pieninica* sp. n. *Greenisca inermis* (GREEN) — jest to *G. brachypodii* BORCHS. & DANZIG (gatunek ten został wydzielony w 1964 r.). *Brevennia tetrapora* GOUX została uprzednio mylnie oznaczona — jest to *Heterococcus variabilis* SCHMUTTERER.

Łącznie z całego Pienińskiego Pasa Skalicowego obecnie jest znanych 50 gatunków. Pełna ich lista została przedstawiona w tabeli II.

Wyróżniono kilka grup siedliskowych czerwów. I grupa — związana z roślinnością łąk, polan śródleśnych i pastwisk. Na roślinności zielnej tych siedlisk zebrano aż 14 gatunków czerwów, na drzewach i krzewach 8 gatunków. II grupę stanowią czerwce związane z lasami świerkowymi. III grupa — to czerwce występujące w lasach dolnoreglowych. IV grupa — czerwce roślinności naskalnej. V grupa — gatunki występujące zarówno w wyżej wymienionych siedliskach jak i w zaroślach śródpolnych, przy drogach itp.

РЕЗЮМЕ

Фауна основного района Пенин обсуждалась в работе с 1964 г. (Жак-Огаза & Котэя). В настоящей работе авторы приводят результаты исследований остальных участков Скалистой Полосы Ненин, именно на запад от Чорштына по Тисовую Скалу и на восток от Щавницы по Верхличку в Малых Пенинах. Границы исследуемых участков изображены на рис. 1. Обнаружено здесь 38 видов кокцид, в том числе 1 описан как новый — *Luzulaspis pieninica* sp. n.

8 видов оказалось новыми для фауны Польши и 6 для Скалистой Полосы Пенин. Новые виды в фауне Польши следующие: *Heterococcus variabilis* SCHMUTTERER, *Spinococcus calluneti* (LNDGR.), *Trionymus aberrans* GOUX, *T. newsteadi* (GREEN), *Atrococcus cracens* WILLIAMS, *Rhodania occulta* SCHMUTTERER, *Rhizococcus agropyri* BORCHS., *Eriopeltis rasinae* BORCHS. Новые виды для Скалистой Полосы Пенин — *Arctorthelia cataphracta* (OLAV.), *Allococcus vovae* (NASS.), *Luzulaspis nemorosa* КОТЕЯ, *Lecanium ciliatum* (DOUGL.), *Diaspidiotus bavaricus* (LNDGR.), *Leucaspis loewi* COLVÉE. Кроме того обнаружено 13 видов, которые определено только до рода. Виды эти являются, вероятно, новыми в энтомологии и изучение их требует дополнительных исследований.

Из района основных Пенин приведено 37 видов. 12 из них не удалось обнаружить на исследуемых участках. Из числа приведенных раньше вычеркнули три вида. 1) *Luzulaspis grandis* BORCHS. является новым видом, описанным как *Luzulaspis pieninica* sp. n., 2) *Greenisca inermis* (GREEN) является *G. brachypodii* BORCHS. & DANZ., 3) *Brevennia tetrapora* (GOUX) ошибочно определен — это *Heterococcus variabilis* SCHMUTTERER.

В итоге на территории Скалистой Полосы Пенин обнаружено 50 видов. Полный их список приведен в табл. II.

Выделено несколько групп кокцид по местообитанию. 1 — связана с луговой растительностью и растительностью лесных полян и пастбищ. На двудольных растениях этих местобитаний обнаружено 14 видов, на деревьях и кустарниках 8 видов. 2 группа — связана с ельниковыми лесами, где обнаружено 6 видов. 3 группа — обнаруживается в нижнереглевых лесах, 4 — на наскальной растительности и 5 группа — виды встречающиеся как в вышеуказанных местообитаниях, так и в полевых и придорожных зарослях и др.

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