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Phorophyte preferences of epiphytic mosses within the *Orthotrichaceae* family in the Góry Bialskie Mts. (SW Poland)

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Abstract: A bryological survey of epiphytic bryophytes in the Góry Bialskie Mts. was carried out between 2003-2005. A total of 10 species of the *Orthotrichum* genus (*O. affine, O. anomalum, O. diaphanum, O. lyellii, O. obtusifolium, O. pallens, O. pumilum, O. speciosum, O. stramineum, O. striatum*), 2 species of the *Ulota* genus (*U. bruchii, U. crispa*) and 1 species of the *Zygodon* genus (*Z. dentatus*) were recorded there by the authors. The phorophyte preferences of all observed species were noted and the preliminary results are presented in this paper.

Key words: Orthotrichaceae, *Orthotrichum*, *Ulota*, *Zygodon*, epiphytic mosses, host specificity, phorophyte preferences, Góry Bialskie Mts., Poland

The investigation of host specificity of epiphytic bryophytes is a very intensively studied part of substratum ecology (Smith 1982, Bates 2000). Barkman (1958) summarized the knowledge about the structure and composition of the epiphytic vegetation of bryophytes. His results suggest that most epiphytic mosses have some phorophyte preferences. They often respond to features of the bark of trees such as pH, chemical composition and bark roughness (cf. Bates 1992, Gustafsson & Eriksson 1995). The problem is that in different geographical regions the same species occasionally show different phorophyte preferences (Schmitt & Slack 1990). The survey of the host specificity of epiphytic mosses within the *Orthotrichaceae* family in Góry Bialskie Mts. was carried out as a part of general bryofloristic research of the mountain range.

Methods

A bryological survey of epiphytic mosses in the Góry Bialskie Mts. was carried out between 2003-2005.

The mountain range (on the area of 60 km²) is situated in the SW part of Poland along the Polish-Czech border. The scale of altitude oscillates from 550 to 1140 m a.s.l. Due to high rates of rainfall (about 1000 mm per year) and an impermeable surface, the range belongs to an exceptionally humid region. Both the climate & the number of suitable and easy-reached substrates (solitary deciduous trees, alleys, fruit trees, etc.) enable communities of epiphytic bryophytes to successfully evolve there.

All of the recorded epiphytic species were collected and the ecological data on them was noted (e.g. habitat, phorophyte preferences, height-position on the trunk, size of moss cover, exposition, inclination of the substrate, moisture and shadow conditions & fertility of the plants). The host trees were located by GPS.

All data about the phorophyte preferences of the species was analyzed and is presented on graphs. Graphs No. 1-11 show the percentages of the phorophyte preferences of species within the genus *Orthotrichum* and the genus *Ulota*. Considering the fact that *Zygodon dentatus* and *Orthotrichum lyellii* were found only once (*Z. d.* on the bark of *Fraxinus excelsior* and *O. l.* on the bark of *Acer platanoides*), the graphs for these species are not presented. Graph No. 12 presents the percentages of the host specificity of all recorded species from the *Orthotrichaceae* family in the Góry Bialskie Mts. In the presented graph 6-letter abbreviations are used for the tree species as follow:

ACENEG - *Acer negundo*, ACEPLA - *Acer platanoides*, ACEPSE - *Acer pseudoplatanus*, ALNGLU - *Alnus glutinosa*, BETPEN - *Betula pendula*, FAGSYL - *Fagus sylvatica*, FRAEXC - *Fraxinus excelsior*, MALDOM - *Malus domestica*, POPBER - *Populus* x *berolinensis*, POPNIG - *Populus nigra*, POPTRE - *Populus tremula*, PYRCOM - *Pyrus communis*, SALALB - *Salix alba*, SALCAP - *Salix caprea*, SALFRA - *Salix fragilis*, SORAUC - *Sorbus aucuparia*, ULMGLA - *Ulmus glabra*, ULMLAE - *Ulmus laevis*

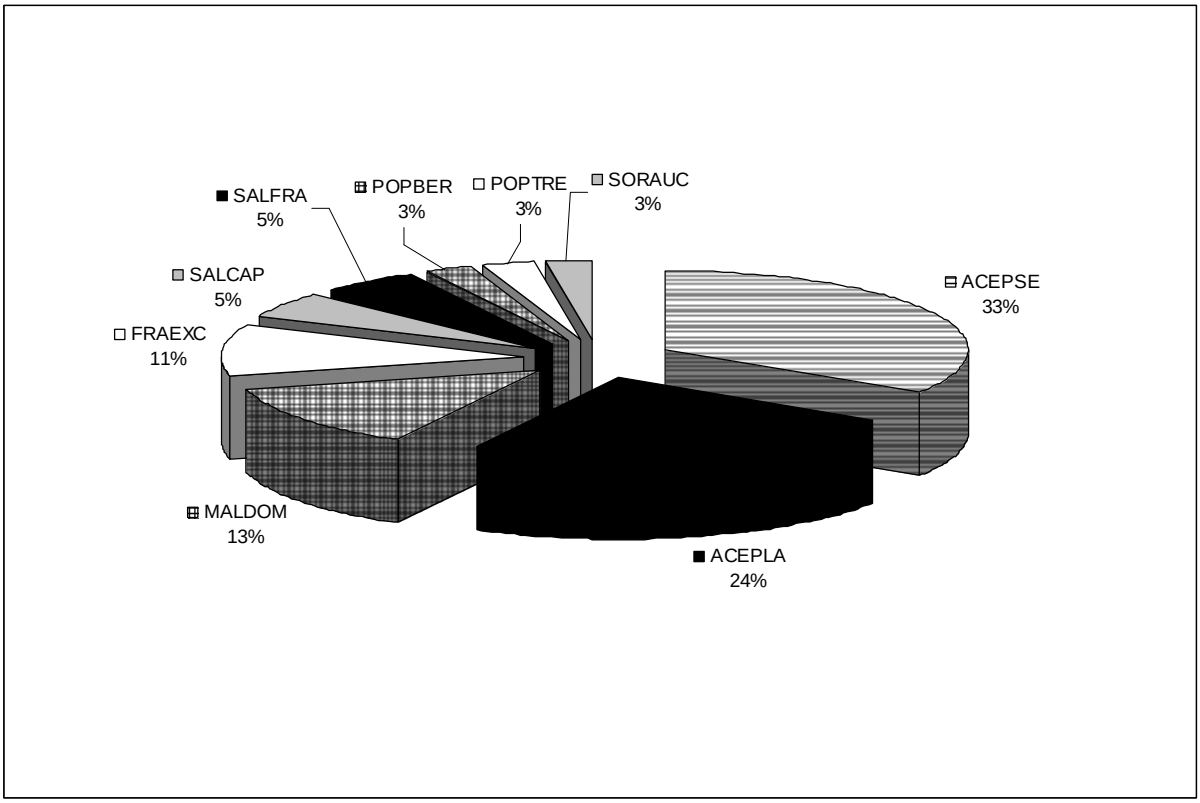
About 250 herbarium specimens were collected there and all of them will be housed in the herbarium of the Silesian Museum in Opava (OP) and in the private collection of the first author.

Results

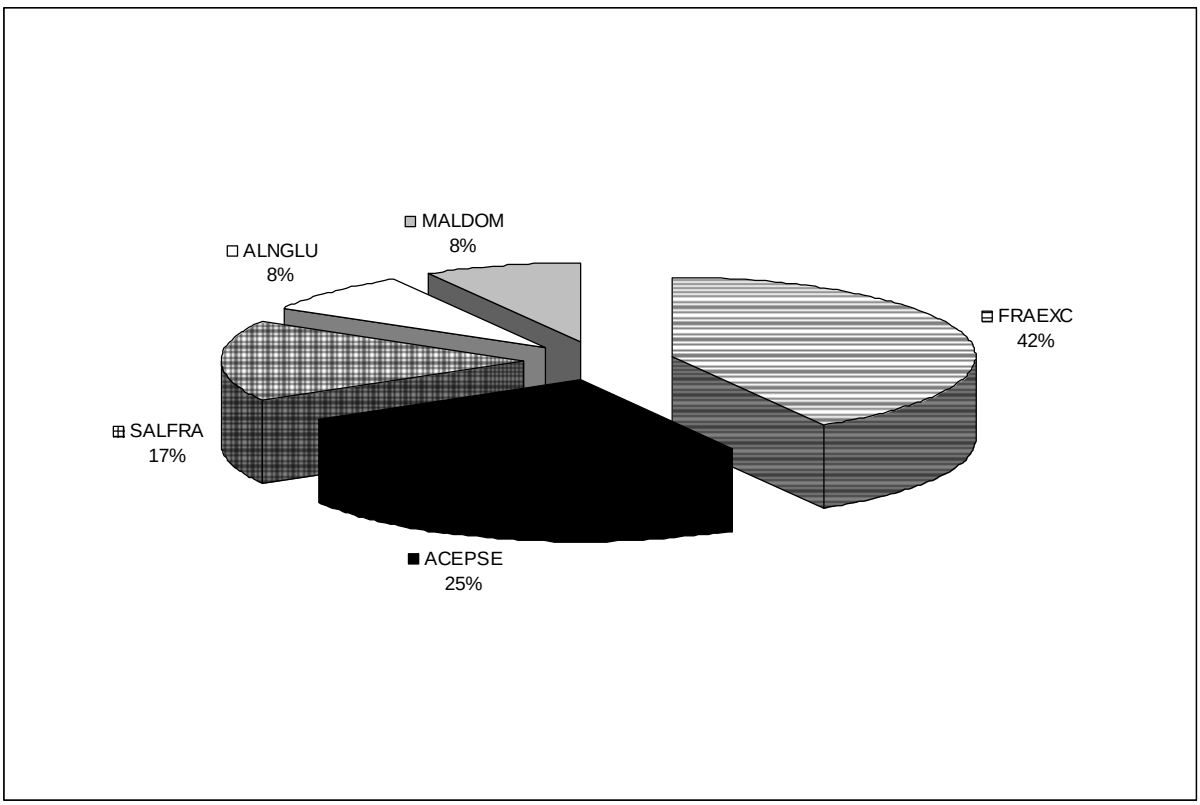
Epiphytic bryophytes within the *Orthotrichaceae* family were recorded on 18 tree species in the area. A total of 10 species of the *Orthotrichum* genus (*O. affine, O. anomalum, O. diaphanum, O. lyellii, O. obtusifolium, O. pallens, O. pumilum, O. speciosum, O. stramineum, O. striatum*), 2 species from the *Ulota* genus (*U. bruchii, U. crispa*) and 1 species from the *Zygodon* genus (*Z. dentatus*) were recorded by authors in the mountains. Contrary to similar mountain ranges the diversity of epiphytic mosses seems to be higher there. In addition some of the above-mentioned species are considered as a threatened in Poland (Żarnowiec, Stebel & Ochyra 2004):
Endangered category (EN): *Zygodon dentatus*.
Vulnerable category (VU): *Orthotrichum stramineum, O. striatum, Ulota bruchii & U. crispa*
Rare category (R): *Orthotrichum lyellii*

The mosses recorded there most frequently occurred on the bark of *Acer pseudoplatanus* (35,5 %), twice as often as on other trees such as: *Acer platanoides* (17,1 %) and *Fraxinus excelsior* (15,5 %). An extensive occurrence of epiphytic mosses was also noted on *Malus domestica* (8,8 %). Other trees were grown over with epiphytic mosses in less than 5 % of cases.

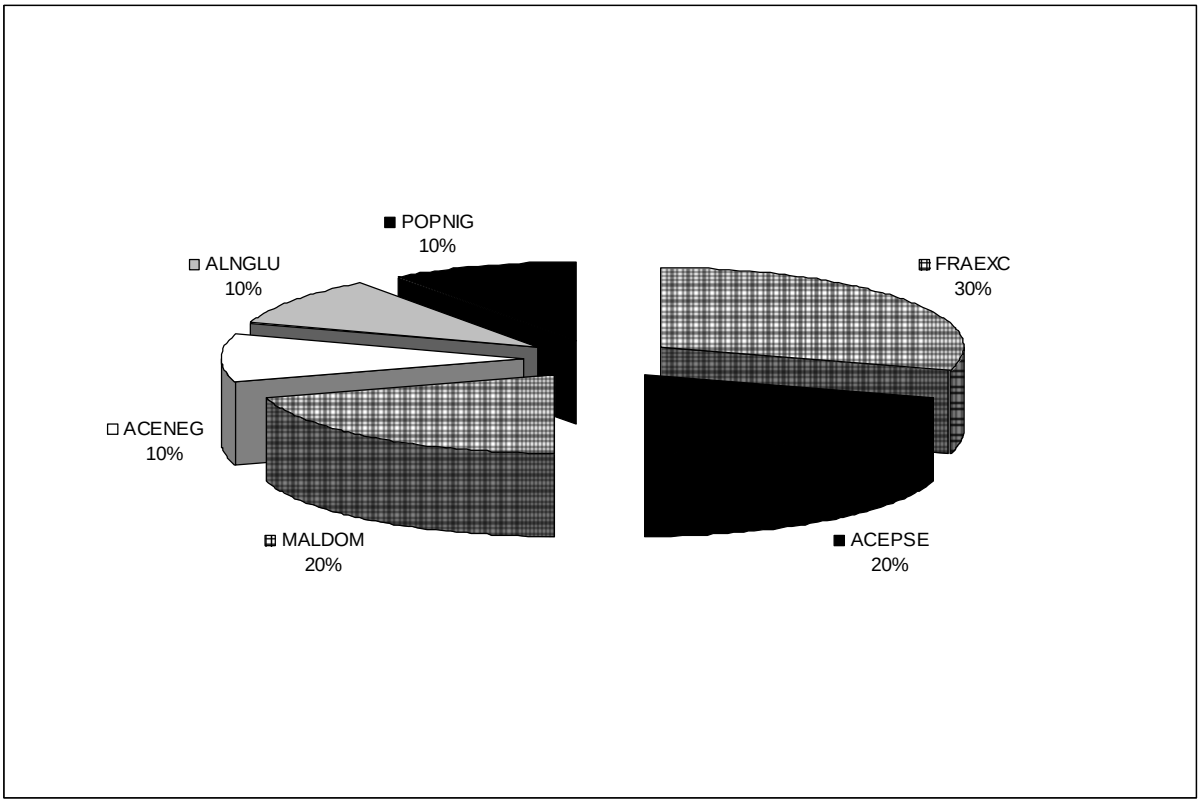
Detailed phorophyte preferences of different moss species are shown on graphs No. 1-11. An ability to colonize the widest variety of tree species was recorded in *Orthotrichum pumilum* - it was observed on 16 trees. *Orthotrichum affine* (9 trees) and *O. speciosum* (8) showed a wide host specificity as well. On the contrary *Ulota crispa* was recorded only on the bark of 3 trees.



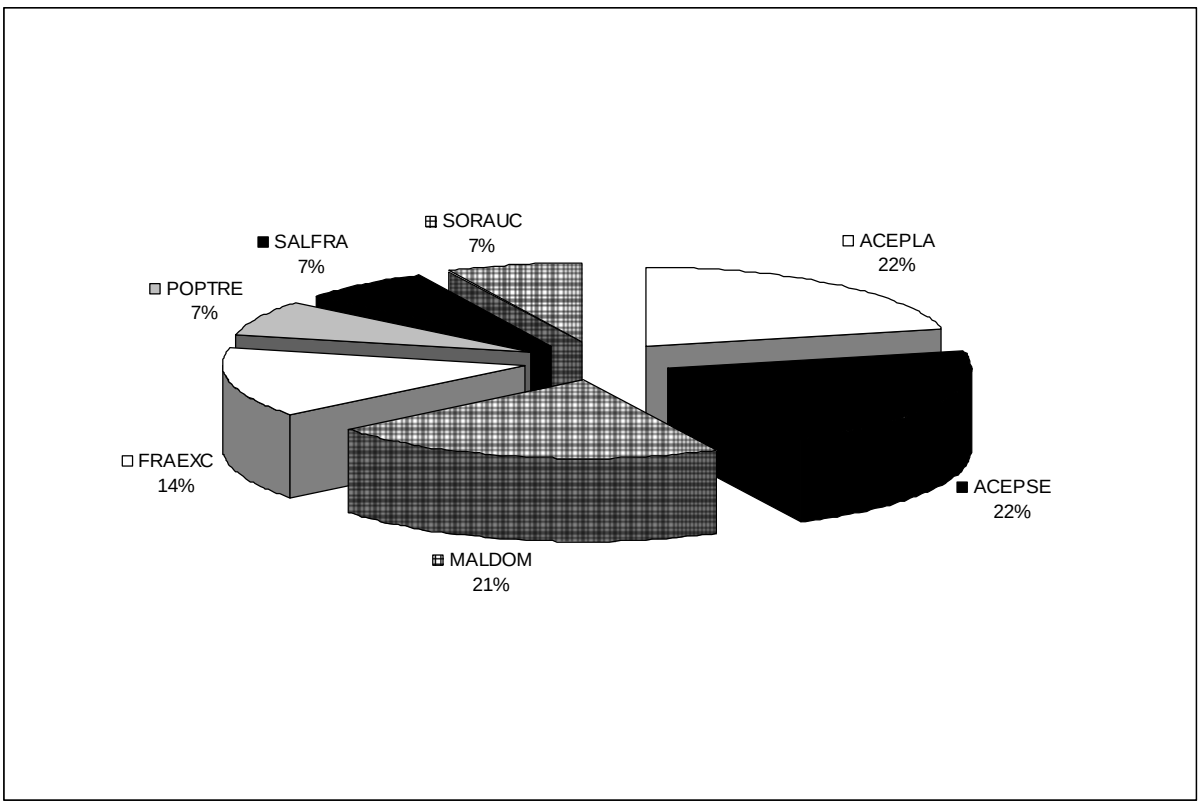
Graph 1. Percentages of phorophyte preferences of the species *Orthotrichum affine*.



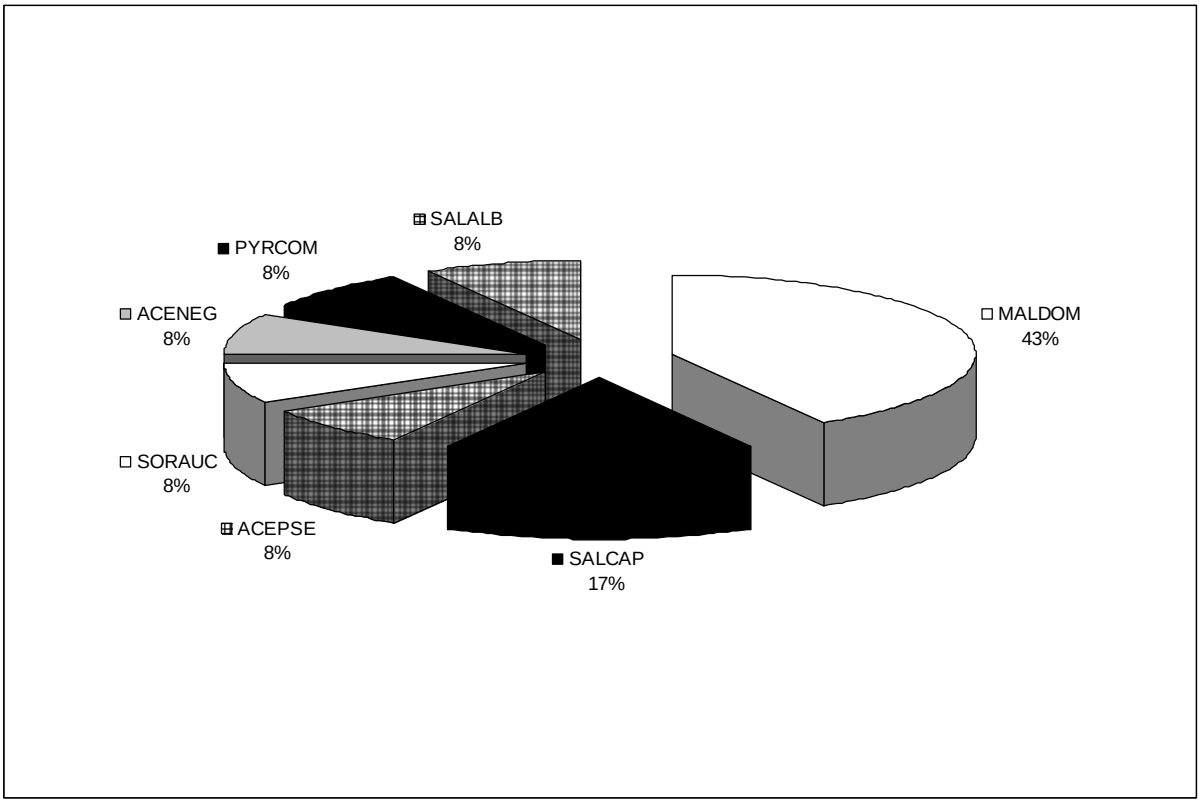
Graph 2. Percentages of phorophyte preferences of the species *Orthotrichum anomalum*.



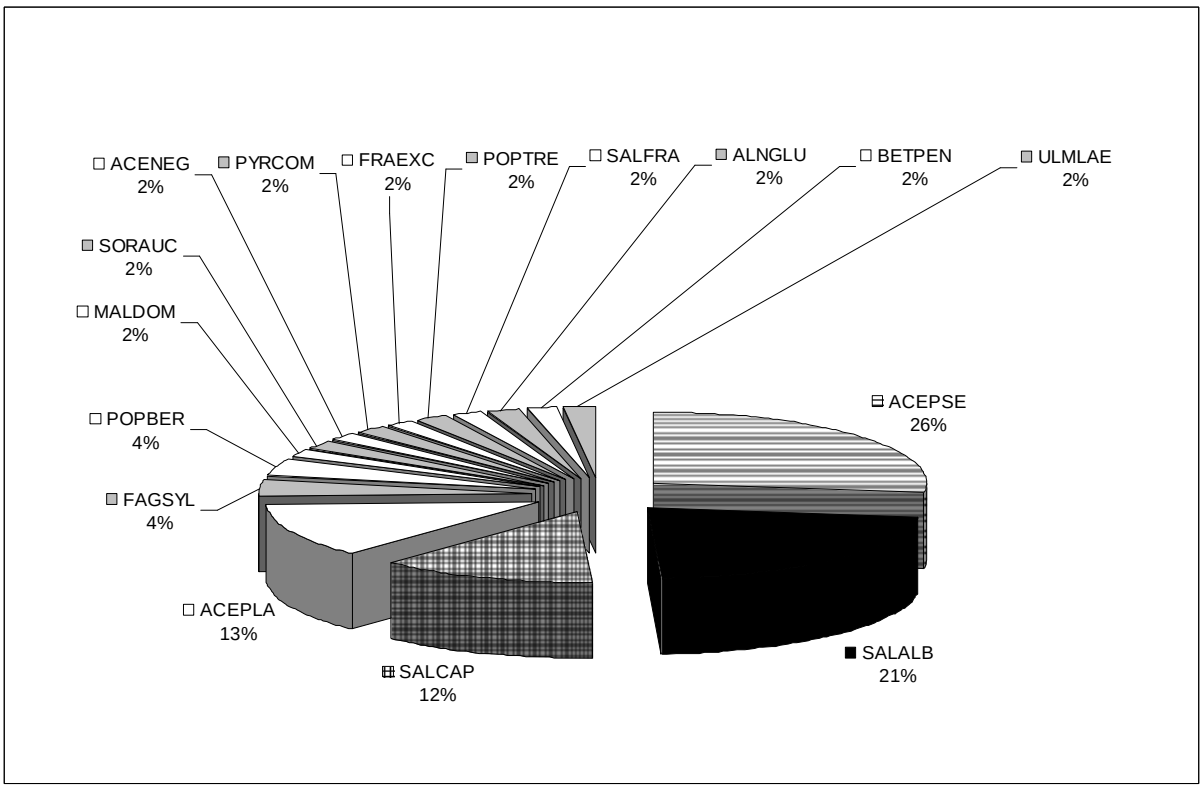
Graph 3. Percentages of phorophyte preferences of the species *Orthotrichum diaphanum.*



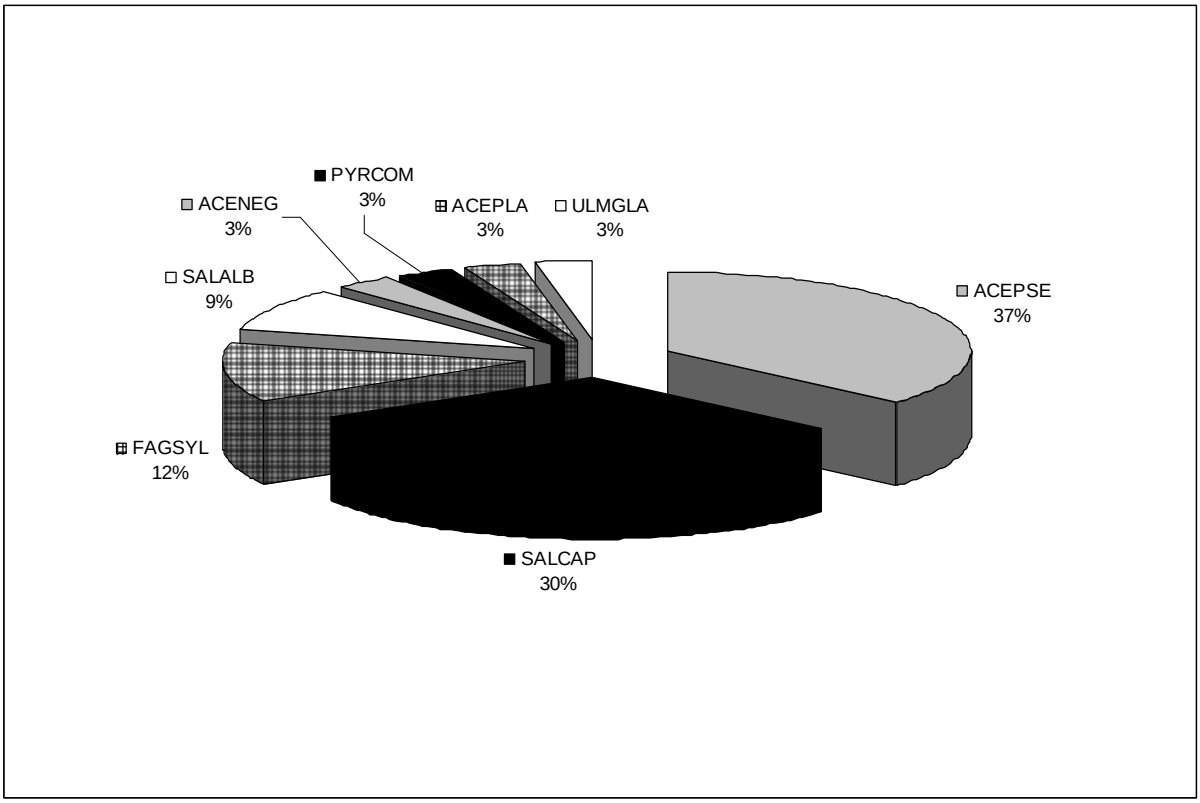
Graph 4. Percentages of phorophyte preferences of the species *Orthotrichum obtusifolium.*



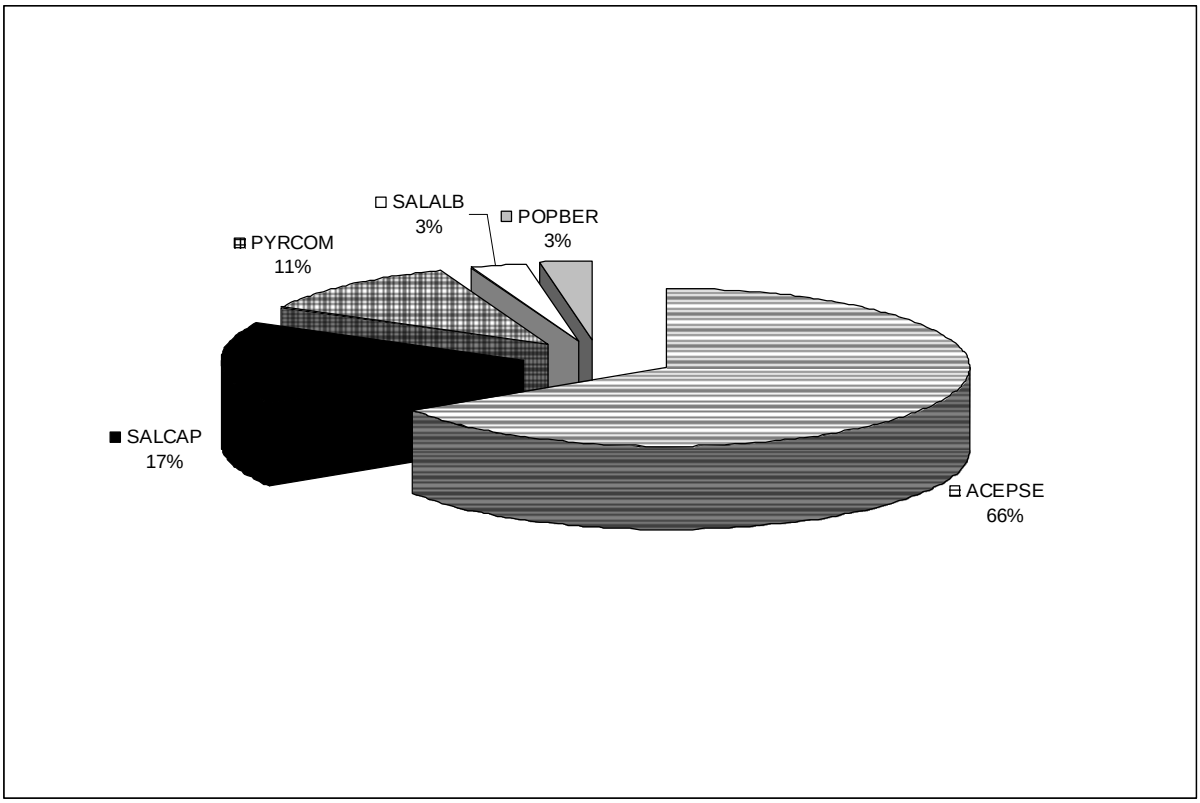
Graph 5. Percentages of phorophyte preferences of the species *Orthotrichum pallens.*



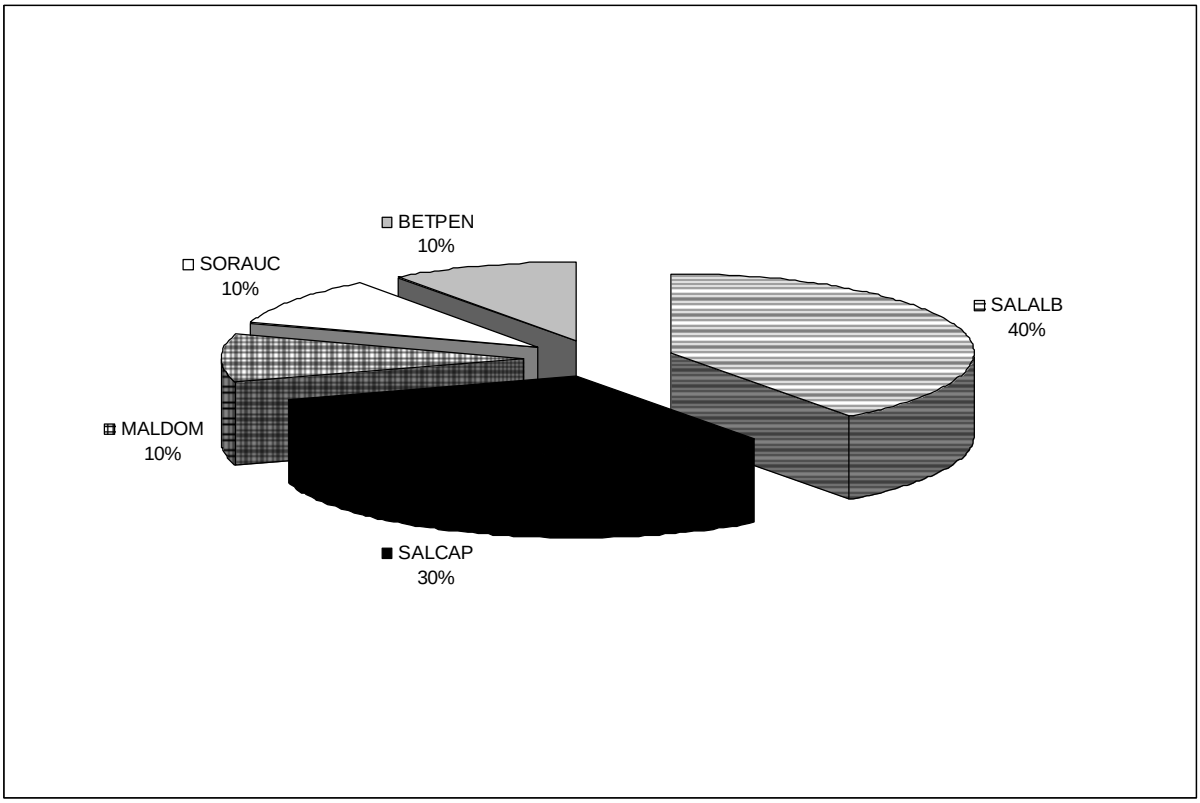
Graph 6. Percentages of phorophyte preferences of the species *Orthotrichum pumilum.*



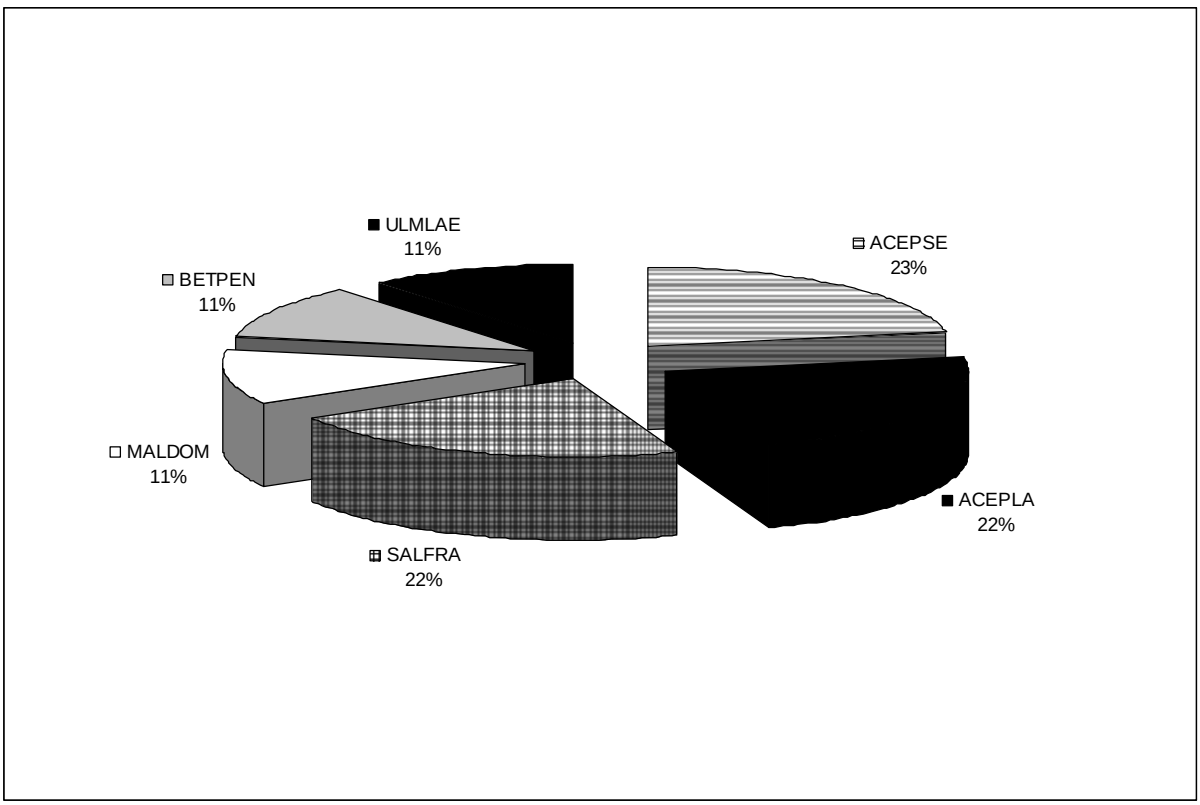
Graph 7. Percentages of phorophyte preferences of the species *Orthotrichum speciosum.*



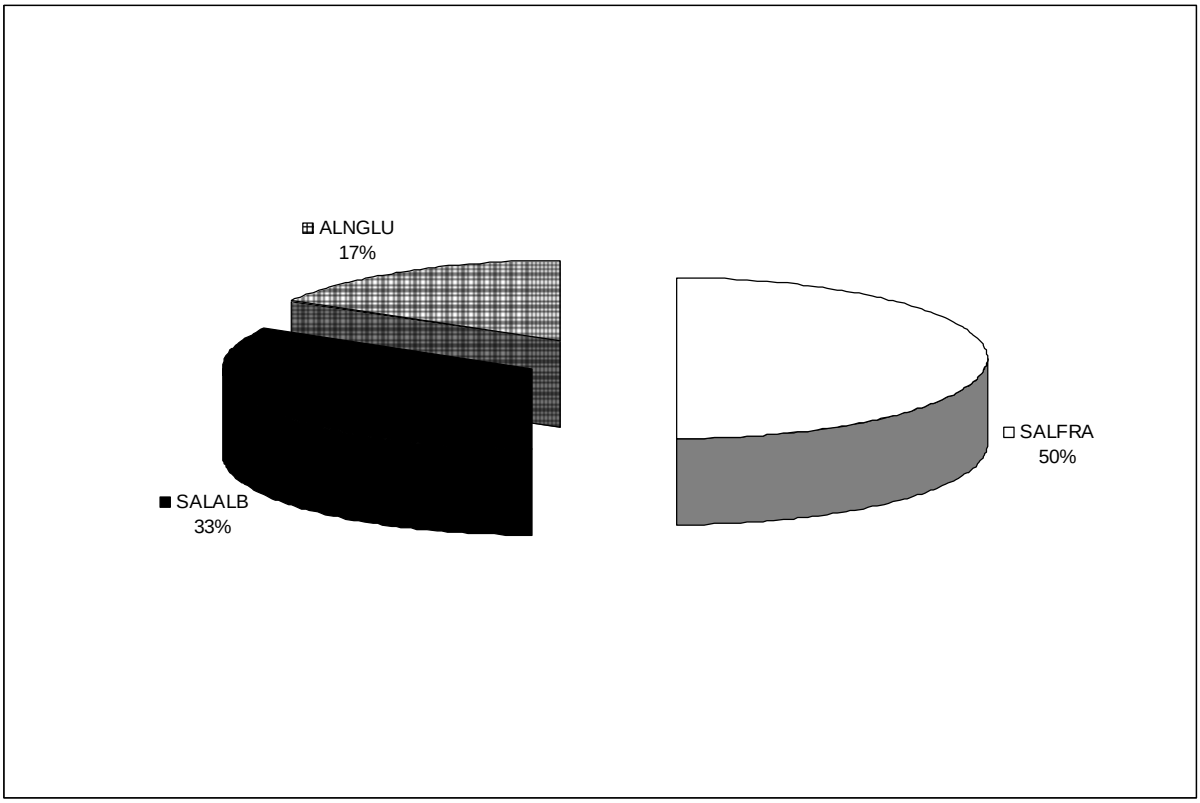
Graph 8. Percentages of phorophyte preferences of the species *Orthotrichum stramineum*.



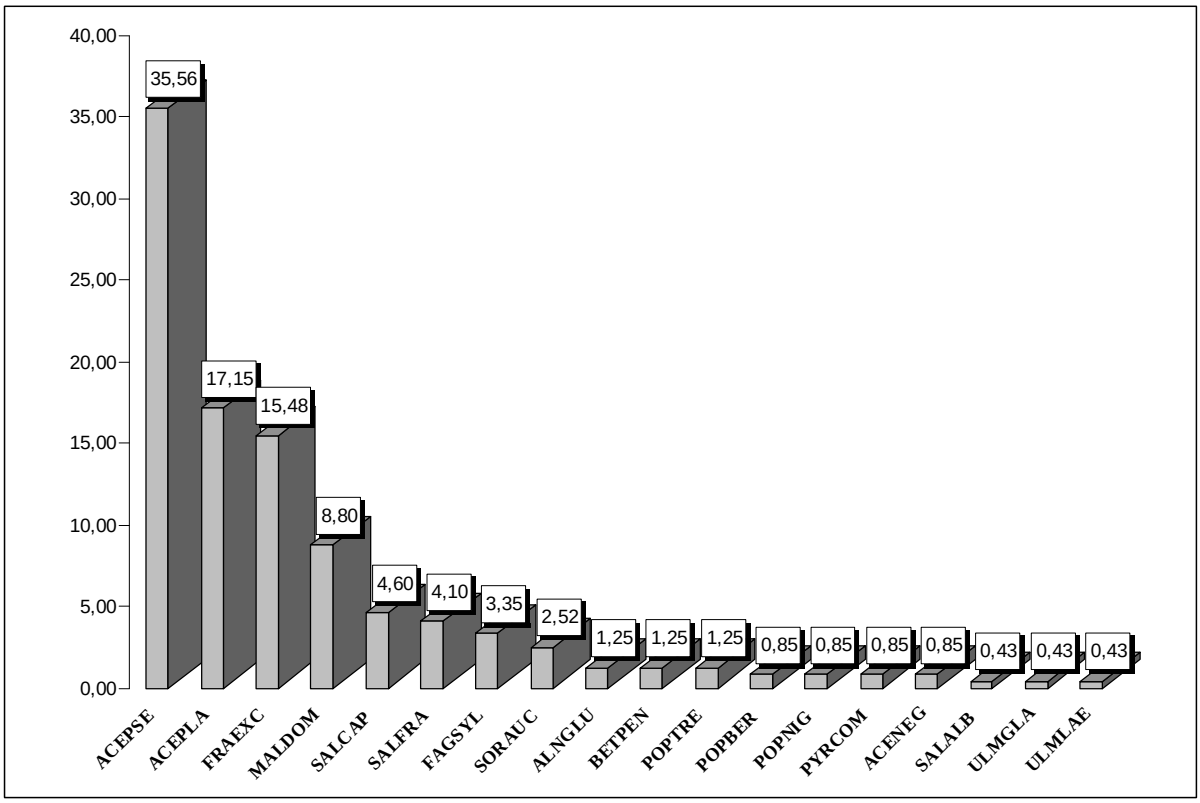
Graph 9. Percentages of phorophyte preferences of the species *Orthotrichum striatum.*



Graph 10. Percentages of phorophyte preferences of the species *Ulota bruchii*.



Graph 11. Percentages of phorophyte preferences of the species *Ulota crispa*.



Graph 12. Relative frequency (%) of the occurrence of species within the *Orthotrichaceae* family on host trees in the Góry Bialskie Mts.

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