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## VASCULAR FLORA OF CEMETERIES IN THE TOWN OF ZAKOPANE IN THE TATRA MOUNTAINS

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**ABSTRACT.** In two cemeteries in the town of Zakopane (south Poland), 171 species of wild or naturalized vascular plants were found: 82 in the Old Cemetery and 144 in the New Cemetery (58 taxa in common). Additionally, we recorded 29 native herbaceous taxa that are only cultivated there. The Old Cemetery was dominated by annuals and biennials, while the New Cemetery by perennials, due to the lack of raking and intensive treading in the New Cemetery. The contribution of alien species was greater in the New than in the Old Cemetery. ‘Permanent cemetery species’ included *Aegopodium podagraria*, *Centaurea mollis* and *Leucanthemum vulgare*. The cemeteries are refuges for some rare native plant species: *Cirsium eriophorum*, *Centaurea mollis*, *Primula elatior* and *Pinus cembra* in the New Cemetery, and *Asplenium trichomanes*, *Cystopteris fragilis*, *Dentaria glandulosa* and *Primula elatior* in the Old Cemetery.

**Key words:** Tatra Mts, Zakopane, cemetery, vascular flora

### Introduction

Cemeteries are national monuments of the past, linking historical and natural values. They are integral parts of the landscape, which are easy to distinguish in the field. However, our knowledge about cemeteries in general and about their vegetation is rather poor.

In the town of Zakopane in the Tatra Mts (southern Poland) there are two necropolises of wide renown and long history: the Old and the New Cemetery. Both are located at the centre of the town and are often visited by tourists (Fig. 1).

We conducted there floristic investigations in the growing season of 2004 and in the spring of 2005. In each cemetery, frequency of individual plant species was assessed on a scale of 1 to 5 (1 – very rare, 2 – rare, 3 – moderately common, 4 – common, 5 – very common). We also took into account the cultivated native species (marked with asterisks in Table 1) that were not found outside graves. We distinguished ‘permanent ceme-

tery species', i.e. the species that were planted there but have survived in good condition although they are no longer cared for. Such plants are very useful ornamentals for planting in modern cemeteries. Species names follow those used by Mirek et al. (2002).

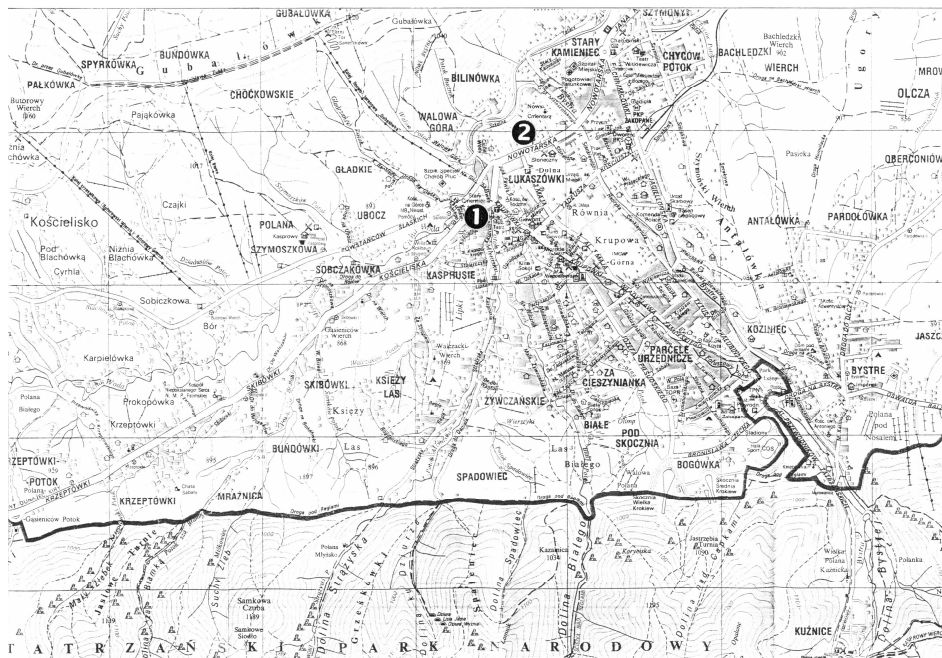


Fig. 1. Location of the Old (1) and New (2) Cemeteries in Zakopane  
Ryc. 1. Lokalizacja Starego (1) i Nowego Cmentarza (2) na terenie Zakopanego

## Results of the surveys of vascular flora

The Old and New Cemeteries differ in size, light conditions and degree of human interference, which is reflected in the taxonomic composition of wild and naturalized plants.

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### Old Cemetery

The Old Cemetery, popularly called Pęksowe Brzysko, is located near the Kościeliska Street and was established in 1848. In 1931 it acquired the status of a historical cemetery (**Kalamacki** – year not given). The cemetery covers an area of about 1400 m<sup>2</sup> and is surrounded with old concrete walls.

There are many trees in this cemetery, so it is very shaded. The tree layer is composed of *Acer pseudoplatanus*, *A. platanoides*, *Fagus sylvatica*, *Fraxinus excelsior*, *Larix decidua* and *Picea abies*, while the shrub layer of *Fagus sylvatica*, *Syringa vulgaris* (infrequent), *Sambucus racemosa* (one specimen), *Sorbus aucuparia*, *Ribes spicata*,

and the subshrub *Vinca minor* (planted on a grave). The taxonomic composition of the herb layer is presented in Table 1. Crevices of the concrete walls have been colonized by *Asplenium ruta-muraria*, *Cystopteris fragilis*, *Fagus sylvatica*, *Mycelis muralis*, *Phegopteris dryopteris*, and a crevice in one tombstone by *Asplenium trichomanes*. On another grave, *Asplenium viride* has been planted. The cemetery is visited by many tourists, so the herb layer is scanty. Aliens are represented there only by small amounts of *Impatiens parviflora*, *I. glandulifera*, and *Epilobium ciliatum*.

**Table 1**  
**List of vascular plant taxa in the herb layer in the Old (❶) and New (❷)**  
**Cemeteries in Zakopane**  
**Wykaz zielnych roślin naczyniowych na Starym (❶) i Nowym (❷)**  
**cmentarzu w Zakopanem**

Taxon – Takson	❶ Fre- quency Częstość wystę- powania	❷ Fre- quency Częstość wystę- powania	Raunkiaer's life form Forma życiowa Raunkiaera	Geo- graphic- -historical group Grupa geograficz- no-histo- ryczna
1	2	3	4	5
<i>Acer pseudoplatanus</i> L. – juv.	1	1	M	Sp. n.
<i>Achillea millefolium</i> L.	.	1	H	Sp. s.
<i>Aegopodium podagraria</i> L.	3	5	H	Sp. s.
<i>Ageratum mexicanum</i> Sims.	.	1	T	Dia.
<i>Agrostis gigantea</i> Roth	.	2	H	Sp. s.
<i>Agrostis stolonifera</i> L.	.	4	H	Sp. n.
<i>Ajuga reptans</i> L.	1*	2*	H	Sp. n.
<i>Alchemilla monticola</i> Opiz	1	3	H	Sp. n.
<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	1*	1	H	Sp. s.
<i>Anemone ranunculoides</i> L.	.	2*	G	Sp. n.
<i>Angelica sylvestris</i> L.	1	.	H	Sp. n.
<i>Anthriscus nitida</i> (Wahlenb.) Hazsl.	1	2	H	Sp. n.
<i>Aquilegia vulgaris</i> L.	1	2	H	Sp. n.
<i>Arabis alpina</i> L.	.	2*	Cn	Sp. n.
<i>Arctium tomentosum</i> Mill.	.	1	H	Sp. s.
<i>Armoracia rusticana</i> P. Gaertn., B. Mey. & Schreb.	.	1	G	Arch.
<i>Artemisia vulgaris</i> L.	.	2	H	Sp. s.

Table 1 – cont.

1	2	3	4	5
<i>Aruncus sylvestris</i> Kostel.	1*	1*	H	Sp. n.
<i>Asarum europaeum</i> L.	1*	.	H	Sp. n.
<i>Asplenium ruta-muraria</i> L.	1	.	H	Sp. s.
<i>Asplenium trichomanes</i> L.	2	.	H	Sp. s.
<i>Asplenium viride</i> Huds.	1*	.	H	Sp. n.
<i>Astrantia major</i> L.	2	2	H	Sp. n.
<i>Athyrium filix-femina</i> (L.) Roth	1	1	H	Sp. n.
<i>Atriplex patula</i> L.	.	1	T	Sp. s.
<i>Avena sativa</i> L.	.	1	T	Dia.
<i>Barbarea vulgaris</i> R. Br.	.	1	H	Sp. s.
<i>Bidens frondosa</i> L.	.	1	T	Ken.
<i>Brachypodium sylvaticum</i> (Huds.) P. Beauv.	1	.	H	Sp. n.
<i>Bunias orientalis</i> L.	.	4	H	Ken.
<i>Calamagrostis arundinacea</i> (L.) Roth	.	1	H	Sp. n.
<i>Campanula patula</i> L.	.	1	H	Sp. s.
<i>Campanula persicifolia</i> L.	1	1	H	Sp. n.
<i>Campanula rapunculodes</i> L.	2	4	H	Sp. s.
<i>Campanula trachelium</i> L.	1	1	H	Sp. s.
<i>Capsella bursa-pastoris</i> (L.) Medik.	.	3	T	Arch.
<i>Cardamine impatiens</i> L.	1	2	T	Sp. s.
<i>Cardamine pratensis</i> L.	1	2	H	Sp. n.
<i>Cardaminopsis arenosa</i> (L.) Hayek	1	1	H	Sp. s.
<i>Cardaminopsis halleri</i> (L.) Hayek	.	1*	H	Sp. n.
<i>Carlina acaulis</i> L.	1*	.	H	Sp. n.
<i>Centaurea mollis</i> Waldst. & Kit.	1	4	H	Sp. n.
<i>Cerastium glomeratum</i> Thuill.	1	1	T	Sp. s.
<i>Cerastium holosteoides</i> Fr. em. Hyl.	2	2	H	Sp. s.
<i>Chaenorhinum minus</i> (L.) Lange	.	1	T	Sp. s.
<i>Chaerophyllum hisutum</i> L.	1	.	H	Sp. n.
<i>Chamomilla suaveolens</i> (Pursh) Rydb.	.	1	T	Ken.
<i>Chenopodium album</i> L.	.	1	T	Sp. s.
<i>Chrysosplenium alternifolium</i> L.	1*	1	H	Sp. n.

Table 1 – cont.

1	2	3	4	5
<i>Cicerbita alpina</i> (L.) Wallr.	1	.	H	Sp. n.
<i>Cirsium arvense</i> (L.) Scop.	.	1	G	Sp. s.
<i>Cirsium eriophorum</i> (L.) Scop.	.	1	H	Sp. n.
<i>Cirsium vulgare</i> (Savi) Ten.	.	1	H	Sp. s.
<i>Convallaria majalis</i> L.	2*	1*	G	Sp. n.
<i>Conyza canadensis</i> (L.) Cronquist	.	1	T	Ken.
<i>Cosmos bipinnatus</i> Cav.	.	1	T	Dia.
<i>Crocus chrysanthus</i> (Hebert) Hebert	.	1*	G	Dia.
<i>Cruciata glabra</i> (L.) Ehrend.	1	2	H	Sp. n.
<i>Cystopteris fragilis</i> (L.) Bernh.	3	.	H	Sp. s.
<i>Dactylis glomerata</i> L.	1	2	H	Sp. s.
<i>Daucus carota</i> L.	.	1	H	Sp. s.
<i>Dentaria glandulosa</i> Waldst. & Kit.	3	.	G	Sp. n.
<i>Dipsacus sylvestris</i> Huds.	.	1	H	Dia.
<i>Doronicum austriacum</i> Jacq.	.	1*	H	Sp. n.
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	.	1	H	Sp. n.
<i>Dryopteris filix-mas</i> (L.) Schott	1	1	H	Sp. n.
<i>Echium vulgare</i> L.	.	1	H	Sp. s.
<i>Elymus caninus</i> (L.) L.	1	.	H	Sp. n.
<i>Elymus repens</i> (L.) Gould	.	2	G	Sp. s.
<i>Epilobium ciliatum</i> Raf.	1	3	H	Ken.
<i>Epilobium montanum</i> L.	1	.	H	Sp. n.
<i>Epilobium roseum</i> Schreb.	.	1	H	Sp. n.
<i>Epilobium roseum</i> Schreb. × <i>E. ciliatum</i> Raf.	.	1	H	Sp. s.
<i>Erigeron annuus</i> (L.) Pers.	.	1	T	Ken.
<i>Eryngium planum</i> L.	.	1	H	Ken.
<i>Erysimum cheiranthoides</i> L.	.	1	T	Sp. s.
<i>Festuca pratensis</i> Huds.	.	1	H	Sp. s.
<i>Festuca rubra</i> L.	.	1	H	Sp. n.
<i>Ficaria verna</i> Huds.	.	1*	G(H)	Sp. n.
<i>Fragaria vesca</i> L.	1	1	H	Sp. n.
<i>Galanthus nivalis</i> L.	1*	1	G	Sp. n.

Table 1 – cont.

1	2	3	4	5
<i>Galeobdolon luteum</i> Huds.	1*	.	Cn	Sp. n.
<i>Galeopsis bifida</i> Boenn./ <i>G. tetrahit</i> L.	.	1	T	Sp. s.
<i>Galinsoga ciliata</i> (Raf.) S.F. Blake	.	2	T	Ken.
<i>Galinsoga parviflora</i> Cav.	.	3	T	Ken.
<i>Galium mollugo</i> L.	1	1	H	Sp. s.
<i>Galium odoratum</i> (L.) Scop.	2*	.	H	Sp. n.
<i>Geranium phaeum</i> L.	2	2	H	Sp. n.
<i>Geranium pratense</i> L.	.	1	H	Sp. s.
<i>Geranium robertianum</i> L.	1	.	T	Sp. s.
<i>Geum urbanum</i> L.	3	1	H	Sp. s.
<i>Glechoma hederacea</i> L.	.	1	H	Sp. s.
<i>Gnaphalium uliginosum</i> L.	.	1	T	Sp. s.
<i>Hemerocallis flava</i> L.	1	1	H	Ken.
<i>Hepatica nobilis</i> Schreb.	1*	1*	H	Sp. n.
<i>Heracleum sphondylium</i> L.	1	2	H	Sp. n.
<i>Hesperis matronalis</i> L.	.	2	H	Ken.
<i>Hieracium lachenalii</i> C.C. Gmel	.	1	H	Sp. n.
<i>Hieracium murorum</i> L.	2	1	H	Sp. n.
<i>Holcus lanatus</i> L.	.	1	H	Sp. s.
<i>Hypericum maculatum</i> Crantz	.	1	H	Sp. n.
<i>Impatiens parviflora</i> DC.	2	2	T	Ken.
<i>Impatiens glandulifera</i> Royle	1	2	T	Ken.
<i>Jovibara sobolifera</i> (Sims) Opiz	1*	.	Cn	Sp. n.
<i>Lamium album</i> L.	.	1	H	Arch.
<i>Lamium maculatum</i> L.	1*	.	H	Sp. n.
<i>Lapsana communis</i> L.	2	1	T	Sp. s.
<i>Lathyrus pratensis</i> L.	1	2	H	Sp. s.
<i>Leontodon autumnalis</i> L.	.	1	H	Sp. s.
<i>Leontopodium alpinum</i> Cass.	1*	1*	H	Sp. n.
<i>Lepidium densiflorum</i> Schrad.	.	1	T	Ken.
<i>Leucanthemum vulgare</i> Lam.	1	3	H	Sp. n.
<i>Leucoium vernum</i> L.	2*	2*	G	Sp. n.

Table 1 – cont.

1	2	3	4	5
<i>Lilium martagon</i> L.	1	.	G	Sp. n.
<i>Linaria vulgaris</i> Mill.	.	1	G	Sp. s.
<i>Linum usitatissimum</i> L.	.	1	T	Dia.
<i>Lolium perenne</i> L.	.	1	H	Sp. s.
<i>Lotus corniculatus</i> L.	.	1	H	Sp. s.
<i>Lupinus polyphyllus</i> Lindl.	.	1	H	Ken.
<i>Luzula sylvatica</i> (Huds.) Gaudin	1*	1*	H	Sp. n.
<i>Lysimachia nummularia</i> L.	2	1*	Cn	Sp. n.
<i>Lysimachia punctata</i> L.	1*	1	H	Ken
<i>Maianthemum bifolium</i> (L.) F.W. Smidt	1	.	G	Sp. n.
<i>Matricaria maritima</i> L. subsp. <i>inodora</i> (L.) Dostál	.	1	T	Arch.
<i>Matteucia struthiopteris</i> (L.) Tod.	1	1	H	Sp. n.
<i>Medicago lupulina</i> L.	1	1	T	Sp. s.
<i>Melandrium album</i> (Mill.) Garcke	.	1	H	Sp. s.
<i>Melilotus alba</i> Medik.	.	2	T	Sp. s.
<i>Mercurialis perennis</i> L.	2*	.	G	Sp. s.
<i>Moehringia trinervia</i> (L.) Clairv.	2	1	T	Sp. n.
<i>Mycelis muralis</i> (L.) Dumort.	3	.	H	Sp. n.
<i>Myosotis arvensis</i> (L.) Hill	1	1	T	Arch.
<i>Myosotis sylvatica</i> Ehrh. ex Hoffm.	1	.	H	Sp. n.
<i>Nigella damascena</i> L.	.	1	T	Dia.
<i>Odontites serotina</i> (Lam.) Rchb.	.	1	T	Sp. s.
<i>Oxalis acetosella</i> L.	3	2*	G	Sp. n.
<i>Oxalis dilenii</i> Jacq.	.	1	T	Dia.
<i>Oxalis fontana</i> Bunge	.	1	G	Ken.
<i>Petasites albus</i> (L.) Gaertn.	1	2	H	Sp. n.
<i>Petasites hybridus</i> (L.) P. Gaertn., B. Mey. & Scherb.	.	1	G	Sp. n.
<i>Phalaris arundinacea</i> L.	.	1*	Hy (H, G)	Sp. n.
<i>Phyteuma spicatum</i> L.	1	.	H	Sp. n.
<i>Pimpinella major</i> (L.) Huds.	1	.	H	Sp. n.
<i>Plantago major</i> L.	3	4	H	Sp. s.

Table 1 – cont.

1	2	3	4	5
<i>Poa annua</i> L.	3	4	T	Sp. s.
<i>Poa nemoralis</i> L.	1	1	H	Sp. n.
<i>Poa palustris</i> L.	.	1	H	Sp. n.
<i>Poa pratensis</i> L.	.	2	H	Sp. s.
<i>Polygonatum verticillatum</i> (L.) All.	2	.	G	Sp. n.
<i>Polygonum amphibium</i> L. for. <i>terrestre</i> Leyss	.	1	G	Sp. s.
<i>Polygonum aviculare</i> L.	.	4	T	Sp. s.
<i>Polygonum persicaria</i> L.	.	1	T	Sp. s.
<i>Primula elatior</i> (L.) Hill.	1	3	H	Sp. n.
<i>Pulmonaria officinalis</i> Dumort.	1*	1*	H	Sp. n.
<i>Pulsatilla vulgaris</i> Mill.	1*	1*	H	Sp. n.
<i>Ranunculus acris</i> L.	2	1	H	Sp. s.
<i>Ranunculus platanifolius</i> L.	1*	.	H	Sp. n.
<i>Ranunculus repens</i> L.	2	3	H	Sp. s.
<i>Raphanus raphanistrum</i> L.	.	2	T	Arch.
<i>Reynoutria japonica</i> Houtt.	.	2	G	Ken.
<i>Rorippa palustris</i> (L.) Besser	.	1	H	Sp. s.
<i>Rumex crispus</i> L.	.	1	H	Sp. s.
<i>Rumex obtusifolius</i> L.	1	2	H	Sp. s.
<i>Sagina procumbens</i> L.	.	1	T	Sp. s.
<i>Scilla sibirica</i> Haw.	1	3	G	Dia.
<i>Scrophularia scopolii</i> Hoppe	.	1	H	Sp. n.
<i>Sedum acre</i> L.	.	1*	Cn	Sp. s.
<i>Sedum fabaria</i> W.D.J. Koch	.	1	H	Sp. n.
<i>Senecio ovatus</i> (P. Gaertn., B. Mey. & Scherb.) Willd.	1	.	H	Sp. n.
<i>Senecio subalpinus</i> W.D.J. Koch	1*	.	H	Sp. n.
<i>Senecio viscosus</i> L.	.	1	T	Ken.
<i>Senecio vulgaris</i> L.	.	1	T	Arch.
<i>Sisymbrium officinale</i> (L.) Scop.	.	1	T	Arch.
<i>Solidago gigantea</i> Aiton	1	1	H	Ken.
<i>Sonchus arvensis</i> L.	.	1	G	Sp. s.



Table 1 – cont.

1	2	3	4	5
<i>Sonchus oleracus</i> L.	.	2	T	Arch.
<i>Stellaria media</i> (L.) Vill.	2	3	T	Sp. s.
<i>Symphytum officinale</i> L.	.	2	H	Sp. n.
<i>Tanacetum vulgare</i> L.	1	3	H	Sp. s.
<i>Taraxacum officinale</i> Web.	.	5	H	Sp. s.
<i>Telekia speciosa</i> (Schreb.) Baumg.	1	2	H	Dia.
<i>Thalictrum aquilegifolium</i> L.	1*	.	H	Sp. n.
<i>Trifolium hybridum</i> L.	.	1	H	Sp. n.
<i>Trifolium pratense</i> L.	1	2	H	Sp. s.
<i>Trifolium repens</i> L.	2	3	H	Sp. s.
<i>Tussilago farfara</i> L.	1	2	G	Sp. s.
<i>Ulmus glabra</i> Huds. – juv.	1	1	M	Sp. s.
<i>Urtica dioica</i> L.	2	2	H	Sp. s.
<i>Vaccinium myrtillus</i> L.	1	.	Cw	Sp. n.
<i>Veratrum lobelianum</i> Bernh.	1*	.	H	Sp. n.
<i>Veronica arvensis</i> L.	.	1	T	Sp. s.
<i>Veronica chamaedrys</i> L.	1	.	Cn	Sp. s.
<i>Veronica persica</i> Poir.	.	1	T	Ken.
<i>Vicia cracca</i> L.	.	1	H	Sp. s.
<i>Vicia hirsuta</i> (L.) Gray	.	1	T	Arch.
<i>Vicia sepium</i> L.	2	2	H	Sp. n.
<i>Viola arvensis</i> Murray	1	.	T	Arch.
<i>Viola odorata</i> L.	1*	.	H	Arch.
<i>Viola reichenbachiana</i> Jord. ex Boreau	1	.	H	Sp. n.
<i>Viola tricolor</i> L.	.	1	T	Sp. s.

1 – very rare, 2 – rare, 3 – moderately frequent, 4 – frequent, 5 – very frequent, \* – cultivated, Sp. n. – nonsynanthropic spontaneophyte, Sp. s. – synanthropic spontaneophyte, Arch. – archaeophyte, Ken. – kenophyte, Dia. – diaphyte, Cn – non-woody chamaephyte, Cw – woody chamaephyte, G – geophyte, H – hemicryptophyte, Hy – hydrophyte, M – megaphanerophyte, T – therophyte.

1 – gatunek bardzo rzadki, 2 – gatunek dość rzadki, 3 – gatunek dość częsty, 4 – gatunek częsty, 5 – gatunek bardzo częsty, \* – gatunek uprawiany, Sp. n. – sponteofit niesynantropijny, Sp. s. – sponteofit synantropijny, Arch. – archeofit, Ken. – kenofit, Dia. – diafit, Cn – chamefit niezdrewniały, Cw – chamefit zdrewniały, G – geofit, H – hemikryptofit, Hy – hydrofit, M – megafanerofit, T – terofit.

## ②

**New Cemetery**

The New Cemetery near Nowotarska Street is much larger, as it covers about 20 000 m<sup>2</sup>. It is surrounded by a wire fence. The first burial there took place on 31 December 1907 (**Kalamacki** – year not given). There are not many trees in the cemetery. The tree layer consists of *Acer pseudoplatanus*, *Alnus incana*, *Betula pendula*, *Fraxinus excelsior*, *Larix decidua*, *Picea abies*, *Thuja occidentalis* and *Salix alba*, and four large specimens of *Pinus cembra*, while the shrub layer includes *Acer platanoides*, *Daphne mezereum* (near a grave), *Fraxinus excelsior*, *Hedera helix* (on a grave), *Populus tremula*, *Taxus baccata* (one specimen), *Syringa vulgaris* (infrequent), and numerous conifers, planted near the main cemetery road. The areas between graves are neither raked nor intensively treaded, so they are densely covered with herbs (Table 1). *Centaurea mollis* and *Chrysanthemum leucanthemum* are very frequent between graves. Other interesting plants recorded there include *Cirsium eriophorum* and *Pinus cembra*. In the crevice of one grave, *Sedum fabaria* was found. Aliens are represented there by *Bunias orientalis*, *Epilobium ciliatum*, *Hesperis matronalis*, *Impatiens parviflora*, *I. glandulifera*, *Lamium album*, *Lepidium densiflorum*, *Oxalis dillenii*, *O. fontana*, etc.

## Results and discussion

In the two cemeteries in Zakopane, 171 species of wild or naturalized vascular plants were found: 82 in the Old Cemetery and 144 in the New Cemetery. Only 58 taxa were present in both cemeteries. Additionally, we recorded 29 native herbaceous taxa, which are now only cultivated there, but may become ‘permanent cemetery species’ in time.

In the Old Cemetery, a large contribution of annuals and biennials was observed, while in the New Cemetery, perennial herbs prevailed (Table 2). This difference was due mainly to intensive treading of paths in the Old Cemetery and the very limited treading and no raking in the New Cemetery. The contribution of alien species was greater in the New than in the Old Cemetery (Table 3). This reflected the synanthropization of the flora in the New Cemetery. In comparison to the cemeteries in Jarocin (**Czarna** 2004), the number of species in the New Cemetery in Zakopane was over 50% higher.

**Table 2**  
**Contributions of Raunkiaer’s life forms to the flora of the Old (①) and New (②) Cemeteries in Zakopane**  
**Udział form życiowych we florze Starego (①) i Nowego (②) cmentarza w Zakopanem**

Life form Forma życiowa	No. of species – Liczba gatunków	
	①	②
Annual and biennial – Roczne i dwuletnie	54	45
Perennial herbs – Byliny	23	97
Trees and shrubs – Krzewy i drzewa	5	2
Total – Razem	82	144

**Table 3**

**Contributions of geographic-historical groups to the flora of the Old (❶) and New (❷) Cemeteries in Zakopane**  
**Udział grup geograficzno-historycznych we florze Starego (❶) i Nowego (❷) cmentarza w Zakopanem**

Geographic-historical group Grupa geograficzno-historyczna	No. of species – Liczba gatunków	
	❶	❷
Nonsynanthropic spontaneophytes Spontaneofity niesynantropijne	42	39
Synanthropic spontaneophytes Spontaneofity synantropijne	31	67
Archaeophytes – Archeofity	2	10
Kenophytes – Kenofity	5	19
Diaphytes – Diafity	2	9
Total – Razem	82	144

‘Permanent cemetery species’ in the studied cemeteries included *Aegopodium podagraria*, *Centaurea mollis* and *Leucanthemum vulgare*. Necropolises play the role of refuges for some native plant species. These included *Asplenium trichomanes*, *Cystopteris fragilis*, *Dentaria glandulosa* and *Primula elatior* in the Old Cemetery, and *Cirsium eriophorum*, *Centaurea mollis*, *Primula elatior* and *Pinus cembra* in the New Cemetery. It is noteworthy that *Centaurea mollis* derives from the montane and higher zones, but has been cultivated at lower altitudes for a long time and is now naturalized there (Piękoś-Mirkowa and Mirek 1978).

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## FLORA NACZYNIOWA CMENTARZY W ZAKOPANEM

## S t r e s z c z e n i e

Na cmentarzach w Zakopanem stwierdzono obecność 171 gatunków roślin naczyniowych. Na Starym Cmentarzu zanotowano 82 gatunki, a na Nowym Cmentarzu 144. 58 gatunków to taksony wspólne. Zanotowano również 29 gatunków rodzimych występujących wyłącznie w uprawie.

Na Pęksowym Brzysku (Stary Cmentarz) zaobserwowano duży udział gatunków rocznych i dwuletnich, natomiast na Nowym Cmentarzu największy udział mają byliny (tab. 2). Taki stan jest spowodowany silnym wydeptywaniem ścieżek między grobami na Pęksowym Brzysku i niemal całkowitym brakiem wydeptywania oraz całkowitym brakiem grabienia na Nowym Cmentarzu.

Udział gatunków obcych na Nowym Cmentarzu jest zdecydowanie większy niż na Starym (tab. 3). Stosunkowo duży udział gatunków obcych młodszej nekropolii to przejaw synantropizacji flory. Udział ten okazuje się bardzo duży także w porównaniu z cmentarzami innych rejonów Polski – jest o 50% większy niż ten, który odnotowano na przykład na cmentarzach w Jarocinie (Czarna 2004).

Do „trwałych gatunków cmentarnych” występujących na terenie analizowanych nekropolii należy zaliczyć: *Aegopodium podagraria*, *Centaurea mollis* i *Leucanthemum vulgare*. Tereny przeznaczone na miejsca pochówku pełnią funkcję ostoi dla niektórych gatunków rodzimej flory. Na Nowym Cmentarzu są to następujące gatunki: *Cirsium eriophorum* i *Centaurea mollis* – uprawiana na Podtatrzu i w niżej położonych miejscowościach tatrzańskich, skąd dziczejac powtórnie, przenosi się na siedliska naturalne (Piękoś-Mirkowa i Mirek 1978), a także *Primula elatior* i *Pinus cembra*. Natomiast na Starym Cmentarzu do tej grupy należą: *Asplenium trichomanes*, *Cystopteris fragilis*, *Dentaria glandulosa* i *Primula elatior*.

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