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Rare vascular plants of the railway areas in Central-Eastern Poland. I. Lublin Upland, eastern part, Roztocze, Volhynia Upland

Rzadsze rośliny naczyniowe terenów kolejowych środkowowschodniej Polski. I. Wyżyna Lubelska, wschodnia część, Roztocze, Wyżyna Wołyńska

SUMMARY

Unpublished stations of 66 more interesting species of vascular plants were characterized that were discovered in the habitats of the railway areas in central-eastern Poland. This applies to the eastern part of the Lublin Upland, Roztocze and Volhynia Upland (Fig. 1). Among this flora anthropophytes (38 species) slightly dominate over apophytes (28 species). These are mostly plant species rarely recorded from different regions and habitats of central-eastern Poland. A dozen--odd other plants are species previously not recorded in those regions. This group also includes several other species now investigated, which, despite being published from the above areas, had indeterminate stations and habitats.

STRESZCZENIE

Scharakteryzowano nieznane dotąd stanowiska 66 bardziej interesujących gatunków roślin naczyniowych, odkryte na siedliskach antropogenicznych terenów kolejowych we wschodniej części makroregionu lubelskiego. Pod względem geograficznym badane tereny usytuowane są w środkowowschodniej Polsce na obszarze wschodniej części Wyżyny Lubelskiej oraz na Roztoczu, Wyżynie Wołyńskiej i Kotlinie Pobuża (ryc. 1). W zdecydowanej większości są to gatunki podawane jedynie z nielicznych stanowisk w skali całego makroregionu. Do najbardziej interesujących należą m.in.: *Amaranthus albus, Alopecurus myosuroides, Allium angulosum, Erysimum hieraciifolium,*

Oenothera hoelscheri i *O. wienii*. Kilkanaście innych to gatunki nowe niepublikowane dotąd z wymienionych regionów lub podawane z tych obszarów, ale o bliżej nieokreślonych stanowiskach i siedliskach. Odnosi się to przede wszystkim do roślin, jak: *Abutilion theophrasti, Aegilops cylindrica, Ambrosia trifida, Bromus japonicus, B. squarrosus, Crepis setosa, Geranium sibiricum, Gypsophila perfoliata, Oenothera subterminalis, Sideritis montana* i *Vicia pannonica*.

K e y w o r d s: Rarer vascular species of the railway areas, stations, habitats, and number of specimens. Lublin Upland, Eastern part, Roztocze, Volhynia Upland, the Bug River Basin, central-eastern part (Lublin macro-region).

THE SCOPE OF STUDY

In the habitats of railway areas there are specific plants. This is connected with both the occurrences of originally differentiated anthropogenic habitats there and with diverse possibilities of plant expansion with railway transport (4, 17).

In the whole area of the Lublin macro-region the plant cover of railway areas is comparatively the least investigated, especially, in those situated outside urban and industrialized locations (4, 5). Hence, during intensive geobotanical investigations in the railway areas in the eastern part of Lublin Upland as well as in Roztocze and Volhynia Upland, stations were discovered of numerous vascular plant species belonging to apophytes or anthropophytes. These investigations were carried out in 1998–2000. During those field studies account was taken of all habitats directly and indirectly connected with railway lines, stations and minor stopping places, such as trackage, embankments, trackage trenches, station facilities, platforms, squares and yards etc.

The present study has described the previously unpublished stations of 66 most interesting species of vascular plants now uncovered in habitats of the railway areas in the eastern part of the Lublin macro-region (Fig. 1). They are mostly plant species with few stations previously reported from various regions and habitats of central-eastern Poland (3, 4, 5, 16, 17, and literature cited). Furthermore, this also applies to a dozen-odd plant species that have not been previously published from central-eastern Poland or were reported from indeterminate stations and habitats (4, 5).

The nomenclature of the investigated plant species was given after M i r e k et al. (15). The membership of their particular ecological elements of apophytes and geographical-historical anthropophytes was given after the cited publications 4, 5, 9, 10, 17, 23, 24. Almost each of these stations was documented with herbarium specimens deposited in the Herbarium of the Institute of Biology's Department of Geobotany, Maria Curie-Skłodowska University.

The studied plant species were systematically listed within families in the alphabetical order (19). The stations of these species were enumerated against the background of particular meso--regions of the investigated area, using the following marking (Fig. 1): DG — Grabów Divides, PZ — Zamość Valley, RŚ — Central Roztocze, RW — Eastern Roztocze, OD — Dubienka Depression, GH — Horodło Grzęda, KH — Hrubieszów Basin, GS — Sokal Grzęda. Moreover, the plant stations listed were located against the ATPOL grid squares (Fig. 1).

AREA OF INVESTIGATIONS

Studies of the flora of railway areas were conducted in central-eastern Poland, in the eastern part of the Lublin province. Physico-geographically and geobotanically, this area is on the borderland of two sub-provinces: the Lublin-Lvov Upland in its western part and the Volhynia-

Fig. 1. Situational map of the area of investigations against the ATPOL grid. 1 — boundaries of macro- and meso-regions. 2 — standard-gauge railway lines and standard and wide-gauge lines (LHS). 3 — dismantled narrow-gauge railway lines. NB. The railway line routes include main localities with marked sites of railway stations and halts

-Podolia Upland in its eastern part (l, 2, 3, 5, 8, 18). These, in turn, are contact areas belonging to several secondary physico-geographical units. On the western side, they belong to the Lublin Upland macro-region, with the meso-regions of Grabów Divides and Zamość Valley, and to the Roztocze macro-region with the meso-regions of Central Roztocze and Eastern Roztocze. On the eastern side the investigated area belongs to the Volhynia Upland macro-region with the meso--regions of Horodło Grzęda, Hrubieszów Basin and Sokal Grzęda, and to the macro-region of the Bug River Basin with the meso-region of the Bełz Plain.

Morphologically, this is essentially an upland area (Lublin Upland and Volhynia Upland), with characteristic basin-like depressions (Zamość Valley, Hrubieszów Basin, Bełz Plain) and with an isolated group of upland heights (Roztocze). In general, this area is situated at 170–390 m above sea level. In the superficial layer of the substratum, Quaternary typical loess, loess-like and sandy formations, and boulder clay and alluvia most often dominate (l, 3, 6, 8, 20, 21). The Tertiary substratum of cretaceous rocks often appears from under the above Quaternary covers.

The climatic conditions in the investigated area have a characteristic profile. (7, 22, 25). The mean annual air temperature ranges from 8.4°C to 8.6°C. The mean annual precipitation total ranges from 650–700 mm. In the studied territory, for geomorphological reasons, the Roztocze macro-region is far more humid and colder as compared with the macro-region of the Lublin Upland, Volhynia Upland and the Bug River Basin (7, 25).

The total length of the tracks studied was ca. 360 km (Fig. 1) — they comprised all three local kinds of railway lines with the track gauge: standard, wide (LHS — iron and sulphur ore line), and narrow. These are railway routes 176, 82 and 102 km long respectively. The standard-gauge lines started to operate in the early 20th century. The LHS line has been in operation since 1980, but less used in recent years. The narrow-gauge railway lines built in the 1920s were entirely dismantled in the 1970s. The standard and wide-gauge (LHS) lines are the main railway routes between the central-eastern part of Poland and other regions of Poland and Ukraine. The narrow-gauge railway lines were separate local transport routes in two junctions: Zwierzynice and Hrubieszów (Fig. 1).

The studied sections of railway lines run across the terrain with diverse environmental conditions (Fig. 1): farmland, meadows, forests, urban and industrialized areas. They are accompanied by diversified anthropogenic habitats, starting from extremely specialized ruderal to those close to semi-natural and natural ones. Vegetation in the railway lines is mechanically or chemically destroyed. This is done on a large scale in the vicinity of railway stations, and sporadically outside them.

THE SURVEY OF STATIONS OF THE INVESTIGATED FLORA

Equisetaceae

Equisetum hyemale L. A forest and shrubs apophyte DG: GE6213 — Dworzyska, E part, forest margin. The slope of the trackage trench with a sandy surface with a loose plant cover. In numerous places loose and dense tufts scattered along the length of ca. 300 m. KH: GE8605 — Tyszowce, E part, forest margin, the site of the dismantled PKP (Polish State Railways) halt of the narrow-gauge railway line. A derelict railway track with a sandy surface with a loose plant cover. Weakly compact tuft.

Equisetum ramosissimum Desf. A meadow apophyte. PZ: GE8174 — Klemensów, the PKP station, W part. A vast square between railway tracks with a sandy surface with a loose plant cover. A dozen-odd specimens. RW: GF4411 — Horyniec, the PKP station, NE part. The site between tracks with a sandy-gravel surface with a graminaceous and herbaceous plant cover. A dense tuft. GF2559 — Werchrata, the PKP railway station, E part. The site between railway tracks with a sandy-gravel surface with a loose plant cover, chiefly with

Poa compressa. A dozen-odd specimens. RŚ: GE9110 — Żurawnica, middle part. The slope of the trackage embankment with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens.

Equisetum variegatum Schleich. A meadow apophyte. RW: GF3559 — Werchrata, the PKP railway station, E part. A depressed site between low trackage embankments with a sandy-gravel surface with a loose plant cover. A loose tuft.

Chenopodiaceae

Salsola hali subsp. ruthenica (Iljin) Soó. An agresto-epecophyte. PZ: GE8167 — Bodaczów, W part. The flat fringe of a railway track with a sandy-gravel surface with sparse plants. Several specimens. RW: GF2595 — Hrebenne, the PKP railway station, central part. A broad site between railway tracks with a sandy surface with sparse plants. Several specimens. KH: GE7725 — Hrubieszów, the PKP railway station, central part. The flat fringe of a railway track with a sandy--gravel surface with a loose plant cover. A dozen-odd specimens. GE8417 — Miączyn, the PKP railway station, central part. The flat fringe of a railway track with a sandy-gravel surface with a loose plant cover. Several specimens.

Amaranthaceae

Amaranthus albus L. An agresto-epecophyte. PZ: GE8349 — Zamość, central part, around Peowiaków St. A railway track with a sandy-gravel surface. In a loose community with *Viola arvensis*. Several specimens. RW: GF2416 — Bełżec, the PKP railway station, central part. The flat fringe of a railway track with a sandy--breakstone surface with sparse plants. Several specimens.

Portulaceae

Portulaca oleracea L. An agresto-epecophyte? PZ: GE8175 — Klemensów, the PKP railway station, central part. The margin of the freight handling yard with a sandy-loamy surface with a loose plant cover. A dozen-odd specimens. GE7148 — Ruskie Piaski, the PKP railway station, central part. The flat fringe of a platform with a sandy surface with a loose plant cover. A dozen-odd specimens together with *Eragrostis minor*. KH: GE7696 — Werbkowice, the PKP railway station, central part. The flat fringe of a railway track with a sandy-gravel surface with a loose plant cover. Several dozen scattered specimens. GS: GF0526 — Grodysławice, W part. The site of a dismantled narrow-gauge railway halt with a sandy-loamy surface with a loose plant cover. A dozen-odd specimens.

Caryophyllaceae

Gypsophila fastigiata L. An agresto-epecophyte?. PZ: GE8433 — Miasteczko, N part, near a level crossing. The flat fringe of the crest of the trackage embankment with a sandy surface with a loose plant cover. A dozen-odd specimens. RŚ: GF0113 — Zwierzyniec — Józefów Roztoczański, the forest area of the Roztocze National Park. The slope of a dry ditch at the trackage embankment with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. RW: GF2503 — Bełżec II, the PKP railway station, W part, on the forest margin. The foot of the slope of a trackage embankment with a sandy surface with a loose plant cover. A dozen-odd specimens scattered over a length of ca. 100-m. KH: GE8417 — Miączyn, the PKP railway station, E part. The flat fringe of a railway track with a sandy surface with a loose plant cover. A dozen-odd specimens.

Gypsophila perfoliata L. An agresto-ephemerophyte?. PZ: GE8326 — Zamość, N part, the Szopinek quarter. A disused side track on the LHS (iron and sulphur ore) line with a sandy-gravel surface with loose plant cover Several tufts. KH: GE7726 — Hrubieszów, a reloading station of the LHS line, central part. (Fig. 2) A broad site between railway tracks with a sandy-gravel surface with a loose plant cover. Several tufts.

Euphorbiaceae

Euphorbia serrulata Thuill. An agresto-epecophyte?. RW: GF2559 — Werchrata, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens scattered over a length of 50 m.

Euphorbia virgultosa Klokov. A xerothermic apophyte PZ: GE7158 — Ruskie Piaski, the PKP railway station, central part. A disused side track with a sandy-gravel surface. In a community with *Rorippa austriaca*. A dozen--odd specimens. GE8242 — Zawada, NE part, surrounded by ploughland. The flat fringe of a railway track with a sandy-gravel surface with a loose grass community. In large numbers, together with *Potentilla recta* and *Anthylis vulneraria.* KH: GE7695 — Werbkowice, W part. The slope of a high railway track embankment with a sandy-dusty surface with a loose plant cover. A dozen--odd specimens. GE7726 — Hrubieszów, an LHS loading station, central part. The vast flat fringe of a railway track with a sandy-dusty-gravel surface with a loose plant cover. A dozen-odd specimens. GE7726 — Hrubieszów, SW part. The fringe of a low narrow-gauge railway embankment with a loamy-gravel surface with a dense shrubbery cover. Several specimens. GE8513 — Koniuchy,

W part, private forests area. The flat fringe of a railway track with a sandy surface with a loose plant cover. In large numbers, together with *Chondrilla juncea*. GS: GF0712 — Dutrów, E part. The site of a dismantled narrow-gauge railway halt. The slope of the trackage trench with a loamy surface with a loose graminaceous--herbaceous cover. A dozen-odd specimens.

Ranunculaceae

Thalictrum lucidum L. A meadow apophyte. KH: GE7621 — Brodzica, N part, in the vicinity of the Huczwa river bridge. The slope of a high embankment on the dismantled narrow-gauge railway line with a loamy surface. On the margin of a community with *Melilotus officinalis*. Several specimens. GE7762 — Metelin, NW part. The slope of a railway track embankment with a sandy-breakstone surface with a dense graminaceous-herbaceous cover. Several specimens.

Thalictrum simplex L. A xerothermic apophyte. KH: GE7729 — Gródek, S part. The slope of a low railway track embankment on the LHS with a sandy--gravel surface with a dense graminaceous-herbaceous cover. Several specimens.

Cruciferae

Brassica nigra (L.) W. D. J. Koch An ergasio-epecophyte. PZ: GE8331 — Zamość, central part, in the vicinity of the overpass in Powiatowa St. The slope of the trackage trench with a loamy-sandy surface. On the edge of a community with *Urtica dioica*. A dense tuft. GS:

GF0646 — Zimno, NE part, in the vicinity of grain elevators. The margin of a dismantled narrow-gauge railway line with a sandy-loamy surface with a dense graminaceous-herbaceous cover. Two dense tufts.

Erysimum hieraciifolium L. A xerothermic apophyte. PZ: GE8215 — Zamość, the PKP railway station Bortatycze, central part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. Scattered in large numbers together with *Bromus japonicus* and *Oenothera biennis*. RW: GF3550 — Werchrata, the PKP railway station, E part. A railway track with a sandy--gravel surface with a loose plant cover. Several specimens. GF3493 — between Horyniec and Dziewięcierz, the area of state forests. The flat fringe of a low railway track embankment with a sandy-breakstone surface with sparse plants. Several specimens. KH: GE7696 — Werbkowice, the PKP railway station, E part. A disused, outer railway track with a sandy-breakstone surface with a loose plant cover. Several specimens together with *Bromus tectorum* and *Poa compressa.* GE7727 — Hrubieszów, a LHS loading station, central part. The broad site

between railway tracks with a sandy-gravel surface with a loose plant cover. Several specimens together with *Centaurea stoebe* and *Poa compressa*.

Erysimum marschallianum A n d r z. Ex M. B and e b. An agresto-epecophyte RW: GF3497 — Dziewięcierz, E part, in the vicinity of ploughland. The flat fringe of a railway track with a sandy-breakstone surface with sparse plants. Several specimens.

Lepidium campestre (L.) R. Br. An archeophyte. PZ: GE8248 — Zamość, the PKP railway station, central part. The flat site between railway tracks with a sandy-gravel surface. On the edge of a community with *Carex hirta.* Several specimens. RŚ: GE9101 — Szczebrzeszyn, the PKP railway station, central part. The flat site between railway tracks with a gravel surface with sparse plants. Several specimens scattered over a length of ca. 30-m. GE9172 — Zwierzyniec, the PKP railway station, S part. A side track with breakstone surface with sparse plants. A dozen-odd specimens. RW: GF2403 — Bełżec II, the PKP railway station, W part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. KH: GE7696 — Werbkowice, the PKP railway station, central part, in the region of the branching of the track junction towards the sugar plant. A railway track with a sandy-breakstone surface with a loose plant cover. Several specimens.

Lepidium virginicum L. An agresto-epecophyte. PZ: GE8254 — Zamość, the PKP railway station, W part. The site between railway tracks with a sandy-gravel surface. In a community with *Chamomilla suaveolens*. A dozen-odd specimens. RŚ: GF1370 — Susiec, the PKP railway station, central part. The flat fringe of a railway track with a sandy-gravel surface with a loose plant cover. Several specimens. RW: GF2552 — Lubycza Królewska, central part, the area of state forests. The sandy-breakstone fringe of a railway track embankment with a sandy--gravel surface with sparse plants. Several specimens.

Rorippa austriaca (Crantz) Besser A meadow apophyte. PZ: GE7148 — Ruskie Piaski, the PKP railway station, central part. A disused railway track with a sandy-gravel surface with a dense graminaceous-herbaceous cover. It forms a separate expanse of the community. GE7119 — Krzak, S part. The flat fringe of a railway track with a sandy-gravel surface. On the edge of a community with *Equisetum arvense*. A dozen-odd specimens. RŚ: GF0176 — Józefów Roztoczański, the PKP railway station, N part. A sandy heap near the railway track, with a loose plant cover. It forms a separate expanse of the community. RW: GF2416 — Bełżec, the PKP railway station, central part. The flat fringe of a railway track with a sandy-gravel surface with a loose plant cover. It forms a separate expanse of the community. KH: GE7725 — Hrubieszów, the PKP railway station, central part. The flat fringe of a railway track with a sandy surface with a loose plant cover. A large loose tuft.

Crasullaceae

Sedum reflexum L. A grass-growing-on-sand apophyte. RŚ: GF1200 — Długi Kąt, the PKP railway station, W part. The site between railway tracks with a sandy-gravel surface with sparse plants. Several specimens together with *Sedum acre*.

Rosaceae

Geum allepicum Jacq. A forest and shrub apophyte. R: GF1223 — Majdan Nepryski, SE part. The slope of a high railway track embankment with a sandy--gravel surface with a loose plant cover. Several specimens.

Potentilla collina Wibels. s. A grass-growing-on-sand apophyte. PZ: GE7148 — Ruskie Piaski, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface. In a community with *Poa compressa*. Several specimens. RŚ: GE9134 — Senderki — Zwierzyniec, the forests of the Roztocze National Park. The slope of a deep trackage trench with a sandy-dusty surface with a loose plant cover. Several specimens together with *Potentilla argentea*. GF1380 — Susiec, the PKP railway station, E part. A square between railway tracks with a sandy-gravel surface with sparse plants. Several specimens. KH: GE8416 — Miączyn, the PKP railway station, central part. The flat fringe of a railway track with a sandy-gravel surface. On the fringe of a community with *Artemisia campestris*. Several specimens. GS: GE9636 — Tuczapy, W part. The flat margin of a dismantled narrow-gauge track with a sandy-dusty surface. In a community with *Achillea millefolium*. Several specimens. GF0526 — Grodysławice, E part. The square after a dismantled narrow-gauge railway halt with a sandy-dusty surface with a dense graminaceous-herbaceous cover. Several specimens together with *Potentilla argentea* and *Trifolium arvense*.

Potentilla heptaphylla L. A grass-growing-on-sand apophyte. DG; GE6270 — Tarzymiechy, N part, near a level crossing. The fringe of the summit of a high railway track embankment with a sandy-gravel surface with a loose plant cover. Several specimens.

Potentilla intermedia L. non Wahlenb. An agresto-epecophyte. GS: GE9852 — Witków, E part, the area of a dismantled narrow-gauge railway halt with a sandy-dusty surface. In a community with *Euphorbia cyparissias*. Several specimens.

Potentilla recta L. A xerothermic apophyte. PZ: GE8248 — Zamość, the PKP railway station, central part. The flat fringe of a railway track with a sandy--breakstone surface with a loose plant cover. Several specimens. GE8242 — Zawada, NE part, around plougland. The flat fringe of a railway track with

a sandy-gravel surface with a loose plant cover, chiefly *Galium verum* and *Anthyllis vulneraria*. A dozen-odd specimens. RŚ: GF1254 — Nowiny, the PKP railway station, NW part. The flat fringe of a railway track with a sandy surface with a loose graminaceous cover. Several specimens. GE9192 — Zwierzyniec Towarowy, the PKP railway station, NW part. The edge of a square, near a railway track with a sandy surface with a loose graminaceous cover, chiefly with *Calamagrostis epigejos* and *Arrhenatherum elatius*. Several specimens. RW: GF4402 — Sioło, central part. A railway track with a sandy-loamy-gravel surface with a loose graminaceous cover. Several tufts.

Potentilla supina L. A water and waterside apophyte. PZ: GE8340 — Zamość, central part, in the area of Peowiaków St. The flat fringe of a railway track with a sandy-gravel surface. In a community with *Viola arvensis*. Several specimens.

Papilionaceae

Astragalus onobrychis L. A xerothermic apophyte. KH: GE7729 — Gródek, SE part. The slope of a low LHS railway embankment with a sandy-gravel surface. Scattered over a length of ca. 50 m. In loose tufts.

Onobrychis viciifolia Scop. An ergasio-epecophyte. KH: GE7697 — Werbkowice, the PKP railway station, E part. The site between railway tracks with a sandy-breakstone surface with sparse plants. Several specimens together with *Plantago arenaria*. GE7727 — Hrubieszów, E part, a LHS (iron and sulphur ore line) loading station. The site between railway tracks with a sandy-gravel surface with sparse plants. Several specimens. GE7728 — Gródek, SE part. The slope of a low LHS railway embankment with a sandy-gravel surface with sparse plants. Several specimens.

Ononis spinosa L. A xerothermic apophyte. RŚ: GF1380 — Susiec, the PKP railway station, E part. A freight-handling yard with a sandy surface with a loose plant cover. A dozen-odd specimens in a tuft.

Trifolium alpestre L. A grass-growing-on-sand apophyte. RŚ: GF1382 — Koszele — Maziły, the state forests area. The slope of a high railway tracks embankment with loamy-sandy surface with a dense graminaceous-herbaceous cover. Several specimens.

Vicia grandiflora Scop. An agresto-epecophyte. RŚ: GF0156 — Józefów Roztoczański — Borowina, the area of state forests. The slope of a high railway track embankment with a sandy surface with a dense graminaceous-herbaceous cover. Several specimens. GF0176 — Józefów Roztoczański, the PKP railway station, N part. The fringe of a railway track with a sandy-breakstone surface with a dense graminaceous-herbaceous cover. Several specimens. GF0101 — Szozdy — Zwierzyniec, the forests of the Roztocze National Park. The slope of

a high railway track embankment with a sandy-loamy surface. In a community with *Melilotus officinalis*. Several specimens. OD: GE5776 — Liski, N part, the state forests area, a halt of the dismantled narrow-gauge railway line. The substratum with a sandy-dusty surface with a dense graminaceous-herbaceous cover. Several specimens. KH: GE7696 — Werbkowice, central part, near the sugar plant. A dismantled narrow-gauge railway track with a sandy-dusty surface. In a community with *Bromus inermis.* Several specimens.

Vicia pannonica Crantz. An agresto-epecophyte. DG: GE6280 — Tarzymiechy, central part. The slope of a low railway track embankment with a sandy--loamy surface with a loose plant cover. Several specimens.

Oenotheraceae

Oenothera hoelscheri Renner ex Rostański. An agresto-epecophyte. DG: GE5273 — Krasnystaw, SE part, Zastawie quarter, in the area of fish ponds. The sandy-dusty slope of the trackage trench with a loose plant cover. Several specimens. GE6260 — Tarnogóra, NE part, surrounded by ploughland. The slope of the trackage trench with a sandy surface with crumbs of limestone rock, with a loose plant cover. A dozen-odd specimens. PZ: GE8215 — Zamość, the PKP railway station Bortatycze, central part. A vast site between the railway tracks with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. GE8224 — Zamość, W part. The slope of a railway tracks embankment with a sandy-gravel surface with a loose plant cover. A dozen odd specimens. RŚ: GF0176 — Józefów Roztoczański, the PKP railway station. In two remote sites: the S part of the PKP railway station, the freight-handling yard with a sandy--gravel surface. The N part of the PKP station, the slope of a high railway tracks embankment with a gravel-sandy surface. In both sites among a loose plant cover, several specimens in each. GF0145 — Zwierzyniec — Józefów Roztoczański, the state forests area. The flat fringe of a railway track — with a sandy-gravel surface with a loose plant cover. Several specimens. GF1212 — Długi Kąt — Nowiny, the state forests area. The margin of a high railway tracks embankment with a sandy-dusty surface with a loose plant cover. Several specimens. GF1380 — Susiec, the PKP railway station, central part. In two sites close to each other. In the old sand heap near the railway track and on the fringe of the track with a sandy-dusty surface. In both sites among loose plant covers. Several specimens each. KH: GE7716 — Hrubieszów, NE part, among plougland. The site between LHS railway tracks with a sandy-gravel surface with a loose plant cover. Several specimens together with *Oenothera rubricaulis.*

Oenothera salicifolia Desf. Ex G. Don. An agresto-epecophyte. PZ; GE8217 — Zamość, W part. The site between railway tracks with a sandy- dusty

surface with a loose plant cover. Several specimens. RŚ: GF0176 — Józefów Roztoczański, the PKP railway station, central part. A square with a sandy-dusty surface with a loose plant cover. Several specimens. KH: GE8515 — Koniuchy, W part, the area of private forests. The flat fringe of a railway track with a sandy-dusty surface with a loose plant cover. Several specimens.

Oenothera subterminalis R. R. G a t e s. An agresto-epecophyte. RŚ: GF0156 — Zwierzyniec — Józefów Roztoczański, the state forests area. The slope of a ditch at the foot of a railway track embankment with a sandy surface with a loose herbaceous-graminaceous cover. A dozen-odd specimens together with *Oenothera biennis*. GE9192 — Zwierzyniec, the PKP railway station, SE part. The flat fringe of a railway track with a sandy surface with a loose plant cover, chiefly with *Trifolium arvense* and *Artemisia campestris*. A dozen-odd specimens.

Oenothera wienii Renner ex Rostański. An agresto-epecophyte. PZ: GE8307 — Zamość, N part. The slope of LHS railway embankment with a sandy--dusty surface with a dense graminaceous cover, chiefly with *Festuca rubra* and *Corynephorus canescens*. Several dozen specimens scattered over a length of ca. 300 m. RŚ: GE9100 — Brody Małe, the PKP railway station of Szczebrzeszyn, freight station. A freight-handling yard with a sandy surface with a loose plant cover. A dozen-odd specimens.

Malvaceae

Abutilion theophrasti M e d i k. An agresto-epecophyte. RW: GF2595 — Lubycza Królewska, the PKP railway station, central part. The flat fringe of the outer railway track with a sandy-gravel surface with a loose plant cover. Several specimens.

Geraniaceae

Geranium columbinum L. An archeophyte. PZ: GE8174 — Klemensów, the PKP railway station, W part. The flat fringe of a railway track with a sandy surface with a loose graminaceous cover. Several specimens. RŚ: GF1370 — Susiec, the PKP railway station, W part. The foot of a low railway track embankment, with a sandy-gravel surface. On the edge of a community *Rubus caesius*. Several specimens.

Geranium sibiricum L. An agresto-epecophyte. OD: GE5776 — Liski, NW part, the state forests area. The square after a dismantled narrow-gauge railway halt with a sandy-dusty surface with a dense herbaceous-graminaceous cover. Several specimens together with *Trifolium arvense* and *Helichrysum arenarium*. GE5786 — Liski, SW part, the slope of the trench of a dismantled narrow-gauge

railway track with a loamy surface with a dense graminaceous-herbaceous cover. Several dozen tufts scattered over a length of ca. 150 m. GH: GE6766 — Dziekanów, central part. The roadside with a sandy-dusty surface with a dense plant cover. A dozen-odd tufts, scattered over a length of ca. 100 m. GE6747 — Kobło, W part. The slope of the trench of a dismantled narrow-gauge railway track with a sandy-dusty surface with a dense graminaceous-herbaceous cover. A dozen-odd tufts. GE6738 — Kobło, N part. The flat fringe of a dismantled narrow-gauge railway track, with a sandy-loamy surface with a dense graminaceous-herbaceous cover. Several tufts. GE6747 — Szpikołosy, SE part, on the margin of a small forest. A dismantled narrow-gauge railway track with a sandy--loamy surface with a dense graminaceous-herbaceous cover. Several specimens. GE6766 — Dziekanów, N part. The slope of a ditch near a dismantled narrow--gauge railway track with a sandy-loamy surface with a dense graminaceous--herbaceous cover. A dozen-odd tufts. GE6717 — Kopyłów, N part. The slope of the trench of a dismantled narrow-gauge railway track with a sandy-loamy surface. In a community with *Calamagrostis epigejos*. Several tufts. GE6738 — Kobło, W part. The square after a dismantled narrow-gauge railway halt with a sandy-loamy surface with a dense plant cover chiefly with *Galium verum* and *Origanum vulgare.* A dozen-odd specimens. GE6864 — Strzyżów, central part, near the road in the direction of Horodło. The site of a dismantled narrow--gauge railway track. In a community with *Bunias orientalis*. Several tufts. KH: GE76 — Werbkowice, the PKP railway station, E part. The trackage of store-yard side-tracks leading towards the sugar plant with a sandy-gravel surface with a mosaic of dense or loose herbaceous-graminaceous covers (Fig. 3). Several dozen clusters scattered over a length of ca. 200 m. GE7644 — Alojzów, E part (Fig. 3), in the area of a level crossing. The slope of a low railway track embankment with a sandy-gravel surface. On the fringe of a community with *Urtica dioica.* Several specimens. GE7735 — Hrubieszów, SW part. The ridge of the low embankment of a dismantled narrow-gauge railway track with a loamy-gravel surface with a dense herbaceous-graminaceous cover. Several tufts. GE7735 — Hrubieszów. In three remote sites, the central-northern part of town, near Dwernickiego St. The edge of the site of a dismantled narrow-gauge railway halt with a loamy-gravel surface with a dense herbaceous-graminaceous cover, several tufts; Kolonia Sławęcin, from the Huczwa river bridge as far as Nowe Osiedle St., the ridge and slope of dismantled narrow-gauge railway track embankment with a dusty-sandy surface with a dense herbaceous-graminaceous cover. Several dozen tufts scattered over a length of ca. 600 m. SW part of town, the PKS coach station, near Nowa St. A disused flower-bed with a dusty-sandy surface with a dense herbaceous-graminaceous cover. Several tufts. GE8514 — Koniuchy, the PKP railway station, E part. The flat fringe of a railway track with a sandy-

-dusty surface with a dense graminaceous-herbaceous cover. Several specimens. GE8514 — Koniuchy, the PKP railway station, E part. The site between railway tracks with a sandy-breakstone surface with sparse plants. Several tufts. GE8635 — Strzyżowiec, S part. On a dismantled narrow-gauge railway track with a sandy-dusty surface with a dense graminaceous-herbaceous cover. Several tufts. GS: GE9626 — Lipowiec, central part, at the intersection with the Tyszowce road. On a dismantled narrow-gauge railway track with a loamy-humus surface with a dense graminaceous-herbaceous cover. Several tufts. GF0624 — Kolonia Łaszczów, E part, in the vicinity of the road to Łaszczów. On a dismantled narrow-gauge railway track with a sandy-loamy surface with a dense graminaceous cover. Several tufts. GF0615 — Łaszczów, N part. The site of a dismantled narrow-gauge railway halt with a sandy-dusty surface with a dense graminaceous-herbaceous cover. A dozen-odd specimens in a loose cluster.

Umbelliferae

Heracleum sosnowski Manden. An ergasio-epecophyte. KH: GE8615 Malice, middle part. The site between tracks with a sandy-gravel surface with a graminaceous and herbaceous plant cover. Several specimens.

Primulaceae

Androsace septentrionalis L. A xerothermic apophyte. RW: GF2416 — Bełżec, the PKP railway station, SE part. A railway track with a sandy-gravel surface. In a community with *Plantago arenaria*. Several specimens.

Boraginaceae

Lappula squarrosa (Retz.) Dumort. A xerothermic apophyte. KH: GE7727 — Hrubieszów, an LHS freight-handling station, central part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. GE8514 — Koniuchy, the PKP railway station, central part. The flat site between railway tracks with a sandy-gravel surface with a loose plant cover. Several specimens. GE7729 — Gródek, SE part, LHS. The fringe of a railway track with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens scattered over a length of ca. 50 m.

Labiatae

Galeopsis angustifolia (Ehrh.) Hoffm. A xerothermic apophyte. PZ: GE8234 — Siedliska, W part. A railway track with a sandy-breakstone surface

with sparse plants. Several specimens, GE8312 — Zamość, N part, the Majdan housing estate. The site between LHS railway tracks with a sandy-gravel surface with sparse plants. A dozen-odd specimens. RŚ: GF0123 — Józefów Roztoczański — Borowina, the state forests area. The fringe of the top of railway tracks embankment with a breakstone surface with sparse plants. Several specimens. GF1380 — Susiec, the PKP railway station, E part. The foot of a railway tracks embankment with a sandy-gravel surface with a loose plant cover. Several specimens. GF1382 — Koszele — Maziły, the state forests area. The foot of a railway tracks embankment with a sandy-gravel surface with a loose plant cover. Several specimens. GE9192 — Zwierzyniec, the PKP loading station, central part. The site between railway tracks with a breakstone surface with sparse plants. Several dozen specimens.

Salvia nemorosa L. A xerothermic apophyte. KH: GE7729 — Gródek, SE part. The slope of a trackage trench with a loamy-sandy-gravel surface with a loose plant cover. Several dozen specimens scattered over a length of 200 m.

Sideritis montana L. An agresto-epecophyte. PZ: GE8340 — Zamość, central part, under the viaduct in Peowiaków St. The site between railway tracks with a sandy-breakstone surface with a loose plant cover. Several specimens.

Stachys annua (L.) L. A xerothermic apophyte. RW: GF2416 — Bełżec, the PKP railway station, central part. The site between railway tracks with a sandy surface. On the edge of a community with *Medicago falcata*. Several specimens

Thymus marschallianus W i l l d. A grass-growing-on-sand apophyte. KH: GE7729 — Gródek, SE part. The slope of a railway tracks embankment with a sandy-loamy-gravel surface with a loose plant cover. Several dozen specimens scattered over a length of ca. 100 m.

Rubiaceae

Galium rivale (S i b t h. & S m.) Griseb. A forest and shrubs apophyte. KH: GE8517 — Miączyn, E part. The slope of a trackage trench with a sandy-dusty surface with a loose plant cover. Several specimens.

Campanulaceae

Campanula bononiensis L. A xerothermic apophyte. DG: GE5273 — Krasnystaw, Zastawie, in the area of fish ponds. The slope of a trackage trench with a sandy-dusty surface with a loose plant cover. A dozen-odd specimens. GE6260 — Tarnogóra, NE part. The slope of trackage trench, on a loamy substratum with limestone rock crumbs, with a loose plant cover. Several specimens.

Compositae

Ambrosia trifida L. An ergasio-ephemerophyte. PZ: GE8166 — Bodaczów, W part, in the vicinity of the sugar plant. The flat fringe of a railway track with a sandy-gravel surface. On the fringe of a developing community *Tanacetum vulgare* and *Cirsium arvense*. Several specimens.

Anthemis ruthenica M. B i e b. An agresto-epecophyte. RŚ: GE9171 — Zwierzyniec, the PKP passenger station, S part. The site between railway tracks with a breakstone surface with a loose plant cover. Several specimens. KH: GE7725 — Hrubieszów, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. Several specimens.

Centaurea diffusa Lam. An agresto-epecophyte. PZ: GE8347 — Cześniki, central part, the PKP railway halt. The site between railway tracks with a sandy-gravel surface with sparse plants. Several specimens. RŚ: GE9161 — Zwierzyniec, central part, in the area of Obrocka St. The fringe of railway tracks with a sandy surface. In a community with *Trifolium arvense*. A dozen-odd specimens. RW: GF2416 — Bełżec, the PKP railway station, E part. A yard near the railway track with a sandy-gravel surface with sparse plants. A dozen-odd specimens. GF3534 — Siedliska Tomaszowskie, the PKP railway station, central part. The slope of a low railway tracks embankment with a sandy-breakstone surface with sparse plants. Several specimens. KH: GE7727 — Hrubieszów, an LHS freight-handling station, chiefly in its central and E part. The sites between railway tracks with a sandy-gravel surface with a loose plant cover. Several dozen scattered specimens. GE8517 — Miączyn, E part. The fringe of the LHS track with a sandy-breakstone surface with sparse plants. Several specimens.

Chondrilla juncea L. A grass-growing-on-sand apophyte. RW: GF2416 — Bełżec, the PKP railway station, E part. A vast site, on the fringe of a railway track with a sandy surface with a loose plant cover. A dozen-odd specimens. KH: GE7727 — Hrubieszów, the LHS freight-handling station, E part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. GE8513 — Koniuchy, W part, the area of a private forest. The fringe of a low railway track embankment with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens.

Coleostephanus myconis (L.) R c h b. An agresto-ephemerophyte. KH: GE8527 — Frankamionka, W part. A flat site between railway tracks with a sandy-gravel surface with sparse plant specimens. One tuft (Fig. 4).

Crepis setosa Hallerf. An agresto-ephemerophyte. RŚ: GF1223 — Długi Kąt–Nowiny, the state forests area. The slope of a railway track embankment with a sandy-gravel surface. Several specimens.

Inula helenium L. An ergasio-epecophyte. RW: GF2404 — Bełżec II, E part. Near a railway track, a sand and loam heap with a loose plant cover. Several specimens. KH: GE7649 — Brodzica, N part, the Huczwa river valley. The foot of the high embankment of a dismantled narrow-gauge railway track with a sandy-dusty surface with a dense graminaceous-herbaceous cover. A dozen-odd specimens. GE7752 — Metelin, N part. A littered heap of sand and rubble near the railway track with a loose herbaceous cover. Several specimens.

Pulicaria vulgaris Gaertn. A water and waterside apophyte. PZ: GE8166 — Bodaczów, central part, in the vicinity of the PKP railway station. A vast freight-handling yard near the sugar-plant. In crevasses between pavement stones. Several dozen specimens.

Liliacea

Allium angulosum L. A meadow apophyte. KH: GE7729 — Gródek, SE part. The foot of a high LHS railway track embankment with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens.

Orchidaceae

Epipactis helleborine (L.) Crantz. A forest and shrubs apophyte. RŚ: GF1212 — Długi Kąt — Nowiny, the state forests area. The slope of a ditch near the railway track with a sandy-gravel surface with a dense graminaceous--herbaceous cover. Several specimens.

Gramineae

Aegilops cylindrica Host. An agresto-epecophyte. PZ: GE8348 — Zamość, the PKP railway station, W part. A railway track with a breakstone-sandy surface with sparse plants. A dozen-odd specimens scattered over a length of ca. 100-m. GE8256 — Mokre, N part. A railway track with a sandy-gravel surface with sparse plants. Several specimens. RW: GF3596 — Hrebenne, E part, in the area of fish ponds. The fringe of the top of a railway tracks embankment with a breakstone surface with sparse plants. Several specimens. GF3534 — Siedliska Tomaszowskie, the PKP railway station, S part. A railway track with a breakstone surface with sparse plants. Several specimens. KH: GE7726 — Hrubieszów, the PKP railway station, E part. A railway track with a sandy-gravel surface with sparse plants. Several specimens. GE7696 — Werbkowice, the PKP railway station, central part, a side forking of the railway tracks towards the sugar plant. A railway track with a breakstone-sandy surface with sparse plants. Several specimens.

Alopecurus myosuroides Huds. An archeophyte. PZ: GE8340 — Zamość, the PKP railway station, W part. A railway track with a sandy-breakstone surface with a loose plant cover. Several specimens. RŚ: GF2428 — Zatyle-Bełżec, the state forests area. A railway track with breakstone-sandy surface. In a community with *Rubus caesius*. Several specimens. KH: GE8692 — Konopne, a PKP halt, W part. A railway track with a sandy-breakstone surface with sparse plants. A dozen-odd specimens. GE8519 — Zawałów, E part. A railway track with a sandy-gravel surface with sparse plants. A dozen-odd specimens. GE8528 — Frankamionka, the PKP railway station, E part. A railway track with a breakstone surface with sparse plants. A dozen-odd specimens.

Bromus carinatus Hook. & Arn. An agresto-epecophyte. PZ: GE8141 — Zawada, the PKP railway station, central part. A railway track with a sandy-gravel surface with sparse plants. Several specimens together with *Bromus japonicus* and *B. sterilis*. GE8166 — Bodaczów, W part. The flat fringe of a railway track with a sandy-gravel surface with sparse plants. Several specimens. GE8256 — Mokre Kolonia, E part. The fringe of a railway track with a sandy-gravel surface with a dense graminaceous-herbaceous cover. A dozen-odd specimens scattered over a length of ca. 30 m. GE8416 — Miączyn, the PKP railway station, W part. The slope of a high railway tracks embankment with a sandy-dusty surface with a dense graminaceous-herbaceous cover. Several specimens. KH: GE7696 — Werbkowice, the PKP railway station, W part. The fringe of the outer railway track with a sandy-gravel surface. On the edge of a community with *Bromus inermis.* A dozen-odd specimens.

Bromus japonicus Thunb. ex Murr. An agresto-epecophyte. DG: GE6260 — Tarnogóra, NE part. A railway track with a sandy-gravel surface with sparse plants. Several specimens. GE6280 — Tarzymiechy Drugie, N part. A railway track with a sandy-gravel surface with sparse plants. Several specimens. GE5273 — Krasnystaw, E part, the Zastawie quarter. A railway track with a breakstone surface with sparse plants. A dozen-odd specimens. PZ: GE8241 — Zawada, the PKP railway station, central part. The site between railway tracks with a breakstone surface with sparse plants. A dozen-odd specimens together with *Bromus carinatus* and *B. tectorum*. GE8174 — Klemensów, the PKP railway station, central part. The site between railway tracks with a breakstone surface with sparse plants. A dozen--odd specimens together with *Bromus tectorum.* GE8331 — Zamość, central part, in the vicinity of Peowiaków St. A railway track with a sandy-breakstone surface with sparse plants. Several specimens. GE8308 — Zamość, W part. The slope of a railway track embankment with a sandy-breakstone surface with sparse plants. Several specimens. GE8209 — Zamość, N part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. Several specimens. GE8243 — Płoskie, W part. The flat fringe of a railway track with a sandy-dusty surface

with a slight admixture of breakstone, with sparse plants. Several dozen specimens scattered over a length of ca. 500 m. GE8327 — Jarosławiec, W part. The flat fringe of a railway track with a sandy-breakstone surface with sparse plants. A dozen--odd specimens. RW: GF3595 — Hrebenne, the PKP railway station, N part. The site between railway tracks with a sandy-gravel surface with sparse plants. Several specimens. GF2595 — Hrebenne, N part. The site between railway tracks with a sandy-gravel surface with sparse plants. Several specimens. GF3550 — Werchrata, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface. In a community with *Equisetum arvense.* Several specimens. GF3544 — Siedliska Tomaszowskie, S part. The flat fringe of a railway track with a breakstone surface. In a community with *Bromus tectorum*. A dozen--odd specimens. GF2416 — Bełżec, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface. In a community with *Viola arvensis*. Several specimens. GF2542 — Lubycza Królewska, central part. The area of state forests. The upper slope of a railway tracks embankment with a sandy-gravel surface with sparse plants. Several specimens. RŚ: GE9120 — Żurawnica, SW part. The site between railway tracks with a breakstone surface with sparse plants. Several dozen specimens. GE9192 — Zwierzyniec, a loading railway station, central part. The flat fringe of a railway track with a sandy--gravel surface with sparse plants, chiefly with *Poa compressa*. Several specimens. KH: GE7696 — Werbkowice, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface with sparse plants. Several specimens. GE7744 — Alojzów, central part. The flat fringe of a railway track with a sandy-gravel surface with sparse plants. A dozen-odd specimens. GE7726 — Hrubieszów, an LHS freight-handling station, central part. The site between railway tracks with a sandy-gravel surface. In a community with *Poa compressa*. A dozen--odd specimens. GE7728 — Hrubieszów — Gródek. The whole of the LHS trackage area with a sandy-gravel surface. Several hundred specimens scattered over a length of ca. l km. GE8513 — Koniuchy, W part, the area of private forests. The flat fringe of a railway track with a sandy-gravel surface with sparse plants. Several specimens together with *Bromus squarrosus*. GE8416 — Miączyn, the PKP railway station, central part. A railway track with a breakstone surface with sparse plants. A dozen-odd specimens. GE8528 — Frankamionka, the PKP railway station, central part. The site between railway tracks with a sandy-gravel surface with sparse plants. A dozen-odd specimens, together with *Alopecurus myosuroides.*

Bromus squarrosus L. An agresto-epecophyte DG: GE6213 — Wólka Orłowska, central part. A yard near the railway track with a sandy surface. In a community with *Papaver rhoeas*. Several specimens. PZ: GE8231 — Zawada, the PKP railway station, SW part. The site between railway tracks with a sandy-gravel surface with sparse plants, chiefly *Bromus tectorum*. A dozen-odd specimens.

GE8414 — Horyszów Kolonia, W part, a forest margin. The slope of a railway tracks embankment with a breakstone-sandy surface with sparse plants. Several specimens. GE8215 — Zamość, the PKP station of Bortatycze, E part. The site between railway tracks with a sandy-gravel surface with sparse plants. In great numbers, scattered over a length of ca. 100 m. GF8256 — Mokre Kolonia, E margin. The slope of a railway track with a sandy surface. In a community with *Poa compressa*. Several specimens. KH: GE7726 — Hrubieszów, an LHS freight--handling station, central part. A railway track with a sandy-breakstone surface with sparse plants. A dozen-odd specimens. GE7725 — Hrubieszów, the PKP railway station, W part. The slope of a railway track with a sandy-gravel surface with sparse plants. Several specimens. GE7729 — Gródek, SE part. An LHS railway track with a sandy-gravel surface with sparse plants. In great numbers, over a length of several hundred metres.

Eragrostis pilosa (L.) P. B e a u v. An agresto-epecophyte. RW: GF4411 — Horyniec, the PKP railway station, central part. The slope of a railway track with a sandy-gravel surface with sparse plants. A dozen-odd specimens. GS: GF0515 — Wożuczyn, S part, in the vicinity of the sugar plant on the site of a dismantled narrow-gauge railway halt. The fringe of a yard with a sandy-gravel surface with a loose plant cover. A dozen-odd specimens together with *Puccinellia distans*.

Elymus arenarius L. A grass-growing-on-sand apophyte. PZ: GE8174 — Klemensów, the PKP railway station, W part. The site between railway tracks with a sandy-gravel surface with a loose plant cover. A dense tuft. RŚ: GF1244 — Nowiny, NE part. The slope of a trackage trench with a sandy surface with a loose plant cover. A dense expanse. GE9120 — Żurawnica, central part. The slope of a railway track embankment with a breakstone-sandy surface with crumbs of limestone rock with a loose plant cover. A small dense expanse.

Festuca arundinacea S c h r e b. A water-waterside apophyte. PZ: GE8311 — Zamość, central part, in the area of the viaduct in Powiatowa St. The slope of the trackage trench on the LHS with a sandy-gravel surface. In a community with *Sambucus ebulus*. Several tufts. RŚ: GF1200 — Długi Kąt, central part. The slope of a railway track with a sandy-dusty surface with a dense graminaceous--herbaceous cover. Several tufts. GS: GF0695 — Dobużek, S part. A dismantled narrow-gauge railway track with a sandy-dusty surface. On the edge of a community with *Rosa rugosa*. A dozen-odd tufts.

RESULTS

In the investigated area among the newly discovered stations of 36 rarer plant species of the habitats in the railway areas, anthropophytes (38 species) slightly dominate in numbers over apophytes (30 species). Within anthropophytes,

agresto-epecophytes (24 species) and agresto-ephemerophytes (3 species) distinctly predominate over archeophytes (3 species) and ergasio-ephemerophytes (1 species). Several of those plant species are difficult to classify as belonging to a specific geographical-historical element on account of the fact that it has not been proved if they have been sown and have settled in Poland permanently (epecophytes) or for a transient period (ephemerophytes), in natural or anthropogenic habitats. This applies primarily to kenophytes such as *Abutilion theophrasti, Aegilops cylindrica, Allium angulosum, Ambrosia trifida, Bromus carinatus, Coleostephanus myconis, Erysimum marschallianum, Geranium sibiricum, Gypsophila fastigiata* and *G. trichotoma* (4, 11, 12, 13, 14, 17, 24). In the case of apophytes the number of xerothermic plant species (12 species) almost equals the total number of plant species of grasses growing on sand (7 species), meadow species (5 species), forest-shrubs species (4 species), water and waterside species (2 species).

Stations have been generally given here of plants with previously unknown stations in the habitats of the railway areas. Among the rare plant species especially worth noting are species with previously unpublished stations from the eastern Lublin macro-region or with stations published earlier from this region but with indeterminate sites of occurrence. (4, 5, 16, 17). This applies primarily to the stations of *Abutilion theophrasti, Aegilops cylindrica, Ambrosia trifida, Crepis setosa, Eragrostis pilosa, Euphorbia serrulata, E. virgultosa, Erysimum marschallianum, Bromus carinatus, B. japonicus, B. squarrosus, Coleostephanus myconis. Geranium sibiricum, Gypsophila perfoliata, Lepidium virginicum, Oenothera subterminalis, Sideritis montana* and *Vicia pannonica*. These are mostly synanthropic plants regarded as the rarest in the whole of Poland. (11, 12, 13, 14, 16, 17).

The second and fundamental group of the plants investigated are the species published earlier from the studied region of central-eastern Poland, but most frequently from sparse stations, mostly occurring outside the habitats of the railway areas. The most interesting plants in this group include: *Amaranthus albus, Alopecurus myosuroides, Allium angulosum, Erysimum hieraciifolium, Centaurea diffusa, Galeopsis angustifolia, Geranium columbinum, Oenothera hoelscheri, O. wienii, Ononis spinosa, Potentilla intermedia* and *Rorippa austriaca* (5, 16).

In central-eastern Poland, the most interesting geographical regions in terms of the occurrence of the rare flora of the railway area habitats are: Grzęda Horodelska, the Hrubieszów Basin and Zamość Valley. The following stations were most often or exclusively recorded: *Euphorbia virgultosa. Geranium sibiricum* and *Gypsophila peroliata*. It should be noted that the LHS (iron and sulphur ore line) railway runs through those regions along the route of Central Roztocze — Zamość — Hrubieszów — Ukraine. In this case there is very high likelihood of bringing in Eastern European, Asian and other elements of plants

through the railway transport from the Ukrainian territories through the Volhynia Upland towards the Lublin Upland.

In the studied area, the comparatively most afforested, more cool and humid Roztocze seems to be the least favourable to the occurrence of many rarer xerothermic plants in the habitats of the railway areas. Worth noting are the discovered stations of plants previously unknown from the eastern part of the Lublin macro-region: *Euphorbia serrulata, Erysimum marschallianum, Abutilion theophrasti, Oenothera subterminalis* and *Lepidium virginicum*. The most interesting plants reported in the habitats of the railway areas in the western part of the studied region include: *Vicia pannonica* (Grabów Divides) and *Ambrosia trifida* and *Sideritis montana* (Zamość Valley).

REFERENCES

1. Chałubińska A., Wilgat T. 1954. Podział fizjograficzny województwa lubelskiego. Przewodnik V Zjazdu PTGeogr. Lublin.
2. Dobrzański B., Uziak S. 1969. Pokrywa glebowa województwa lubelskiego. Przegl. Geogr. 41: 23–28.
3. Fijałkowski D. 1972. Stosunki geobotaniczne Lubelszczyzny. Lub. Tow. Naukowe. Prace Wydz. Biol. Ossolineum Wrocław.
4. Fijałkowski D. 1978. Synantropy roślinne Lubelszczyzny. Lub. Tow. Nauk., Prace Wydziału Biol., 5, Warszawa–Łódź.
5. Fijałkowski D. 1994, 1995. Flora roślin naczyniowych Lubelszczyzny. 1, 2. Środowisko Przyrodnicze Lubelszczyzny. Lub. Tow. Naukowe Lublin.
6. Jahn A. 1956. Wyżyna Lubelska. Rzeźba i czwartorzęd. Inst. Geogr. PAN, Prace Geogr. 7, PWN Warszawa.
7. Kaszewski B. M., Mrugała Sz., Warakomski W. 1995. Klimat. 1. Temperatura powietrza i opady atmosferyczne na obszarze Lubelszczyzny (1951–1990). In: Środowisko przyrodnicze Lubelszczyzny. Lub. Tow. Naukowe Lublin.
8. Kondracki J. 1998. Geografia regionalna Polski. PWN Warszawa.
9. Kornaś J. 1968. Prowizoryczna lista nowych przybyszów synantropijnych (kenofitów) zadomowionych w Polsce. Materiały Zakł. Fitosoc. Stos. UW. 25: 43–53.
10. Krawiecowa A., Rostański A. 1976. Zależność flory synantropijnej wybranych miast polskich od ich warunków przyrodniczych i rozwoju. Acta Univ. Wratisl. 303, Prace Bot. 21: 5–61.
11. Kuc M. 1958. *Gypsophila trichotoma* Wend. w Środkowej Polsce. Fragm. Flora. et Geobot. 3: 29–33.
12. Latowski K. 1978. *Aegilops cylindrica* Host., nowy gatunek trawy dla flory synantropijnej Polski. Fragm. Flor. et Geobot. 24: 358–362.
13. Mirek Z. 1981. *Geranium sibiricum* L. — rzadki w Polsce gatunek synantropijny. Fragm. Flor. Geobot. 26: 251–257.
14. Mirek Z. 1982 (1984). *Bromus carinatus* Hook. et Arn. — nowy gatunek synantropijny we florze Polski. Fragm. Flor. et Geobot. 28: 97–105.
15. Mirek Z., Piękoś-Mirkowa H., Zając A., Zając M. 1995. Vascular plants of Poland. A checklist. Pol. Bot. Stud. Guidebook, series 15, Inst. Bot. im. W. Szafera PAN Kraków.

16. Rostański K., Fijałkowski D.: 1991. Rodzaj *Oenothera* L. na Lubelszczyźnie. Ann. UMCS, sectio C. 46: 45–59.
17. Rostański K., Sowa R. 1986–1987. Alfabetyczny wykaz efemerofitów Polski. Fragm. Flor. et Geobot., 31–32: 151–205.
18. Szafer W. 1972. Podstawy geobotanicznego podziału Polski. In: Szata roślinna Polski. Szafer W., Zarzycki K. (eds). 2. PWN, Warszawa, p. 9–15 + map.
19. Szafer W., Kulczyński S., Pawłowski B. 1976. Rośliny polskie. PWN Warszawa.
20. Turski R., Uziak S., Zawadzki S. 1993. Gleby. Środowisko przyrodnicze Lubelszczyzny. Lub. Tow. Naukowe, Lublin.
21. Uziak S., Pomian J. 1967. Wstępne badania utworów lessowatych Wyżyny Lubelskiej i gleb z nich wytworzonych. Ann. UMCS, sectio B, 22: 91–105.
22. Woś A. 1999. Klimat Polski. PWN Warszawa.
23. Zając A. 1979. Pochodzenie archeofitów występujących w Polsce. UJ, Rozp. habilit. 29, 1–213.
24. Zając M., Zając A. 1992. A tensitive list of segetal and ruderal apophytes in Poland. Zesz. Nauk. Uniw. Jagiellońskiego, Pr. Bot. 24: 7–23.
25. Zinkiewicz W., Zinkiewicz A. 1973. Stosunki klimatyczne województwa lubelskiego. Ann. UMCS, sectio B, 28: 139–202.