



zasadnicze ich grupy. Do pierwszej należy 14 gatunków o nieopublikowanych dotąd stanowiskach z badanego obszaru Wyżyny Lubelskiej i regionów przyległych. Dotyczy to takich stanowisk, jak np.: *Aegilops cylindrica*, *Artemisia dracunculus*, *Avena strigosa*, *Brassica nigra*, *Erysimum marschalianum*, *Lactuca tatarica*, *Lepidium latifolium*, *L. virginicum*, *Lathyrus nissolia*, *Rapistrum perenne*, *Rubus laciniatus*, *Rumex patientia*, *Sisymbrium wolgense*, *Vicia lathyroides*.

Do drugiej, zasadniczej grupy rozpatrywanych roślin należą gatunki o wcześniej opublikowanych stanowiskach z terenów środkowo-wschodniej Polski, ale głównie z siedlisk niezwiązanych z terenami kolejowymi i to najczęściej ze stanowisk bliżej nieokreślonych (5, 11, 28). Odnosi się to zarówno do roślin opublikowanych ze stanowisk nielicznych (21 gat.), jak i licznych (34 gat.). Przykładami tych roślin są w pierwszym przypadku: *Atriplex tatarica*, *Bromus japonicus*, *Eragrostis pilosa*, *Euphorbia virgultosa*, *Geranium sibiricum*, *Lepidium campestre*, *L. perfoliatum*, a w drugim: *Allium angulosum*, *Anthemis ruthenica*, *Chondrilla juncea*, *Galeopsis angustifolia*, *Gypsophila fastigiata*, *Inula helenium*, *Oenothera hoelscheri*, *Potentilla heptaphylla*, *P. recta*, *Pulicaria vulgaris*.

**Key words:** rare vascular plants, railway sites, Lublin Upland.

#### THE SCOPE OF STUDY

During geobotanical investigations conducted in 1998–2001 in railway sites in the western part of the Lublin Upland numerous stations of interesting vascular plants were discovered. In the course of field studies all kinds of habitats directly or indirectly connected with railway lines were taken into account, including: railway stations and halts, platforms, yards, tracks, trackage embankments and trenches, etc.

The present study characterizes the stations of 69 most interesting vascular plant species, previously unknown from railway sites. These are mostly species regarded as rare in the Lublin macro-region as well as in many other parts of Poland. The basic information about their distribution is found in the sources quoted (4, 5, 11–17, 19, 26).

The naming of the species investigated was given after Mirek et al. (15). Their membership of particular ecological elements of apophytes and geographical-historical elements of anthropophytes was given after Krawiecowa and Rostański (10), Kornaś (9), Zając (25) and according to literature quoted therein. All stations of the plants described were documented with herbarium specimens, which were included in the herbarium of Geobotany Department, Institute of Biology, UMCS, Lublin.

The investigated species were listed according to the accepted family order in the key „Rośliny polskie” (Polish plants) (20). Within their families, however, plant species were listed in the alphabetical order in accordance with their names. In the spatial location of stations of particular plant species the cartogram method, called ATPOL (24), was used.

**Explanation of symbols:** MPW — The Małopolska Vistula Gorge, PN — Nałęczów Plateau, PŚ — Świdnik Plateau, RB — Bełżyce Plain, WU — Urzędów Heights, KCH — Chodel Basin, RBI — Biłgoraj Plain, OD — Dorohusk Depression.

Similar floristic data collected from railway sites have so far been published from the eastern part of Central-Eastern Uplands (21).

#### AREA OF INVESTIGATIONS

The investigated area of railway sites is situated in the western part of the Lublin Upland, in six meso-regions: Nałęczów Plateau, Świdnik Plateau, Bełżyce Plain, Urzędów Heights, Chodel

Fig. 1. Situational map of the western part of the Lublin Upland against the ATPOL grid. 1 — boundaries of macro- and meso-regions; 2 — standard-gauge railway line; 3 — narrow-gauge railway line (a lot of part closed)

Basin, the Małopolska (Little Poland) Vistula Gorge. They are regions with many similar and different physico-geographical and geobotanical values (1, 2, 3, 5, 8, 19).

Morphologically, the western part of the Lublin Upland represents a slightly folded upland. In its surface layer typical Quaternary loess, loess-like and sandy formations as well as boulder clay and alluvial deposits mostly dominate (2). The climatic conditions are determined by several kinds of air masses (7, 27). However, polar-maritime and polar-continental air masses dominate. Mean annual air temperature at the adjusted level reaches  $7.8^{\circ}\text{C}$ . Mean annual precipitation rate is 560 mm; the lowest being in winter (80–100 mm), the maximum values occurring in summer (230–260 mm).

The studied railway lines cover two types: standard-gauge and narrow-gauge (Fig. 1). Their lengths are 250 km and 40 km respectively. They run in different directions, the dominant one being east-west. The standard-gauge line has functioned for almost 150 years (18) and is the main transport route between central-eastern Poland and other regions. The narrow-gauge line, built in the 1970s, served to carry local farm produce for a long time. Currently, it functions only on the

Nałęczów-Karczmiska route as a tourist attraction. The remaining sections of the narrow-gauge line are out of service and are being successively dismantled. The railway sites described essentially cross all types of the local landscape, running among ploughland, meadows, woods, urban areas and industrial premises. The region's largest industrial towns: Lublin, Puławy, and Kraśnik are situated on these routes.

Generally, in the railway sites diverse types of plant habitats develop, from natural and semi-natural to extremely anthropogenic ones. The greatest plant assemblies are found on railway embankments and track trenches, near railway station and halt sites, and on disused side-tracks. The most unfavourable factors eliminating plants from these sites include: high temperature fluctuations, frequent water deficits, and mechanical and chemical destruction of the plant cover by railway service personnel.

#### THE SURVEY OF INVESTIGATED PLANT STATIONS

##### *Equisetaceae*

*Equisetum hyemale* L. A forest and shrubs apophyte. KCH: FE3470 — Majdan Trzebieski, S part. The narrow-gauge embankment, slope, a sandy-gravel surface. Several dozen specimens in a loose expanse on the margin of a pine and birch grove.

*Equisetum ramosissimum* Desf. A meadow apophyte. MPW: FE1319 — Puławy, E part, under the viaduct in Lubelska St. The derelict railway track margin, a sandy surface with a loose plant cover. A dozen-odd specimens. FE2390 — Wilków, central part, in the vicinity of the cemetery. The narrow-gauge tracks margin, a sandy surface. A dozen-odd specimens on the edge of a community with *Tanacetum vulgare*. PN: FE2503 — Nałęczów, the PKP (Polish Railways) railway station, W part. The railway track margin, a breakstone surface with a loose plant cover. In several tufts. PŚ: FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, S part. The derelict railway track margin, a sandy-gravel surface with a loose plant cover. Several dozen specimens. RB: FE4626 — Niedrzwica Duża, NE part. The railway track margin, a sandy surface. A dozen-odd specimens among the community with *Equisetum arvense*. FE3781 — Krężnica Jara, W part. The flat margin of a railway track, a sandy-gravel surface. A dozen-odd specimens on the edge of a community with *Tanacetum vulgare*. KCH: FE3317 — Karczmiska Pierwsze, W part. The narrow-gauge track. A dozen-odd specimens.

##### *Polygonaceae*

*Rumex patientia* L. An agresto-ephemerophyte. PŚ: FE2874 — Lublin, Zadebie, in the vicinity of the AGRAM cold storage plant. The railway track margin, a sandy-graminaceous surface with a loose plant cover. Several specimens.

*Chenopodiaceae*

*Atriplex tatarica* L. An agresto-epycophyte. MPW: FE1319 — Puławy, the PKP freight station, W part. The railway track margin, a sandy-loamy surface. A dozen-odd specimens among a community with *Chenopodium album*. FE0397 — Puławy Miasto, the PKP railway station, central part. The railway track inside, a sandy-gravel surface. Several hundred specimens in a dense expanse. PN: FE1466 — Klementowice, the PKP railway station, NW part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. PŚ: FE2871 — Lublin, Tatary, in the vicinity of the railway bridge over Mełgiewska St. The railway track margin, a sandy-gravel surface. Several specimens. RB: FE3712 — Stasin S part. The railway track margin, a sandy-gravel surface. Several specimens on the edge of a community with *Aster salignus*.

*Salsola kali* subsp. *ruthenica* (Iljin) Soó. An agresto-epycophyte. MPW: FE1319 — Puławy, E part, under a viaduct in Lubelska St. The site between railway tracks, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. PN: FE2798 — Lublin, the PKP Main Station, central part. The side-track inside, a sandy-breakstone surface with a loose plant cover. Several dozen specimens scattered over a length of 100 m. PŚ: FE2881 — Lublin, the PKP Dworzec Połnocny (North Station), W part. The railway track inside, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. RB: FE3736 — Lublin, Zemborzyce, the PKP railway station, N part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. KCH: FE3329 — Karczmiska, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. Several specimens among a community with *Eragrostis minor*.

*Amaranthaceae*

*Amaranthus albus* L. An agresto-epycophyte. PN: FE2798 — Lublin, the PKP Main Station, central part. The railway track margin and inside, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens in a tuft. RB: FE3712 — Stasin, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. WU: FE6539 — Kraśnik, the PKP railway station, W fringe. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens.

*Amaranthus blitoides* S. Watson. An agresto-epycophyte. PN: FE2798 — Lublin, the PKP Main Station, central part. The railway track margin, a sandy-gravel surface. Several specimens in a loose community, mainly with *Kochia scoparia* and *Salsola kali* ssp. *ruthenica*.

*Portulacaceae*

*Portulaca oleracea* L. subsp. *oleracea*. An agresto-epicophyte. PŚ: FE3902 — Minkowice, the PKP railway station, central part. A derelict flower-bed with a sandy-gravel surface. Several dozen tuft specimens. GE3088 — Trawniki, the PKP railway station, central part. A derelict flower-bed with a sandy-loamy surface. A dozen-odd specimens.

*Caryophyllaceae*

*Gypsophila fastigiata* L. A xerothermic apophyte. PŚ: FE2897 — Świdnik, the PKP railway station, central part. A site near the platform, a sandy-gravel surface with a loose plant cover. Several specimens.

*Euphorbiaceae*

*Euphorbia virgultosa* Klokov. A xerothermic apophyte. PN: FE1466 — Klementowice, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among a loose community, mainly with *Pimpinella saxifraga*. FE1891 — Ciecierzyn, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among loose grass. FE2503 — Nałęczów, the PKP railway station, W fringe. The railway track embankment slope, a sandy-gravel surface. A dozen-odd specimens in a loose community, mainly with *Tanacetum vulgare*. PŚ: FE2895 — Świdnik, Biskupie, SE part. The site between railway tracks, a sandy-breakstone surface with a loose plant cover. A dozen-odd specimens. FE2883 — Lublin, Zadębie, the PKP reloading station, N part. The derelict side-track inside, a sandy-gravel surface. Several specimens among a community with *Daucus carota*. FE2841 — Lublin, Trześniów, in the vicinity of Paprociowa St. The railway track embankment slope, a sandy-gravel surface. Several specimens among dense herbaceous plants. GE3066 — Biskupice, SE fringe. The railway track embankment slope, a sandy-gravel surface. Several specimens on the edge of a community with *Artemisia vulgaris*. GE3016 — Łysołaje, NE part. The railway track embankment slope, a sandy-gravel surface. Several specimens among a loose community, mainly with *Trifolium arvense*. GE3088 — Trawniki, the PKP railway station, NW part. The site between railway tracks, a sandy-breakstone surface with a loose plant cover. A dozen-odd specimens. RB: FE3713 — Stasin Polny, the PKP railway station, E fringe. The site between railway tracks, a sandy-gravel surface with a loose plant cover. Several specimens. FE3715 — Lublin, in the vicinity of Poręba housing estate. The railway track margin, a sandy-gravel surface with a loose plant cover. In very great numbers in

scattered loose tufts over the length of ca. 200 m. FE3755 — Lublin, Zemborzyce, N part. The railway track margin, a sandy-gravel surface with a loose plant cover. A very great number of species, scattered over the length of ca. 500 m. WU: FE5654 — Wilkołaz, the PKP railway station, S part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. FE6664 — Sulów, the PKP railway station, central part. The railway track embankment slope, a sandy-loamy surface. A dozen-odd specimens among a community with *Melilotus officinalis*. FE7593 — Potok Kraśnicki, the PKP railway station, S part. A square near the railway tracks, a sandy-loamy surface. A dozen-odd specimens among loose herbaceous plants. FE8512 — Antoniówka, E fringe. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants.

#### *Ranunculaceae*

*Aquilegia vulgaris* L. A forest and shrubs apophyte PŚ: FE2883 — Lublin, Majdan Tatarski, the PKP reloading station, central part. The railway track margin and its inside, a sandy-gravel surface. A dozen-odd specimens among loose herbaceous plants.

#### *Cruciferae*

*Brassica nigra* (L.) W. D. J. Koch. An ergasio-epecophyte. PŚ: GE3065 — Biskupice, central part. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants.

*Erysimum hieraciifolium* L. A xerothermic apophyte. MPW: FE0397 — Puławy Miasto, the PKP railway station, N part. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. PN: FE2548 — Sadurki, the PKP railway station, central part. The site between railway tracks, a sandy-breakstone surface with a loose plant cover. A dozen-odd specimens scattered over the length of ca. 50 m. FE2798 — Lublin, the PKP Main Station, central part. The site between side-tracks, a sandy-gravel surface. A dozen-odd specimens among a loose community, mainly with *Daucus carota*. FE2503 — Nałęczów, the PKP railway station, central part. The side-track margin, a sandy surface. Several specimens among a loose community, mainly with *Pimpinella saxifraga*, *Daucus carota*. PŚ: FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, central part. A wide square between railway tracks, a sandy-gravel surface. Several dozen specimens among a loose community, mainly with *Poa compressa*, *Centaurea stoebe* and *Trifolium arvense*. FE2897 — Świdnik, the PKP railway station, W part. The railway track

margin, a breakstone surface. Several specimens on the site without co-presence of other plants.

*Erysimum marschallianum* Andr. ex M. Bieb. An agresto-epycophyte. PN: FE2548 — Sadurki, the PKP railway station, central part. The derelict railway track inside, a sandy-breakstone surface. Several specimens among a loose community, mainly with *Pastinaca sativa*, *Oenothera biennis*, *Pimpinella saxifraga*. PŚ: GE3088 — Trawniki, the PKP railway station, N part. The railway side-track inside, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. FE2883 — Lublin, Majdan Tatarski, the PKP reloading station, central part. The site between railway tracks, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. WU: FE6630 — Kraśnik, the PKP railway station, SE part. The derelict railway track inside, a sandy-gravel surface with a loose plant cover. Several specimens.

*Lepidium campestre* (L.) R. Br. An archeophyte. PN: FE2648 — Sadurki, the PKP railway station, central part. The side-track margin, a sandy surface. A dozen-odd specimens among a loose community, mainly with *Viola arvensis*. FE2798 — Lublin, the PKP Main Station, part. The railway track inside, a breakstone-sandy surface with a loose plant cover. Several specimens. PŚ: FE2883 — Lublin, Majdan Tatarski, the PKP reloading station, W part. The site between railway tracks, a sandy-gravel surface. Several hundred specimens in a loose expanse. WU: FE6630 — Kraśnik, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens scattered over the length of ca.100 m, on the sites without co-presence of other plants.

*Lepidium latifolium* L. An agresto-epycophyte. PŚ: FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, W part. The derelict railway track inside, a sandy-gravel surface. A dozen-odd specimens among loose grass.

*Lepidium perfoliatum* L. An agresto-epycophyte. PŚ: FE2873 — Lublin, Zadebie, in the vicinity of Chemical Reagents Plant. The railway track embankment slope, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens.

*Lepidium virginicum* L. An agresto-epycophyte. PN: FE2798 — Lublin, the PKP Main Station, central part. A side-track, a sandy-gravel surface with a loose plant cover. Several specimens.

*Rapistrum perenne* (L.) All. An agresto-epycophyte. PŚ: FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, W part. A ruderal square near the railway tracks, a sandy-gravel surface. A dozen-odd specimens among loose grass.

*Rorippa austriaca* (C r a n t z) B e s s e r. A meadow apophyte. RB: FE3773 — Lublin, Zemborzyce, S part. The railway track embankment slope, a sandy-gravel surface with a loose plant cover. Several specimens.



*Sisymbrium wolgensse* M. Bieb. ex E. Fourn. An agresto-epicophyte. PN: FE2503 — Nałęczów, the PKP railway station, central part. Derelict railway tracks, a sandy-gravel surface. A dozen-odd specimens among loose herbaceous plants. PŚ: FE3901 — Jacków, central part. The loess slope of the deep railway track trench. Several dozen specimens in a loose expanse. GE3000 — Kolonia (Settlement) Struże, central part. The railway track embankment slope, a sandy-breakstone surface. Several specimens on the site almost without co-presence of other plants. RB: FE3726 — Lublin, Majdan Wrotkowski. The railway track embankment slope, a sandy-gravel surface. Several specimens among a community with *Tanacetum vulgare*.

#### *Rosaceae*

*Potentilla collina* Wiber agg. A grass apophyte. PŚ: FE2881 — Lublin, the PKP Dworzec Północny (North Station), central part. The platform margin, a sandy surface with a loose plant cover. Several specimens.

*Potentilla heptaphylla* L. A grass apophyte. WU: FE7614 — Szastarka, N part, in the area of ploughland. The railway track embankment slope, a sandy-breakstone surface. Several specimens among loose grass.

*Potentilla intermedia* L. non Wahlenb. An agresto-epicophyte. PN: FE2798 — Lublin, the PKP Main Station, central part. The site between railway tracks, a sandy-gravel surface. Several specimens among loose grass. PŚ: FE2897 — Świdnik, the PKP railway station, W part. The railway track margin, a sandy-gravel surface. Several specimens among a community with *Poa compressa*. KCH: FE3398 — Opole Lubelskie, N part. The derelict narrow-gauge track, the flat margin, a sandy surface. Several specimens among loose grass. FE3420 — Karczmiska, E part. The narrow-gauge track margin, a sandy-gravel surface. Several specimens among a loose community, mainly with *Euphorbia cyparissias*. RBI: FE8429 — Zaklików, the PKP railway station, central part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens.

*Potentilla recta* L. A xerothermic apophyte. PN: FE2503 — Nałęczów, the PKP railway station, W part. The derelict side-track, a sandy-gravel surface. A dozen-odd specimens among loose grass. PŚ: FE3066 — Biskupice, central part. The railway track embankment slope, a sandy-gravel surface. Several specimens among loose grass. Part in the vicinity of ploughland. RB: FE4608 — Majdan Sobieszkański, S The railway track embankment slope, a sandy surface with a loose plant cover. Several specimens scattered over the length of ca. 20 m. WU: FE7573 — Osinki Boguckiego, central part. The railway track embankment slope, a sandy-gravel surface. A dozen-odd specimens among loose grass.

*Potentilla supina* L. A water and waterside apophyte. PN: FE2503 — Nałęczów, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens. FE2798 — Lublin, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among herbaceous plants.

*Rubus laciniatus* Willd. An ergasio-epicophyte. PN: FE2798 — Lublin, the PKP Main Station, central part. The railway track inside, a breakstone surface. Several specimens on the site without co-presence of other plants. PŚ: FE2871 — Lublin, Dworzec Północny PKP, central part. The railway track inside and margin, a sandy-gravel surface. Several specimens in a dense tuft on the site without co-presence of other plants.

#### *Papilionaceae*

*Lathyrus nissolia* L. A meadow apophyte / An agresto-epicophyte?. WU: FE6539 — Kraśnik, the PKP railway station, W part. The railway track margin, a breakstone surface. A dozen-odd specimens scattered over the length of ca. 50 m, on sites without co-presence of other plants. FE6601 — Pułankowice, S part. The railway track embankment slope, a sandy-loamy surface. A dozen-odd specimens among a community with *Melilotus alba*. FE5644 — Wilkołaz, N fringe, in the vicinity of ploughland. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants.

*Onobrychis arenaria* (K. it.) Ser. A xerothermic apophyte. WU: FE6526 — Kraśnik, in the vicinity of Budzyńska St. The slope of the deep trackage trench, a sandy-dusty surface with crumbs of limestone rock. Several dozen specimens among a loose community, mainly with *Odontites rubra*, *Anthyllis vulneraria* and *Thymus serpyllum*.

*Onobrychis viciaefolia* Scop. An ergasio-epicophyte. PŚ: FE3997 — Minkowice, the PKP railway station, central part. The railway track margin, a sandy surface. Several specimens among loose grass. FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, S part. The slope-foot of the trackage trench, a sandy-gravel surface. A dense tuft on the site without co-presence of other plants.

*Vicia lathyroides* L. A grass apophyte. PŚ: FE2883 — Lublin, Majdan Tatarski, the PKP reloading station, SE part. The slope of the trackage trench, a sandy-gravel surface with a loose plant cover. In large numbers, in a dense expanse.

*Vicia pannonica* Crantz. An agresto-epicophyte. WU: FE7605 — Szas-tarka, N part, in the area of ploughland. The railway track embankment slope, a sandy-breakstone surface. A dozen-odd specimens among a loose community, mainly with *Medicago falcata* and *Euphorbia cyparissias*.

*Cucurbitaceae*

*Thladiantha dubia* Bunge. An agresto-epicophyte. PN: FE2438 — Mareczki, E part. The narrow-gauge tracks margin, a sandy-gravel surface. A dozen-odd specimens among herbaceous plants. PN: FE1477 — Klementowice, S part. The railway track embankment slope, a sandy-gravel surface. Several dozen specimens among loose shrubs.

*Oenotheraceae*

*Oenothera acutifolia* Rostański. An agresto-epicophyte. PŚ: FE2883 — Lublin, Ządęcie, the PKP reloading station, central part. A wide site between railway tracks, a sandy-gravel surface with a loose plant cover. Several specimens.

*Oenothera hoelscheri* Renner ex Rostański. An agresto-epicophyte. MPW: FE1397 — Puławy Miasto, the PKP railway station, S part. The railway track margin, a sandy surface with a loose plant cover. Several specimens. PN: FE2684 — Motycz Leśny, the PKP railway station, central part. The railway track margin, a sandy surface. Several specimens among a loose graminaceous-herbaceous community. PŚ: FE2883 — Lublin, Ządęcie, the PKP reloading station, central part. A wide site between railway tracks, a sandy-gravel surface. Several specimens among a loose graminaceous-herbaceous community. GE3066 — Biskupice, central part. The railway track embankment slope, a sandy-gravel surface. Several specimens among loose grass. KCH: FE4308 — Opole Lubelskie, N part. The dismantled narrow-gauge track inside, a sandy-gravel surface with a loose plant cover. Several specimens. RBI: FE8428 — Zaklików, the PKP railway station, central part. The station square, a sandy-gravel surface. Several specimens together with *Oenothera biennis* and *O. rubricaulis*.

*Oenothera salicifolia* Desf. Ex Don. An agresto-epicophyte. PŚ: GE3013 — Jaszczów, the PKP railway station, E part. The railway track margin, a sandy surface with a loose plant cover. Several specimens.

*Oenothera wienii* Renner ex Rostański. An agresto-epicophyte. PŚ: FE2883 — Lublin, Majdan Tatarski, the PKP reloading station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among a loose community, mainly with *Erysimum hieracifolium*, *Centaurea diffusa*, *Picris hieracioides*.

*Malvaceae*

*Lavatera thuringiaca* L. A xerothermic apophyte. OD: GE2093 — Milejów, S part. The railway track margin, a sandy surface. Several tuft specimens among loose grass.

*Geraniaceae*

*Geranium columbinum* L. An archeophyte. PŚ: FE2897 — Świdnik, the PKP railway station, W part. The inside of the railway track, a breakstone surface. Several specimens on the site without co-presence of other plants. FE3728 — Lublin, Dziesiąta, the fringe of side-track leading to the thermal power plant, a sandy-gravel surface with a loose plant cover. Several specimens. RB: FE4626 — Niedrzwica Duża, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. Several specimens on the edge of herbaceous plants. WU: FE6539 — Kraśnik, the PKP railway station, NW part. The railway track margin, a breakstone-sandy surface with a loose plant cover. A dozen-odd specimens.

*Geranium sibiricum* L. An agresto-epicophyte. WU: FE6514 — Kraśnik Fabryczny, NE part. Between the forest and "Energetyk" garden-plots. The side of the path with a sandy-loamy surface with a dense shrubby and herbaceous plant cover. Several dozen scattered tuft specimens. NB: station outside the railway areas.

*Geranium sylvaticum* L. A forest and shrubs apophyte. MPW: FE0387 — Puławy Miasto, the PKP railway station, N part. The railway track embankment slope, a sandy surface. A dozen-odd specimens among loose grass.

*Primulaceae*

*Androsace septentrionalis* L. A xerothermic apophyte PŚ: FE2883 — Lublin, Zadębie, side-tracks in the vicinity of the automobile factory. The railway track margin, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens in a loose tuft.

*Primula veris* L. A forest and shrubs apophyte. PN: FE2841 — Lublin, Trześniów, in the vicinity of Torowa St. The railway track embankment slope, a sandy-gravel surface. Several specimens among thin shrubs.

*Asclepiadaceae*

*Asclepias syriaca* L. An ergasio-epicophyte RB: FE4626 — Niedrzwica Duża, the PKP railway station, central part. The side-track margin, a sandy surface with a loose plant cover. Several dozen specimens scattered over the length of ca. 20 m. FE3773 — Krężnica Jara, N part. The wide road margin near a railway track, a sandy-dusty surface. A dozen-odd specimens in a dense tuft surrounded by loose herbaceous plants.

*Boraginaceae*

*Lappula squarrosa* (Retz.) Dumort. A xerothermic apophyte. MPW: FE0376 — Puławy Chemia, the PKP railway station, N part. The railway track

margin, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens scattered over the length of ca. 50 m. FE0387 — Puławy Miasto, the PKP railway station, N fringe. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. PN: FE2798 — Lublin, the PKP Main Station, central part. The railway track inside, a sandy-gravel surface with a loose plant cover. Several specimens. PŚ: FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, S part. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants.

*Lithospermum officinale* L. A xerothermic apophyte. MPW: FE0387 — Puławy Miasto, the PKP railway station, N fringe. The railway track margin, a sandy-gravel surface. Several specimens on the edge of a loose community, mainly with *Equisetum ramosissimum*. PN: FE2803 — Łagiewniki, N part. The railway track embankment slope, a breakstone surface. Several specimens among loose grass.

*Myosotis sparsiflora* Pohl. A grass apophyte. RB: FE5624 — Obroki, W part, the area of state forests. The railway track embankment slope, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens.

#### *Labiatae*

*Galeopsis angustifolia* Ehrh. ex Hoffm. A xerothermic apophyte. WU: FE6539 — Kraśnik, The railway track forking towards Kraśnik Fabryczny. The railway track margin, a breakstone-sandy surface with a loose plant cover. Several specimens. PN: FE1422 — Pożóg Nowy, NW part. The railway track margin, a sandy surface with a loose plant cover. Several specimens. FE2548 — Sadurki, the PKP railway station, central part. The railway track margin, a sandy-breakstone surface. A dozen-odd specimens on the site without co-presence of other plants. PŚ: FE2883 — Lublin, Zadębie, the PKP reloading station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among a community with *Poa compressa*. RB: FE3764 — Lublin, the PKP railway station Zemborzyce, central part. The site between railway tracks, a sandy-breakstone surface. Several specimens on the site without co-presence of other plants. FE3716 — Lublin, Czuby. The railway track margin, a sandy-breakstone surface. A dozen-odd specimens among a community with *Bromus japonicus*. FE3713 — Stasin Polny, E part. The railway track margin, a sandy-breakstone surface with a loose plant cover. Several specimens. FE3728 — Lublin, Wrotków, in the vicinity of the thermal power plant. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens.

*Salvia nemorosa* L. A xerothermic apophyte PN: FE2803 — Łagiewniki, N part. The slope of the trackage trench, a sandy-gravel surface. A dozen-odd

specimens among loose grass. PŚ: FE2883 — Lublin, Majdan Tatarski, the PKP reloading station, central part. The derelict railway track margin, a sandy-gravel surface, with a loose plant cover. Several tuft specimens.

*Scrophulariaceae*

*Linaria genistifolia* (L.) Mill. A xerothermic apophyte. RB: FE3710 — Konopnica, S part. The slope of a high road embankment, a sandy-loamy surface. A dozen-odd specimens among a dense graminaceous-herbaceous plant cover.

*Compositae*

*Anthemis ruthenica* M. Bieb. An agresto-epicophyte. MPW: FE1319 — Puławy, W part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. PŚ: FE3910 — Nowy Krępiec, N part, in the vicinity of ploughland. The railway track embankment slope, a sandy-gravel surface with a loose plant cover. Several tufts.

*Artemisia dracunculus* L. An ergasio-epicophyte. PN: FE1421 — Stara Wieś, W part. The railway track embankment slope, a sandy-breakstone surface. A dense tuft of a dozen-odd specimens on the site without co-presence of other plants. FE2851 — Lublin, Ponikwoda. An old, sandy-gravel heap near the railway track. A dense expanse of several hundred specimens.

*Centaurea diffusa* Lam. An agresto-epicophyte. PN: FE5605 — Czesławice, the PKP railway station, central part. The platform margin, a sandy surface. A dozen-odd specimens among a loose community, mainly with *Artemisia campestris*. PŚ: FE2896 — Lublin, Zadębie, in the vicinity of Mełgiewska St. The derelict railway track inside and margin, a sandy-gravel surface. A dozen-odd specimens among a loose community, mainly with *Picris hieracioides*. FE2897 — Świdnik, the PKP railway station, W part. The station square, a sandy-breakstone surface with a loose plant cover. A dozen-odd specimens. FE2883 — Lublin, Zadębie, the PKP reloading station, NE part. The square between railway tracks, a sandy-gravel surface with a loose plant cover. In large numbers, scattered. FE2862 — Lublin, Tatary, near the railway crossing in Turystyczna St. The square near railway tracks, a sandy surface. Several specimens among a loose community, mainly with *Sisymbrium altissimum*. WU: FE5653 — Wilkołaz, the PKP railway station, S fringe. The railway track margin, a sandy surface. A dozen-odd specimens among a loose community, mainly with *Centaurea stoebe*.

*Chondrilla juncea* L. A grass apophyte. MPW: FE0398 — Puławy, Ruda Czechowska. The square near railway tracks in the vicinity of the forest,

a sandy surface. Several dozen specimens among a loose community, mainly with *Koeleria glauca*. PN: FE1434 — Pożóg Stary, E part, in the area of the railway crossing. The square near railway tracks, a sandy surface. Several dozen specimens among loose grass.

*Inula helenium* L. An ergasio-epycophyte. PN: FE2503 — Naęczów, the PKP railway station, W part. The railway track margin, a sandy-gravel surface. Several dozen specimens.

*Lactuca tatarica* (L.) C. A. Mey. An agresto-epycophyte. PN: FE1455 — Klementowice, NW part. The railway track margin, a sandy-gravel surface. Several specimens among a loose community, mainly with *Lactuca serriola*. RB: FE3726 — Lublin, Majdan Wrotkowski, in the vicinity of Janowska St. The railway track embankment, the upper slope part, a sandy-gravel surface. A dozen-odd specimens among a community with *Aster salignus*.

*Pulicaria vulgaris* Gaern. A water and waterside apophyte WU: FE7624 — Szastarka, the PKP railway station, central part. The loading yard, a sandy-gravel surface, wet with a loose plant cover. Several dozen specimens.

#### *Liliaceae*

*Anthericum ramosum* L. A forest and shrubs apophyte. MPW: FE0387 — Puławy Miasto, the PKP railway station, NW part. The railway track embankment slope, a sandy surface. A dozen-odd specimens among loose grass.

*Allium angulosum* L. A meadow apophyte. MPW: FE0387 — Puławy Miasto, the PKP railway station, NW fringe. The railway track embankment slope-foot, a sandy-gravel surface. Several specimens among a loose community, mainly with *Anthericum ramosum*. FE3301 — Kolonia (Settlement) Szczekarków, W part. The embankment slope of dismantled narrow-gauge railway tracks, a sandy-gravel surface. Several specimens.

#### *Gramineae*

*Aegilops cylindrica* Host. An agresto-epycophyte. PN: FE2798 — Lublin, the PKP Main Station, central part. The railway track margin, a sandy-breakstone surface. A dozen-odd specimens among loose herbaceous plants. PŚ: FE2881 — Lublin, PKP Dworzec Północny (North Station), central part. The site between railway tracks with a sandy-gravel surface. Several dozen specimens among a community with *Poa compressa*. WU: FE7624 — Szastarka, the PKP railway station, S fringe. The railway track inside, a breakstone surface. Several specimens scattered over the length of 200 m, in sites almost without co-presence of other plants. FE7643 — Polichna, N fringe. The railway track inside, a breakstone

surface. Several specimens on the site almost without co-presence of other plants. FE7643 — Polichna, central part. The railway track inside, a breakstone surface. A dozen-odd specimens scattered over the length of 100 m, in sites almost without co-presence of other plants. FE7614 — Szastarka, N part, in the vicinity of ploughland. Railway tracks, a sandy-breakstone surface. A dozen-odd specimens scattered over the length of 500 m, in sites almost without co-presence of plants. FE6630 — Kraśnik, the PKP railway station, W part. A side-track, a sandy-gravel surface. Several dozen specimens among a community with *Equisetum arvense*. FE5644 — Wilkołaz, N fringe, in the vicinity of ploughland. The railway track inside, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. FE7546 — Rzeczycza Ziemiańska, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. Numerous scattered specimens, on the site without co-presence of other plants. RBI: FE8428 — Zaklików, the PKP railway station, W part. The railway track inside, a sandy-breakstone surface. Several specimens among a loose community, mainly with *Bromus japonicus*.

*Agropyron intermedium* (Host) P. Beauv. A xerothermic apophyte. PŚ: GE3055 — Biskupice, central part. The railway track embankment slope, a sandy-gravel surface. Several specimens among loose grass.

*Avena strigosa* Schreb. An archeophyte. PŚ: FE2883 — Lublin, Zadębie, the PKP reloading station, E part. The railway track inside, a sandy-gravel surface. Several specimens, on the site without co-presence of other plants.

*Bromus carinatus* Hook. & Arn. An agresto-epecophyte. PN: FE2799 — Lublin, the PKP Main Station, central part. The side-track inside, a sandy-breakstone surface. Several specimens among a community with *Agropyron repens*. PŚ: GE3055 — Biskupice, central part. The railway track embankment, the upper slope part, a sandy surface. A dozen-odd specimens among a community with *Bromus inermis*. RB: FE3710 — Konopnica, S part. The railway track margin, a sandy-gravel surface. Several specimens among loose grass. FE4626 — Niedrzwica Duża, the PKP railway station, central part. The railway track inside, a breakstone surface. A dozen-odd specimens among a community with *Bromus tectorum*.

*Bromus japonicus* Thunb. ex Murr. An agresto-epecophyte. MPW: FE0398 — Puławy Miasto, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among a loose community, mainly with *Bromus tectorum* and *Poa compressa*. PN: FE1466 — Klementowice, the PKP railway station, S fringe. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. PŚ: FE2883 — Lublin, Zadębie, the PKP reloading station, central part. The railway track inside, a sandy-gravel surface. A dozen-odd specimens in a loose community,



mainly with *Aegilops cylindrica* and *Bromus tectorum*. GE3013 — Jaszczów, the PKP railway station, NE fringe. The railway track margin, a breakstone surface. A dozen-odd specimens on the site without co-presence of other plants. FE2897 — Świdnik, the PKP railway station, central part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens on the site without co-presence of other plants. RB: FE4675 — Niedzwica Kościelna, S part, in the vicinity of ploughland. The railway track inside, a breakstone surface. Several specimens on the site without co-presence of other plants. FE4626 — Niedzwica Duża, the PKP railway station, central part. The railway track inside, a sandy-breakstone surface with a loose plant cover. A dozen-odd specimens. FE3705 — Lublin, Czuby, at the same level as Stary Gaj (Old Grove). The railway track margin, a sandy-breakstone surface. Numerous specimens in a loose expanse. FE3764 — Lublin, the PKP railway station Zemborzyce, N part. The railway track margin, a sandy-gravel surface. A dozen-odd specimens among a community with *Bromus tectorum*. FE3726 — Lublin, Majdan Wrotkowski, in the vicinity of "Słoneczniki" garden plots. The railway track margin, a sandy-gravel surface. Several specimens on the site without co-presence of other plants. FE3782 — Krężnica Jara, the PKP railway station, central part. The railway track inside, a breakstone-sandy surface with a loose plant cover. Several specimens. WU: FE7652 — Polichna, the PKP railway station, central part. The railway track margin, a sandy-breakstone surface. A dozen-odd specimens among a loose community, mainly with *Viola arvensis*. FE7624 — Szastarka, the PKP railway station, S fringe. The railway track margin, a sandy-breakstone surface. A dozen-odd specimens on the site without co-presence of other plants. FE5653 — Wilkołaz, the PKP railway station, central part. The railway track margin, a sandy-breakstone surface. A dozen-odd specimens among a community with *Bromus tectorum*. FE6630 — Kraśnik, the PKP railway station, SE fringe. The railway track margin, a sandy-gravel surface. Several specimens among loose herbaceous plants. FE6630 — Kraśnik, the PKP railway station, E fringe. The railway track inside, a breakstone surface. Several specimens among a community with *Bromus tectorum*. FE6642 — Kraśnik-Szastarka, the state forest grounds. The railway track inside, a breakstone surface. A dozen-odd specimens on the site without co-presence of other plants. FE7593 — Potok Kraśnicki (stream), the PKP railway station, central part. The railway track inside, a sandy-breakstone surface with a loose plant cover. Several specimens. FE3699 — Majdan Krężnicki, S part. The railway track margin, a sandy-gravel surface. Numerous specimens among a loose community, mainly with *Bromus tectorum* and *Viola arvensis*. RBI: FE8428 — Zaklików, the PKP railway station, W part. The railway track embankment slope, a sandy-gravel surface. Several specimens among a community with *Viola arvensis*.

*Bromus squarrosus* L. An agresto-epecophyte. WU: FE6630 — Kraśnik, the PKP railway station, central part. The side-track margin, a sandy-gravel surface. Several specimens among a loose community, mainly with *Bromus japonicus*. FE5653 — Wilkołaz, the PKP railway station, central part. The station square, a sandy surface. Several specimens among a loose community, mainly with *Centaurea diffusa* and *C. stoebe*.

*Eragrostis pilosa* (L.) P. Beauv. An agresto-epecophyte. MPW: FE0397 — Puławy Miasto, the PKP railway station, central part. The sandy platform margin with a loose plant cover. A dozen-odd specimens. PN: FE2503 — Nałęczów, the PKP railway station, SE part. The railway track embankment foot, a sandy surface. Several specimens in a loose community, mainly with *Eragrostis minor*, *Setaria viridis* and *Atriplex patula*. FE2503 — Nałęczów, the PKP railway station, central part. The station square, a sandy-gravel surface with a loose plant cover. In large numbers in a dense expanse. FE3618 — Motycz, the PKP railway station, central part. Between pavement slabs on the platform. Several dozen tuft specimens. FE1466 — Klementowice, the PKP railway station, central part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. FE1466 — Klementowice, the PKP railway station, NW part. The railway track margin, a sandy-gravel surface with a loose plant cover. Several specimens. FE2520 — Zarzeka, N part. The narrow-gauge track margin, a sandy-loamy surface. Several specimens among a loose community, mainly with *Poa compressa*, *Setaria viridi*, *S. glauca*. FE2798 — Lublin, the PKP Main Station, central part. The railway track margin, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens. RB: FE3782 — Krężnica Jara, the PKP railway station, central part. The platform margin, a sandy-gravel surface with a loose plant cover. Several specimens.

*Festuca arundinacea* Schreb. A water and waterside apophyte. PŚ: FE2882 — Lublin, Majdan Tatarski, the PKP reloading station, W part. A wide square between railway tracks, a sandy-gravel surface. A dozen-odd specimens among a loose community, mainly with *Calamagrostis epigejos* and *Dactylis glomerata*.

*Setaria verticillata* ((L.) P. Beauv. An archeophyte. PŚ: FE2881 — Lublin, PKP Dworzec Północny (North Station), central part. The platform margin, a sandy-gravel surface with a loose plant cover. A dozen-odd specimens.

#### *Orchidaceae*

*Epipactis helleborine* (L.) Crantz agg. A forest and shrubs apophyte. KCH: FE3461 — Majdan Trzebieski, central part, the forest fringe. The narrow-gauge tracks margin, a sandy surface with a loose plant cover. Several specimens.

## RESULTS

In the western part of the Lublin Upland the occurrence in the railway areas of 69 species of vascular plants was reported that are regarded as more interesting on the regional and national scale. Among the species listed anthropophytes (39 species) numerically dominate over apophytes (30 species). Within anthropophytes agresto-epicophytes (28 species) firmly dominate over ergasio-epicophytes (6 species), archeophytes (4 species) and agresto-ephemerophytes (1 species).

In the case of apophytes the number of species of xerothermic habitats (13 species) is somewhat larger than the number of species of forest and shrubs habitats (6 species). However, a smaller quantitative share goes to grass (5 species), meadow (3 species) and water and waterside (3 species) elements respectively. According to the existing state of published stations from the investigated area and neighbouring regions, these plants can be divided into two groups, with two subgroups distinguished in one of them.

The first and at the same time the most interesting group of these plants comprises 14 species with previously unpublished stations from the investigated area, and partly from the adjacent regions (4, 5, 11, 28). They are: *Aegilops cylindrica*, *Artemisia dracunculus*, *Avena strigosa*, *Brasica nigra*, *Erysimum marschallianum*, *Lactuca tatarica*, *Lepidium latifolium*, *L. virginicum*, *Lathyrus nissolia*, *Rapistrum perenne*, *Rubus laciniatus*, *Rumex patientia*, *Sisymbrium wolgensense*, *Vicia lathyroides*.

The second principal group of the plants studied is represented by the species reported earlier from the investigated area, but mostly from habitats not connected with the railway grounds, from indeterminate stations and habitats (5, 11, 24). These species can, on account of the number of previously published stations, be divided into two subgroups. One plant subgroup comprises species recorded from very few stations. They are the following 34 species: *Agropyron intermedium*, *Amaranthus blitoides*, *Androsace septentrionalis*, *Asclepias syriaca*, *Atriplex tatarica*, *Bromus japonicus*, *B. carinatus*, *B. squarrossus*, *Centaurea diffusa*, *Erysimum hieraciifolium*, *Eragrostis pilosa*, *Euphorbia virgultosa*, *Geranium sibiricum*, *G. sylvaticum*, *Lappula squarrosa*, *Lavathera thuringiaca*, *Lepidium campestre*, *L. perfoliatum*, *Linaria genistifolia*, *Myosotis sparsiflora*, *Onobrychis arenaria*, *O. viciifolia*, *Portulaca oleracea*, *Potentilla collina*, *P. intermedia*, *P. supina*, *Primula veris*, *Oenothera acutifolia*, *O. hoelscheri*, *O. wienii*, *O. salicifolia*, *Salvia nemorosa*, *Setaria verticillata*, *Vicia pannonica*, *Thladiantha dubia*.

The other plant subgroup is composed of species recorded in the studied area from numerous stations. It comprises 21 plant species: *Aquilegia vulgaris*, *Allium angulosum*, *Amaranthus albus*, *Anthemis ruthenica*, *Anthericum ramosum*,

*Chondrilla juncea*, *Epipactis helleborine*, *Equisetum hyemale*, *E. ramosissimum*, *Geranium columbinum*, *Galeopsis angustifolia*, *Gypsophila fastigiata*, *Festuca arundinacea*, *Inula helenium*, *Lithospermum officinale*, *Oenothera hoelscheri*, *Potentilla heptaphylla*, *P. recta*, *Pulicaria vulgaris*, *Rorippa austriaca*, *Salsola cali* subsp. *ruthenica*.

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