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Materials for the distribution and ecology of the mistletoe
(*Viscum album* subsp. *album*) in central-eastern Poland.
VI. Vicinity of Lublin

Materiały do rozmieszczenia i ekologii jemioli pospolitej typowej
(*Viscum album* subsp. *album*) w środkowo-wschodniej Polsce. VI. Okolice Lublina

SUMMARY

The paper characterizes the present structure of the stations of the mistletoe (*Viscum album* subsp. *album*) in a definite physical-geographical area of Lublin and its vicinity. Totally, 100 so-far unknown single and group stations of this plant have been localized (Fig. 1). It is here a parasite on 19 host taxa and strange species of trees growing as a result of planting them (Table 1).

STRESZCZENIE

Na badanym terenie w rejonie Lublina o powierzchni ok. 73 km² i 700 m² stwierdzono 100 pojedynczych i grupowych stanowisk podgatunku jemioli pospolitej typowej (*Viscum album* subsp. *album*). Ich struktura przestrzennego rozmieszczenia i ekologii przedstawia się bardzo oryginalnie (ryc. 1, tab. 1).

Nie stwierdzono wyraźnych prawidłowości między rozmieszczeniem stanowisk jemioli a rozmieszczeniem stanowisk potencjalnych dla niej żywicieli. Nie stwierdzono również jednoznacznej korelacji między stanowiskami jemioli i jej żywicieli, a także w przypadku warunków siedliskowych.

Przed wszystkim należy podkreślić, że w przeszłości roślinę tę na zbadanym terenie notowano na ogół rzadko, a przy tym najczęściej na stanowiskach pojedynczych i nielicznych

(ryc. 1–7). Przestrzennie rozmieszczone są one głównie koncentrycznie: dość zwarcie w środkowej części Lublina oraz w rozproszonych zgrupowaniach na zewnętrznym obrzeżu okolicznych miejscowości. Na szczególną uwagę zasługuje fakt, że zlokalizowane stanowiska jemioty w obrębie miast i na terenach wiejskich występują najczęściej przy szosach lub w ich pobliżu.

Na badanym terenie jemiota pasożytuje zaledwie na 19 taksonach żywicieli głównie spośród okazów drzewiastych (tab. 1). Należy podkreślić, że są to drzewa najczęściej zdrowe, liczące 40–50 lat, rodzime i obce, rosnące w parkach, sadach i lasach. Ponadto rosną one zwykle w miejscach otwartych o dostatecznie dużym nasłwieteniu, na różnego typu glebach antropogenicznych, mezofilnych, gliniasto-pyłastych, oraz mniej lub bardziej zasobnych w piasek, okruchy skał, cegły, betonu itp. Lokalnie do głównych żywicieli tutejszej jemioty należy kilka mieszańcowych taksonów hodowanych drzew z rodzaju topola (*Populus*). Na uwagę zasługuje wyraźna ekspansja jemioty na stanowiskach zarówno od dłuższego czasu utrzymujących się jak i nowych. Szczególnie intensywna ekspansja tej rośliny zaznacza się na obszarze Lublina. Notowano również częste przypadki mechanicznego niszczenia stanowisk tej rośliny.

Na obszarze Polski środkowo-wschodniej, mniej lub bardziej podobne przypadki korelacji na poziomie *Viscum album* subsp. *album* – żywiciel – warunki edaficzne, stwierdzono w okolicach kilku miast (17–21).

K e y w o r d s: mistletoe (*Viscum album* subsp. *album* P. W. Ball), stations and ecology, Lublin Upland, Poland

INTRODUCTION

Common mistletoe (*Viscum album* subsp. *album*) represents a geographical element of the submeridional-euroasiatic type (1, 2, 11, 16). In Poland it is considered as an ordinary plant, but with very unequal density of the stations, occurring from the Baltic coast to the lower parts of the Carpathian and Sudety slopes (16, 25). Very thorough studies on the distribution, biology and ecology of mistletoe in the Polish conditions conducted individually by Stypiński, or sometimes by Stypiński and co-author (16 and the literature quoted there) especially deserve attention. In spite of those studies, the correlations between the spatial distribution of this plant and its hosts as well as other conditions of its occurrence are still difficult to define (11, 16).

So-far published data on the occurrence of *Viscum album* subsp. *album*, a plant considered ordinary, in the region of Lublin are incomplete and very general (2, 5, 6, 25). Up till now similar studies have been conducted on the occurrence of mistletoe in central-eastern Poland in the area of a few towns (17–21).

In the researched area, like in others in central-eastern Poland, mistletoe belongs to expansive plants. It is also worth noticing that its stands are increasingly being destroyed almost in the whole area of Poland (16). It is massively obtained for decorative or medicinal purposes. Its specimens settled on fruit trees are destroyed as a seemingly dangerous semi-parasite. It happens more and more frequently that older tree specimens colonized by mistletoe are removed. This refers mainly to the planted trees of American origin from *Populus* genus. Considering the above facts, a lot of settled mistletoe stands will doubtlessly be destroyed before the whole scope of its natural distribution and ecological properties are studied (16–21).

PURPOSE AND SCOPE OF RESEARCH

The principal purpose of the present research was to study the current state of the occurrence of a sub-species of common mistletoe (*Viscum album* subsp. *album*) typical in the region of the city of Lublin and its closest vicinity. The data on this subject were collected in the years 1998–2005. The introductory part of this paper characterizes the area of research in respects of the basic physico-geographical and geobotanical properties. The main part deals with the characteristics of the mistletoe stands, considering the degree of their spatial management and tree-coverage and determining the number of specimens of defined host taxa as well as the degree of their infestation by mistletoe. Attention was paid not only to the mistletoe stands that kept unchanged in the period of the studies but also to the successively spreading stands as well as those that were completely destroyed mechanically. The appended map of the area of research presents the location of all the mistletoe stands studied during 8 years (Fig. 1). Synthetic data on this subject are shown in Table 1. Results of the research (1988–2005) are listed in the final part of the paper. The naming of the tree taxa hosts to mistletoe are given according to Seneta and Dolatowski (15).

Table 1. The structure of mistletoe *Viscum album* subsp. *album* occurrence in the vicinity of the town of Lublin

Tree taxons of hosts of <i>Viscum album</i> subsp. <i>album</i> and tree letter markings in station descriptions	Number of specimens		
	stations	host taxon	<i>Viscum album</i> subsp. <i>album</i>
AG. <i>Acer platanoides</i> L. 'Globosum'	1	1	1
AS. <i>Acer platanoides</i> L. 'Schwedleri'	2	2	7
B. <i>Acer saccharum</i> Marschall.	1	1	1
C. <i>Acer saccharinum</i> L.	8	10	17
D. <i>Crataegus x media</i> Bechst	4	4	10
E. <i>Fraxinus pensylvanica</i> Marshall.	2	4	6
F. <i>Malus domestica</i> Borkh.	4	4	4
G. <i>Populus berolinensis</i> (K. Koch.) Dippel 'Berlin'	11	19	23
HM. <i>Populus euamericana</i> (Dode) Guiner 'Marilandica'	3	3	3
HR. <i>Populus euamericana</i> (Dode) Guiner 'Robusta'	34	57	118
HS. <i>Populus euamericana</i> (Dode) Guiner 'Serotina'	20	28	48
I. <i>Populus koreana</i> Rehd.	1	1	1
J. <i>Populus maximowiczii</i> Henry	1	1	1
K. <i>Populus nigra</i> L. 'Italica'	1	1	1
L. <i>Populus simonii</i> Car.	3	6	15
M. <i>Robinia pseudacacia</i> L.	1	1	1
N. <i>Sorbus aucuparia</i> L. 'Edulis'	4	4	4
O. <i>Tilia americana</i> L.	1	1	1
P. <i>Tilia cordata</i> Mill.	7	9	11
Total	109	157	273

EXPLANATION OF ABBREVIATIONS AND DENOTATIONS

The following letter denotations are used next to the host taxa in the characterization of the localized mistletoe stands:

- AG – *Acer platanoides* L. ‘*Globosum*’
 AS – *Acer platanoides* L. ‘*Schwedleri*’
 B – *Acer saccharum* Marshall.
 C – *Acer saccharinum* L.
 D – *Crataegus x media* Bechst
 E – *Fraxinus pennsylvanica* Marshal.
 F – *Malus domestica* Borkh.
 G – *Populus x berolinensis* (K. Koch) Dippel ‘*Berlin*’
 HM – *Populus x euramericana* (Dode) Guiner ‘*Marilandica*’
 HR – *Populus x euramericana* (Dode) Guiner ‘*Robusta*’
 JS – *Populus x euramericana* (Dode) Guiner ‘*Serotina*’
 I – *Populus koreana* Rehd.
 J – *Populus maximowiczii* Henry
 K – *Populus nigra* L. ‘*Italica*’
 L – *Populus simonii* Car.
 M – *Robinia pseudacacia* L.
 N – *Sorbus aucuparia* L. ‘*Edulis*’
 O – *Tilia americana* L.
 P – *Tilia cordata* Mill.

The number given next to a definite host taxon (AG-P) refers to the total number of its specimens. On the other hand, the number provided after the slash “/” sign point to the number of mistletoe specimens living on all single specimens of a specific host taxon. On the basis of the presented data it is possible to calculate both the number of host taxa occurring on the studied stand and the total number of mistletoe specimens parasitizing on them. Additional denotations: st. – stand, stands, co – circa, * – mechanically removed mistletoe specimens, ** – mistletoe stands partly damaged owing to the clearance of their hosts, *** – mistletoe stands completely destroyed as a result of cutting down the host, **** – a stand distinguished by exceptionally strong expansion of mistletoe specimens, ***** – juvenile stand, which appeared probably in the years 2003/2004.

AREA OF RESEARCH

L o c a t i o n. Studies of mistletoe stands were conducted in the area of Lublin and its closest vicinity. This is an area lying in the north-western part of the Lublin province. It was marked in the form of a rectangle of 24.5 × 26 km, against the background of whole or fragmentary parts of ATPOL grid squares of 1 × 1 km No. FE 16–19, 26–29, 36–39, 46–49 (Fig. 1).

From the geographical-physical and geobotanical points of view, the area is located in the extremely north-western part of the Lublin-Lvov Upland (Lublin Upland) at the juncture of Nałęczów and Świdnik plateaus (3, 7, 9, 14). Considering the climatic regionalization of Poland (13, 24), this is an area situated in the zone of Lublin climate, in the intermediary region between the climate of oceanic and continental influences.

C l i m a t e a n d w a t e r r e l a t i o n s. The studied areas of Lublin within the Lublin macroregion are not distinguished by anything special as far as the climate is concerned (8, 12, 13, 24, 26, 27). The mean air temperature ranged from 6.1°C to 8.3°C. The warmest month is July

(mean 18.4°C) and the coldest – January (mean – 4.0°C). The mean yearly precipitation ranges from 551 to 576 mm. Generally, south-western and north-western winds predominate. The vegetation period lasts 211 days, and the economic one last 234 days.

The studied area is strongly differentiated in respect of surface waters (12; Fig. 1). The main river is the Bystrzyca, running almost southwards, with scarce tributaries. The biggest among the local and practically very few water reservoirs is the Zemborzycki Artificial Lake. It is located in the south-western part of the studied area. It has been opened since 1974 and occupies the area of 2.3 km².

Geology and soils. Two separate zones of the Quaternary cover and accompanying different kinds of soils are visible in the examined area (3, 4, 7, 14, 22, 23). The border line between these zones is marked in the north-western part of the studied area approximately on the line of Borków–Lublin–Niemce–Łuszczów. Typical loess covers and loess-like formation, frequently with erosive valley forms, are the most widespread in the north-western zone. On the other hand, a mosaic-like distribution of patches of loess-like formations, boulder-clays and sandy covers dominate in the south-eastern part of the studied area. Loamy-silty as well as sandy-loamy types of brown, grey-brown and podsollic soils are the most widespread on the enumerated Quaternary covers. Alluvial soils, mostly light and medium ones and more rarely heavy and deeply humus ones, are widespread in the whole studied area in the river basins and the tributaries. Different types of alluvial-muck and boggy, muck and peat soils occur in local hollows. Sometimes, lime soils of rendzina type are uncovered on some slopes of table-like mountain tops and river valleys. Various types of soils with an artificial cover, dry or mesophyll one, are found in towns and outside them, next to the roads and on railway tracks.

Land scape. The studied areas of Lublin constitute an upland region. More or less undulating, lying at the height of 178–280 metres above sea level (3, 9, 10) (Fig. 1). Attention is drawn by a distinct majority of rural agricultural areas, with cultivated fields, fruit orchards and scarce dispersed complexes of forests, mainly deciduous-coniferous ones, with the objects of compact urban build-up.

Two regionally biggest cities are situated almost in the central part of the area: Lublin and Świdnik, with the area of 147.5 and 20.3 km², respectively. These, especially Lublin, have very contaminated environment (27, 28). Parks, squares and cemeteries with different degrees of tree-coverage are frequently found within these towns. Trees of various age and shrubs are planted close to neatly all more important roads. This mostly refers to a few taxa from the genus of *Populus* and the species of *Tilia cordata*, *Robinia pseudoacacia*, *Acer platanoides*, *A. pseudo-platanus* and *Betula verrucosa*, *Crataegus xmedia*, *Quercus robur*, *Salix fragilis*, *Fraxinus excelsior*, *F. pensylvanica*, *Sorbus aucuparia*, *Prunus spinosa* and *Corylus avellana*. An exceptionally big number of tree and shrub species, both from abroad and from Poland, grow in the Botanical Garden of Maria Curie-Skłodowska University (UMCS) in Lublin. It should be observed that the structure of spatial distribution of the stands of potential taxa to mistletoe, except specific objects (e.g. parks, forests, botanical gardens) is almost identical in the whole studied area.

STATIONS OF MISTLETOE

1. Swoboda-Kolonia, SW, about 100 metres SE from the main road. Close to the Primary School buildings isolated among the arable fields. Next to the fence of the school playing field. Among a compact row of trees, mainly poplars. 1 HS/2.
2. Kolonia-Charleż, NE. next to the road, NW side. A green belt between the fences around the buildings and the road. Among a row of a few poplar trees. ***** II/1.

3. Turka, NE. Next to the road on the route from Turka to Sobianowice, on NE side. Opposite a small pine forest. The slope of a pitch for a road on the edge of unused arable lands. Among a poorly compact row of trees, mainly poplars. ***** 1HS/1.
4. Łuszczów. NE. Close to the road on the route Łuszczów I – Kijany, next to a local road, on its NE side. The slope of a ditch next to the road on the edge of unused arable lands with a few buildings. 1HR/2.
5. Łuszczów II, SW. Next to the road from Łuszczów to Mełgiew, on W side. A green belt between the fence of a country garden and the meeting roads. Among a row of a few poplar trees and dense fruit trees. 1HR/1.
6. Łuszczów II-Zarośla, SW. The corner of a meeting of the roads, on W side. Next to the country buildings. In an orchard of fruit trees growing wild. ***** 1F/1.
7. Jacków, NW, about 800 m to the NE of a junction of roads. A meadow-pasture wet area. Over a drainage ditch. Among an isolated row of a few poplar trees. ***** 1HS/2.
8. Świdnik Duży II. The corner of roads, about 70 m to NW of their junction. Next to isolated country buildings among arable fields. The outskirts of an orchard. Among a group of a few trees, mainly poplars.*** 1HS/1.
9. Świdnik, NE edge of enclosed square and buildings belonging to the National Aviation Enterprise. Among a dispersed group of a lot of trees, mainly poplars and lindens. 1 HR/1.
10. Świdnik, SE edge of enclosed square and buildings belonging to the National Aviation Enterprise. Among a dispersed group of trees, mainly poplars and willow. 4HR/3, 6, 5, 3.
11. Świdnik, in the area at the meeting point of Żwirki i Wigury Street and Lotników Polskich Ave. The outskirts of an enclosed square and building of sports objects "Avia". Among numerous scattered trees, mainly poplars and willows. 1G/1.
12. Świdnik, at S side of Targowa Street, near a bazaar, about 80 m away from the meeting point of Targowa and Karola Wyszyńskiego Streets. Next to the fence of a small poplar park. Among a compact row of poplar trees. 1HR/1.
13. Świdnik, E side of the road from Franciszków, about 150 metres away from the railway tracks. A courtyard of country buildings. Among a few trees, mainly linden and apple trees. *** 1P/2.
14. Świdnik, in the area of a meeting place of Targowa Street and railway tracks, from SW side. A green belt between a driveway and railway tracks. Among a compact row of poplar trees. 1G/1.
15. Świdnik, in the area of a meeting place of Targowa Street and railway tracks, near the railway stop Świdnik Wschodni. A green belt next to the pavement of meeting roads. Among a few scattered hawthorn trees. 1D/1.
16. Świdnik, the corner of Hotelowa and Niepodległości Streets, from SW side. Among scattered buildings, on the edge of a schoolyard. Among scattered trees, mainly poplars and lindens. 1HR/1.
17. Świdnik, near Bankowa Street from E side, about 60 m from its joining point with Niepodległości Street. Near the buildings, on the outskirts of a housing estate square. Among numerous, dispersed trees, mainly poplars. 1 HR/1.
18. Krępiec II. Next to the road in the direction of Krępiec I, on E side, several metres to NE from the crossroads, next to a bus stop near the country buildings. The outskirts of arable fields. Among a few rows of poplar trees. 1HR/1.
19. Krępiec II. Next to the road in the direction of Minkowice, on W side, several metres to SE from the crossroads. Near the country buildings, the outskirts of arable fields. Among a row of a few poplar trees. *** 1HR/1.
20. Krępiec II. On E side of the road on the route Minkowice-Krępiec I, several metres to SE from the crossroads. The outskirts of arable fields, in a row of a few poplar trees. 1HS/1.

21. Krępiec II, more or less several metres to SE from the crossroads. The edge of a wild park left after a manor house. In a compact group of trees, mainly lindens and poplars. 1P/3.
22. Bystrzejowice, SW. Next to the road on N side, about 250 m to E from its turning next to a forest complex in Skrzynice II. Next to the country buildings, an orchard growing wild. Among numerous fruit trees. 1F/1.
23. Skrzynice I, extremely NE of the road. The edge of meadows. In a poorly dense row of several poplar trees. 1HR/2.
24. Skrzynice I, almost the central part, below the main road, several metres to NW from its meeting point with the road from Czerniejów to Kolonia. Over the Czerniejówka river basin. In a row of a few poplar trees. 1HR/1.
25. Skrzynice I, on NE side of the road. Next to isolated country buildings. The edge of an orchard growing wild. Among numerous fruit trees. 1F/2.
26. Skrzynice I, on E side of the main road in the direction of Czerniejów, several meters from the fork of the roads, next to a shop building. The Czerniejówka valley. In a dense group of poplar trees. ***** 1HR/1.
27. Skrzynice II, on SW side of the road, several meters to SE from its juncture with the road from the side of Majdan Mętowski. Over the Czerniejówka river basin. In a scarce group of poplar trees. 1 HR/1.
28. Mętów, on E side of the road, about 100 m from the southern border of the locality Głuszczyzna. Between the fence with a hedge of a group of buildings and a ditch next to the road. In a scarce quantity. Loose row of trees, mainly sycamore and linden. ***** 1B/1.
29. Polanówka, SW part on the E side of the road, near a bus stop. A green belt between the fence around the buildings and the road. In a compact row of bushes with a few poplar trees. *** 1HR/3.
30. Prawiedniki, next to the Lublin-bound road, about 250 m from the northern part of the village. In a loose row of trees, mainly poplars, growing near a road. 1HM/1.
31. Strzeszkowice Duże, central-western part on N side of the road, about 180 m to W from its juncture with the Lublin-bound road. Over a deep ditch, the edge of arable fields. In a loose row of trees, mainly poplars. *** 1HR/1.
32. Motycz, extremely SE part, several meters to SE from the railway station. Next to a local road, on S side. Next to the fence around the buildings and an orchard. The slope of a deep ditch. In a dense row of trees, mainly sycamore. 1HS/2.
33. Motycz. NE part, on W side of the road running in the direction of Kozubszczyzna, several meters from a juncture of roads. Over a deep ditch, the edge of arable fields. In a row of numerous poplar trees. ***** 1J/1.
34. Płuszczyce, NW part, at the road on the route from Tomaszowice to Uniszowice, on its both sides, over a deep ditch. On N side of the road, next to the fence around an orchard. In a loose row of trees, mainly maples: 1AS/5. On S side of the road, next to the fence around the yard with the buildings. In a loose row of trees, mainly birch and rowan tree: 1N/1.
35. Dąbrowice, between Kopanina and Aleksandrów-Stawka. On W side of the road, near the country buildings. The edge of a yard. Among a few scattered poplar and apple trees. 1 HS/1.
36. Sierpawce, the central-western part. Next to the road, on its N side. Over a deep ditch, the edge of arable fields, with scattered buildings and fruit trees. In a row of a few trees, mainly poplars. 1 HS/5.
37. Sierpawce, extremely E part. On both sides of the road, within the range of about 200 m. Over a ditch, the edge of arable fields. In a row of trees, mainly poplars, growing individually or in groups in a thicket. On S side of the road: 3HS/1, 1,2. On N side of the road: 2HS/2, 6.

38. Jastków, extremely NW part, the slope of the Ciemięga river valley. On both sides of the road within the range of about 100 m. On the slope of a deep ditch, the edge of poorly cultivated arable fields growing with a forest. In a row of trees, mainly poplars, growing compact in scattered groups or individually. On S side of the road: 1HS/4. On N side of the road: 1HS/1.
39. Pocięcha – Kupno, the bordering line of the villages, the slope of a valley with a water course. On both sides of the road, over the deep ditches of the road. The edge of uncultivated arable fields. In a row of thicket and trees, mainly blackthorn, linden, rown and poplar, growing in groups and individually. On SW side of the road. 1P/1; 1N/1. On NE side of the road: 1T/1.
40. Piotrowice Wielkie, extremely SE. Next to the road, on E side, about 100 m to N from the forest. The slope of a mound for a road, next to the fence around a garden and the country buildings. In a compact row of different-age trees, mainly poplars. ***** 1HR/1.
41. Piotrowice Wielkie, extremely SE part. Next to the road, on E side, about 100 m to SE from a fork of the road. The slope of a mound, next to the fence around the country buildings. In a dense row of different-age trees, mainly poplars. ***** 1HR/1.
42. Majdan Krasieniński, extremely W part. Next to the road, on NW side. About 100 m to NW from the bus stop. Next to the country buildings, the edge of arable fields. In a group of a few trees, mainly poplars. *** 1HR/1.
43. Majdan Krasieniński, almost the central part, about 300 m to S from the road. Between a country building and an alder forest. Among a few dispersed poplar trees. 1HS/1.
44. Majdan Krasieniński, the central-eastern part. Next to the road, on N side. Close to isolated country buildings, the edge of arable fields. In a poorly compact row of trees, mainly poplar and linden. *** 1HR/1.
45. Majdan Krasieniński, extremely NE part. Next to the road, on N side, the edge of arable fields. In a compact row of trees, mainly poplars. 1HR/1.
46. Jastków Północny, next to the road, on N side, about 200 m to E from the bridge on the Ciemięga river. The slope, the edge of arable fields. In a poorly compact row of poplar trees. 1HR/2.
47. Jastków, extremely NW part, on W side, about 300 m to N from the Warsaw-bound road. The slope of a ditch on the edge of arable fields, near the buildings. In a poorly compact row of trees, mainly poplars. 2HS/1, 3.
48. Jastków, extremely NW part, next to the road to Krasienin, on E side, about 50 m from the Warsaw-bound road. A square near old buildings, numerous trees in clusters. At the edge of a group of poplar trees. 2HR/1, 2.
49. Jastków, NW part, on both sides of Warsaw road, about 300 m to SE from the road to Krasienin. On NE side of the road, a green belt at the edge of a square next to a shop building. In a small group of poplar trees: 1HR/1. On NW side of the road, a green belt. Among a few scattered poplar trees: 1HR/1.
50. Jastków, NW part, next to the road to Warsaw, on SW side, about 350 m to N from the church. Next to the pavement, a slope at the edge of arable fields. In a poorly compact row of trees, mainly linden. 1P/2.
51. Dębówka, NW part, at the road to Warsaw, on S side near hotel “Xawer”, about 350 m to SE from the border of Barak. The edge of arable fields with two rows of linden trees. 1P/1.
52. Dębówka, NW part, at the road to Warsaw, on S side, near the buildings, a restaurant “Bar”, about 300 m to SE from the locality Barak. Near the buildings, the edge of arable fields. In a poorly compact row of trees, mainly ash-tree and linden. 1E/1.
53. Dębówka, extremely SE part, at the road to Warsaw, on its both sides, about 120 m from the city borders of Lublin. Near groups of buildings. The edges of uncultivated arable lands,

- within the reach of about 350 m. In a row of trees, mainly linden and sycamore, growing in clusters and individually. On NE side of the road: 2C/1, 2. On SW part of the road: 1C/1.
54. Dębówka, extremely SE part, near the city borders of Lublin. At the road to Warsaw, on N side. Over a ditch, the edge of uncultivated arable fields. In a poorly compact row of trees, mainly ash-tree and sycamore. 1C/1.
 55. Lublin, Wola Sławińska, the area of scattered country buildings, with arable fields and orchards. Between Deszczowa, Główna and Mgielna Streets. Next to the buildings, in an orchard. Among numerous fruit trees. * 1F/1.
 56. Lublin, several meters to S from Północna Street, almost at the end of Długosza Street. The edge of an enclosed city property. Among a few scattered trees, mainly poplars. ***** 1HS/2.
 57. Lublin, at Prusa Street, on E side, about 150 m from its meeting point with Solidarności Ave. A green belt between the pavement and a housing estate square. In a compact row of poplar trees. ***** 1G/2.
 58. Lublin, near Bazylianówka Street, on W side, about 80 m from its meeting point with Magnoliowa Street. Green belt next to the buildings, at the edge of a square belonging to the training center for drivers. In a compact row of trees, mainly poplars. 1HS/1.
 59. Lublin, at Wiejska Street, on N side, about 50 m from its meeting point with Walecznych Street. A green belt between a housing estate and the pavement. In a poorly compact row of trees, mainly maples. 1C/1.
 60. Rudnik, on W side of the road, to SW of a level crossing. The slope of a mound for a road at the edge of arable fields. In a compact row of thicket, with groups of trees, mainly black-thorn, poplar, birch and linden. ***** 1HS/1.
 61. Lublin, at Turystyczna Street, on SW side, about 90 m from the end of the street. A green belt between the enclosure of the square at the building and the pavement of the road. In a small, loose row of poplar trees. *** 1G/1.
 62. Lublin, on NE side of the road connecting Turystyczna and Mełgiewska Streets, about 30 m from a round-about. The edge of an unused square. In a loose row of trees, mainly linden and poplar. ***** 1C/1.
 63. Lublin, between Mełgiewska Street and the road connecting it to Turystyczna Street, A square at the petrol station (CPN), unused. Among a few scattered poplar trees. 1HR/1.
 64. Lublin, at Gospodarcza Street, on E side, about 40 m from its crossing with Mełgiewska Street from N side. A green belt between the square next to the building and the pavement of the road. The edge of a compact row or poplar trees. ***** 1HS/1.
 65. Lublin, Zadębie II, at Mełgiewska Street, near Dojazdowa Street. Next to the enclosure around a housing estate square and a bus stop. In a loose row of trees, mainly poplars. 1G/1.
 66. Lublin, at Kresowa Street, on N side, about 120 m from Gospodarcza Street. A green belt between a building and a road. The edge of a sparse row of poplar trees. *** 1HS/1.
 67. Lublin, in the area of a juncture of Hutnicza Street and a driveway to PKP (Polish National Railways) station. In two places. At Hutnicza Street, a green belt between the road and the enclosure of a housing estate square. In a loose row of trees, mainly poplars: 1HS/1. About 200 m to NE from the first stand. Next to the enclosure of parking lots and a training square for drivers. In a loose row of trees, mainly poplars: 1HS/1.
 68. Lublin, the corner of the juncture of Pogodna and Słowicza Street, from SE side. The edge of an enclosed school yard. In a sparse group of poplar trees. 1HS/1.
 69. Lublin, near the end of Garbarska Street from NW side. A green belt at the edge of a parking place. In a compact group of poplar trees. 3HS/3, 1, 1.

70. Lublin-Zembożyce, on W side of Osmolicka Street, about 600 m from its juncture with Żeglarska Street. A green belt on a parking lot. The edge of a compact row of maple trees. 1AG/1.
71. Lublin, at Diamentowa Street, on E side, at the gate of "Herbapol" enterprise, about 80 m to NE from the end of Romera Street. A green belt between the hedge of a housing estate and the pavement. Among a few poplar trees. *** 1G/1.
72. Lublin, about 100 m to SE from Nowy Świat Street. The edge of an unused military area, with scattered buildings. In a sparse group of trees, mainly poplar and birch. 1HR/1.
73. Lublin, at Roztocze Street, on W side from its juncture with Wielkopolska Street. A green belt between the hedge of a housing estate and the pavement. In a poorly compact row of tree, mainly poplars and willows. ***** 1HR/1.
74. Lublin, on SE side of Kraśnicka Ave. near the church, about 200 m from its juncture with W. Orkana Street. The edge of a post-manor park growing wild. Among compact trees, mainly poplars, oaks and lindens. 1G/1.
75. Lublin, at Kraśnicka Street, on S side, about 180 m from its juncture with Bohaterów Monte Cassino Street. A green belt, between the road and the pavement. In a poorly compact row of trees, mainly rowan. 1N/2.
76. Lublin, at Krasieńskiego Street, on N side, about 300 m from its juncture with Bohaterów Monte Cassino Street. A green belt at the edge of a parking place. In a loose row of poplar trees. * 1HS/1.
77. Lublin, on NW side from Kraśnicka Ave. A green belt at the edge of a parking place for buses. In a sparse group of tree, mainly poplars. 1K/1.
78. Lublin, on W side of Spadochroniarzy Street. A green belt at the edge of a housing estate square. In a loose group of trees, mainly poplar and linden. 1O/1.
79. Lublin, at Weteranów Street, on S side, about 120 m from its juncture with Spadochroniarzy Street. A green belt, between a building and the pavement. In a compact row of hawthorns. 1D/2.
80. Lublin, the corner of the juncture of Bohaterów Monte Cassino and T. Zana Streets, about 60 m to SE from the round-about. On W side of a driveway next to the premises of E. L'eclerc supermarket. A green belt at the edge of an enclosed square of garages. In a sparse row of poplar trees. 1HR/1.
81. Lublin. The corner of the juncture of T. Zana Street and a driveway from SE side, about 120 m to E from the round-about. Near the buildings in the corner of an unused square. In a row of a few poplar trees. ***** 1HR/1.
82. Lublin, at Wajdeloty Street, about 80 m from its juncture with T. Zana Street. At the fence around a schoolyard. At the edge of a house-estate part, in a sparse group of trees, mainly linden and maples. 1HM/1.
83. Lublin, at Grażyny Street, about 150 m from its juncture with Wajdeloty Street. At the fence of a square between the buildings. In a sparse scattered group of trees, mainly rowan hawthorn and poplar. 1N/1.
84. Lublin, at Kazimierza Wielkiego Street, on N side, about 250 m from its juncture with Filaretów Street. A green belt between the pavement and the road. In a loose row of trees, mainly maples. ***** 1C/3.
85. Lublin, at Gliniana Street, on N side, about 80 m from its juncture with Sowińskiego Street. A green belt between the road, the pavement and the hedge. In a loose row of trees, mainly maple and linden. 1C/4.
86. Lublin, at Filaretów Street, on W side, about 100 m to S from the bridge over a loess valley. Next to the pavement, the edge of an unused area. In a compact row of poplar trees. 1G/1.
87. Lublin, at T. Zana Street, on N side, near a fly-over at the fence of a parking lot. A green belt between the hedge and the pavement. In a compact row of poplar trees. 1G/3.

88. Lublin, at T. Zana Street, on S side between I. Ochockiego and M. Brzeskiej Streets. An unused square. Next to the fence around a small parking lot. In a sparse row of poplar trees. 1HR/3.
89. Lublin, at Pograniczna Street, on W side, between Głęboka and Boczna Siewna Streets. A housing estate square, with irregular build-up and poor tree coverage, mainly with robinia and linden. *** 1M/1.
90. Lublin, in the area of the juncture of Nadbystrzycka and Gliniana Streets. In two palces. The edge of a square near the buildings. In the corner of the enumerated streets. In a sparse group of scattered trees, mainly linden and willow: 1P/1. About 120 m to N from the first stand. At Nadbystrzycka Street, a green belt. In a loose row of trees, mainly linden: 1P/1.
91. Lublin, at Głęboka Street, on S side opposite a square of the premises of the Agricultural University. A green belt within the reach of about 200 m. In two rows of trees, mainly poplar. Next to the hedge: **** 13HR/1, 2, 1, 1, 1, 1, 5, 2, 3, 11, 3, 1, 1; 1L/1. At the pavement: **** 2HR/1, 1; 2L/1, 1.
92. Lublin, at Głęboka Street, on N side, about 100 m to W from Raabego Street, near the premises of the Biology Department of UMCS. The edge of an unused area. In a sparse group of trees, mainly poplars and willows. ***** 1HM/1.
93. Lublin, between Głęboka and Wiercińskiego Streets. An unused area, with scattered buildings, irregular and poor tree coverage, mainly with poplar, rowan and willow. At Głęboka Street: ***** 1D/6. Below Wiercińskiego Street: ***** 1HR/2.
94. Lublin, the corner of the juncture of Narutowicza and Rowerowa Streets, from SW side. The area of the provincial Police Headquarters, with poor and irregular build-up and tree coverage. Within the reach of about 2 ha, in two places. From Wiercińskiego Street: 1HR/3. Near Narutowicza Street: 1HR/10.
95. Lublin, Ludowy Park, NW part between the Bystrzyca river and J. Piłsudskiego Ave. Within the reach of about 2 ha, in two places. On NE side of the park amphitheatre. Among poorly compact trees, mainly poplars: 2L/9, 2; 5G/1, 1, 1, 1, 1. Several meters to SW from the park amphitheater. In a compact group of trees, mainly poplars: 2L/1, 1.
96. Lublin, Ludowy Park, NE part near J. Piłsudskiego Ave. Within the reach of about 1 ha. On S side of Wolska Street, the edge of a park with a few isolated poplar trees: 1G/1. Several meters to SW from the previous stand. In an isolated sparse row of poplar trees: 2G/2, 1.
97. Lublin, the corner of Zygmunrowskie Ave. and J. Piłsudskiego Ave., at the edge of the square of the petrol station (CPN). On NE side of the square at the hedge, in a dense row of poplar trees: ** 4HS/6, 1, 2, 2. On N side of the square near Wolska Street, among a few scattered hawthorn specimens: 1D/2. On SW side of the square, at Wolska Street, in a poorly compact row of ash-trees: 3E/1, 1, 3.
98. Lublin, at Wolska Street, on E side, to S from the Czerniejówka river. The edge of a green belt between the housing estate square and the pavement. In a row of a few trees, mainly sycamore. ***** 1C/2.
99. Lublin, at Kapielowa Street, near the Bystrzyca river, about 200 m from Unii Lubelskiej Ave. At the fence around garden plots. In a loose row of trees, mainly sycamore. **** 1C/1.
100. Lublin, between Unii Lubelskiej Ave. and the Bystrzyca river. Next to the gate to the area of garden plots "Podzamcze". In a sparse, scattered group of trees, mainly poplars. 1L/1.

RESULTS

The structure of spatial distribution and the ecology of the localized stands of mistletoe (*Viscum album* subsp. *album*) in the studied region and the Lublin city and its vicinity is unusually differentiated (Fig. 1, Table 1). This is a rectangular area of 73 km² and 700 m². Totally, the studied mistletoe was identified on 100 single and group stands situated in the fields of a square grid ATPOL with the whole of their area (FE 27, 28, 37, 38) and with their small parts (FE 16–19, 26, 29, 36, 39, 46–49).

No distinct regularities were found out between the groups of mistletoe stands and the groups of its hosts' stands. The spatial structure of the distribution of potential hosts to mistletoe, considering their taxonomic composition, is nearly the same in all the studied area. The stands of this plant are grouped mainly in two regions: in the central part of Lublin and on the outer circumference of the area of the adjoining localities.

Forty-six stands of mistletoe were found within the administrative borders of Lublin (nos. 55–100). They mainly occur in the oldest and most built-up parts of the city. On the other hand, mistletoe stands were observed only sporadically on the peripheries of the Lublin city built-up relatively the latest and the worst. Special attention deserves the fact that there were no mistletoe stand in certain considerable areas situated in the oldest and the best built-up central-northern and central-eastern parts of Lublin.

Fifty four mistletoe stands were observed in the localities adjacent to Lublin (nos. 1–54). These are grouped in 6 regions of occurrence – north-western, north-eastern, central-eastern, southern-eastern, southern-western and central-western ones. Attention is drawn here by distinct isolation of the enumerated centres of grouped mistletoe stands with a complete lack of its stands in large areas. In the studied area, in Świdnik – the second largest town – mistletoe occurs most frequently on dispersed rather than grouped stands.

The studies also found no clear regularities between the stands of mistletoe and their environmental conditions. First of all, earlier discussed characteristic spatial grouping of the identified stands of mistletoe deserves to be specially emphasized: fairly compact in the central part of Lublin and with dispersed stands in the outside area of the adjacent localities, in isolated regions. A lack of any mistletoe stands is clearly seen in a large area around the administrative borders of Lublin.

Mistletoe more and more often occurs in the contaminated urban environment as compared to the non-contaminated rural environment. Mistletoe hosts occur much more frequently on a drier mesophyll subsoil than on strongly humid one. The studies found no mistletoe hosts growing on marshy subsoil. These are



Photo 1. Mistletoe (*Viscum album* subsp. *album*) in the crowns of poplar (*Populus x euramericana* 'Serotina'). Łuszczów I, stand no. 4. Photo by F. Świąś, April 2005



Photo 2. Mistletoe (*Viscum album* subsp. *album*) in the crowns of poplar (*Populus x euramericana* 'Serotina'). Jacków, stand no. 7. Photo by F. Świąś, April 2005



Photo 3. Mistletoe (*Viscum album* subsp. *album*) in the crowns of poplar (*Populus beroliniensis* 'Berlin'). Świdnik, stand no. 14. Photo by F. Święż, April 2005



Photo 4. Mistletoe (*Viscum album* subsp. *album*) in the crowns of sycamore (*Acer saccharinum*). Lublin, stand no. 59. Photo by F. Świąż, April 2004



Photo 5. Mistletoe (*Viscum album* subsp. *album*) in the crowns of acacia (*Robinia pseudoacacia*). Lublin, stand no. 89. Photo by F. Świąć, April 2003



Photo 6. Mistletoe (*Viscum album* subsp. *album*) in the crowns of poplars (*Populus beroliniensis* and *P. simonii*). Lublin, stand no. 95. Photo by F. Święs, April 2002

usually the soils of anthropogenous origin with artificially stabilized surfaces, usually dusty, with varying content of sand, gravel, brick crumbs, concrete, plaster, etc.

It needs emphasizing that the total number of the identified mistletoe stands is very small in relation to the size of the area where its distribution was studied. A decisive quantitative domination of its scarce stands over the more numerous ones also deserves attention. The main source of mistletoe seeds are definite species of birds (16).

The studied mistletoe, belonging to the sub-meridian-euroasiatic element, requires a warmer temperate climate (1, 11, 16). Locally, the largest groupings of its stands are found in the zones of the most compact build-up and close to the roads with heavy traffic. Besides, it most frequently occurs on the hosts localized in the places of good lighting. Clearly, it avoids shaded places. It is completely absent in dense and shady forests. In parks it occurs sporadically and if so, it is exclusively on sufficiently lighted edges. It occurs sporadically in open cultivated fields and meadow. It is also interesting to note that no mistletoe stands are found on the trees growing close to different kinds of water reservoirs and water-courses. It was sporadically observed on the trees growing for example on the stand next to the railway tracks.

The mistletoe characterized here parasitizes on the trees growing on 19 host taxa of deciduous trees, including 157 specimens. Totally 273 specimens (shrubs) of mistletoe were found to occur on them. 1–10 mistletoe shrubs occur on one host specimen. A decisive quantitative domination of mistletoe stands occurring on single stands as compared to grouped stands deserves attention. The mistletoe usually parasitizes on healthy trees aged 30–50 years. It does not occur on younger or older trees. All the local specimens of hosts to the studied mistletoe grow as a result of planting. The most important hosts include first of all the species hybrids from the genus of *Populus*. This refers mainly to *Populus x euramericana*, growing in the varieties of 'Robusta' and 'Serotina' as well as *Populus berolinensis* and *P. simonii*. The latter plant, in turn, usually occurs on *Acer saccharinum*, *Tilia cordata*, *Crataegus media* and *Fraxinus pensylvanica*. In the case of fruit trees, it lives exclusively and even if so, not too frequently, on *Malus domestica*. It was found only sporadically on other host taxa. The absence of its stands on such hosts as *Betula verrucosa*, *Salix fragilis* and *Tilia platyphyllos* deserves attention. On the other hand, its presence on *Acer saccharum*, *Populus maximowiczii* and *P. koreana* should be emphasized.

Phenomena of frequent spontaneous spread of this plant as well as the mechanical destruction of its stands were observed. At the turn of the years 2003/2004 it appeared for the first time on 27 stands. It is worth to observe that exceptionally intensive expansion of mistletoe was found in Lublin, in stand 91.

In that place it had occurred till 2000 only on one specimen of *Populus x euramericana* 'Robusta' as three small shrubs. At present it appears here in 34 specimens on 15 trees of *Populus x euramericana* 'Robusta' and in 34 specimens on two trees of *Populus simonii*. A few years ago the mistletoe specimens settled on the trees in 3 stands were completely removed. In the years 2001–2004 the only single specimens of trees hosts to mistletoe earlier localized on 13 stands were cut down. The observed expansion of mistletoe during the last few years can be linked to the mild winters and warmer, dryer vegetation period that occurred in that time.

The structure of occurrence of the studied mistletoe sub-species as complex as at present was also observed earlier in the area of Tarnobrzeg, Stalowa Wola, Kraśnik, Sandomierz and Mielec (17–21).

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