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Expansion of *Iva xanthiifolia* Nutt. in the City of Lublin

Ekspansja gatunku *Iva xanthiifolia* Nutt. na terenie miasta Lublina

INTRODUCTION

The natural range of the *Iva xanthiifolia* covers a fairly large area in the north-western part of the United States (8, 11, 31, 37). As a plant brought in accidentally, the ruderal *Iva xanthiifolia* expanded in the vast area of the United States, Europe and North-West Asia (8, 9, 11–13, 22, 31, 35, 38). In Europe, as a plant that was grown or brought in accidentally it was reported in 1858–1935 (11). In Poland it was first grown in botanical gardens in 1842, and as a species brought in accidentally it was found in 1913 and 1935 (2, 11, 22, 26, 37). An intense expansion of this North-American plant in Europe and Asia started as late as during World War II (9, 11–13, 16, 19, 22, 35, 38).

It is an imposing plant, up to 150 (330) cm high, annual and very productive (22, 37). The occurrence of this plant in natural or accidental stations is connected with regions with warmer continental or temperate climates (11). Edaphically, it grows best in sites with a newly-loosened or overlain, loamy-rubble ground, rather humid and with favourable thermal and light conditions (8, 9–11, 16, 19, 22, 31–33, 37, 38).

There are two main causes of expansion of the plant in question: growing in botanical gardens or accidentally bringing its seeds with various imported seeds and raw materials. The historical and current route of expansion of *Iva xanthiifolia* runs along railway tracks and grain elevators situated in urban and industrial areas.

According to Guzik and Sudnik-Wójcikowska (11) *Iva xanthiifolia* is currently found in Poland in areas characterized with a suboceanic continental climate. This occurs mainly in the mid-eastern and to a lesser extent in the mid-western parts of Poland. In more humid and colder parts of Poland this plants is almost never (the Carpathians and Sudeten) or sporadically found (the whole coastal lowland zone). The most numerous stations of *Iva xanthiifolia* in Poland are grouped in Warsaw (11, 15, 33) and Lublin (Fig. 1).

THE SCOPE AND METHODS OF INVESTIGATIONS

Basic information was given on the occurrence of the *Iva xanthiifolia* species in the Lublin area. This covers its spatial situation, phytosociological and ecological relations and the main direction of its expansion. Results of our own research were used and data in literature (1, 5–7, 11, 16, 17, 36) and those collected in the herbariums of the Plant Taxonomy Department, the Maria Curie-Skłodowska University.

Field studies on the *Iva xanthiifolia* stations were conducted in 1991 and 1992 in all its potential habitats. These resulted in a map of the stations of the plant, which presents all its earlier and current stations in the Lublin area (Fig. 1).

A phytosociological and ecological characterization was carried out of plant communities where *Iva xanthiifolia* occurred, regardless of its percentage (Tables 1–5). The studies of those plant communities at the stations of 66 phytosociological records were conducted in accordance with the binding principles in phytosociology (29). Syntaxonomic classification of plant species listed in phytosociological Tables 1–5 was given primarily after Matuszkiewicz (25) and Oberdorfer (27), less often according to other authors (31, 41) and our own views (36).

The naming of the bryophyte species and vascular plants was given, like in the previous phytosociological study of the Lublin area (36) after Ochyra and Szmajda (28) and Szafer, Kulczyński and Pawłowski (34).

In 20 representative expanses of all 6 main forms of communities with *Iva xanthiifolia* (Tables 1–5) now under study there were examinations of physico-chemical soil properties at three levels. In 60 soil samples collected early October 1992 there were determined: mechanical composition (with an all-purpose method of 0.03 n CH_3COOH extraction), humus content (with the Tiurin method), *pH*, NO_3, Cl (potentiometrically), K, Ca, Na, Mg (photometrically), P (kalometrically) and overall salinity (conductometrically). Laboratory soil examinations were conducted in the regional Chemical-Agricultural Station in Lublin using the methods collected by Czuba (3). The results of lab analyses of soils were presented in Table 6.

The appended photographs show the most representative sites of *Iva xanthiifolia* (Figs. 2–6).

In the list of stations of phytosociological records the following abbreviations of Lublin districts in Fig. 1B were used: Bc — Bronowice, Czy — Czuby, Czw — Czechów, Fn — Felin, Hw — Hajdów, Kk — Kośminek, LSM — Lubelska Spółdzielnia Mieszkaniowa, MT — Majdan Tatarski, Pa — Ponikwoda, Śe — Śródmieście, SM — Stare Miasto, Sk — Sławinek, Wn — Węglin, Ww — Wrotków, Ze — Zemborzyce.

NATURAL ENVIRONMENT OF LUBLIN

Currently the town of Lublin covers 148 km^2 and has a population of 352 thousand (23, 36). It is situated on a small river of Bystrzyca with its two secondary tributaries of Czerniejówka and Czechowianka. At the south-eastern town limit a recreational lake on the Bystrzyca was built in 1974. Lublin is surrounded on all sides with farmland with scanty forest complexes. With respect to its general climate (6, 36, 42) the town is characterized with a not too high annual average of rainfall (576 mm) and a comparatively high mean annual temperature (7.4°C) and insolation factor (4.5 h/day). Most winds come from the western sector and the fewest from the eastern sector (36, 42).

The town extends on a highly folded part of the Lublin Upland, at 170–220 m above sea level. The oldest substratum is composed of limy-muddy marls (1, 36). On those highly cracked and pervious chalk rocks there are 4 basic Quarternary formations (1, 36, 40). Among those, coarse-layered loesses are found only in the eastern part of Lublin while loam, sand and gravel boulders of different depth are dominant mainly in the western part of town. There is thus a distinct borderline between the eastern and western part of Lublin along the Bystrzyca river valley (Fig. 1).

The climate together with the substratum in Lublin provide quite a favourable, because dry and warm, environment for the occurrence of *Iva xanthiifolia* in view of the general habitat requirements of the plant on the national and global scale (8, 11, 31, 35). On the other hand, Lublin's natural environment, just like in other large cities, tends to be successively polluted with car fumes and industrial emission (21, 36, 40). Moreover, the substratum surface in the town has been more and more salinified since the 1970's due to the use of NaCl, $MgCl_2$ and $CaCl_2$ salts for snow removal from the streets and squares (36, 39). It can thus be assumed that the progressive contamination and salinification of the substratum can to some extent affect the direction of expansion of *Iva xanthiifolia*.

THE ORIGINAL AND CURRENT STATE OF STATIONS OF *IVA XANTHIIFOLIA*

Within the present city limits of Lublin *Iva xanthiifolia* may have settled down at the end of the World War II (16). Its first herbarial specimens were collected by K. Karczmarz and D. Fijałkowski in 1955–1962. The earliest recorded stations of *Iva xanthiifolia* in Lublin were found in railway embankments in three places: first in the SW part of town, in the Wrotków district, near the main railway station (16), then in the NE part of town, in

Kalinowszczyzna district, on the rim of the railway tracks of the municipal slaughter house (17) and the extreme SW part of town, in the present day Zemborzyce district, near the railway station (5).

In 1968–1978 *Iva xanthiifolia* was recorded in Lublin by Fijałkowski (6, 7) from 5 new single and group stations among dozen-odd expanses of phytosociological records. Among those, the first and most abundant station comes from the NE part of town, from Majdan Tatarski district, in the vicinity of the railway track (records 69, 75, 97, 123, 124, 134), the second scanty station was found in the SE part of town in Kośminek district (records 156, 157). The third station was in two sites of the central part of town, in Bronowice district (records 59, 80). The fourth and fifth stations of the plant were located in single sites in the NW part of town, on the borderline between the districts of LSM and Sławinek (records 85, 105).

In 1945–1978 *Iva xanthiifolia* grew in Lublin in 8 regions with a total of 15 stations (Fig. 1). Currently, this species occurs in 19 regions of Lublin with an indeterminate number of stations, including 4 regions with earlier recorded stations (Fig. 1, Nos IV, V, X, XI) and 15 regions where stations have not been previously recorded (Fig. 1, Nos I–III, VI–IX, XII–XIX).

The basic data on the current stations of *Iva xanthiifolia* in Lublin, according to their spatial localization and the numerical notation I to XIX in Fig. 1, has been given below.

I. The LSM, NW part. *Iva xanthiifolia* occurs in 1 station with several specimens on the concrete-covered, loamy-gravel embankment of a local road.

II. The LSM, SE part. The plant grows there in 6 scattered stations. Single specimens or their groups occur in numerous sites at the junction of Nowomiejska st. and Nadbystrzycka st. and in 1 site at the exit of Wapienna st. In the other 4 stations it is found on the ruderal rims of roads, mainly as a single specimen or in groups of several specimens.

III. Czuby district, NW part. It grows there in 28 scattered sites on the ruderal, loamy-rubble rims of roads. Everywhere in loose several-specimen groups.

IV. The border area between the districts of Wrotków, Czuby, LSM and Piaski. It is found mainly in loamy-rubble squares, loess slopes and rubble-loamy dykes of storm-water tanks, and sporadically on gravel-sandy railway embankments. This is the largest group of *Iva xanthiifolia* stations in Lublin. The plant is found especially abundantly and in great numbers in the Bystrzyca valley near the Nałkowskis housing estate, between Krochmalna st., E. Romer st., Diamentowa st., Koło st. and Nadbystrzycka st. *Iva xanthiifolia* first grew on that station, as earlier data (5, 16) and our own observations confirm, much less often and in smaller numbers than at present, probably almost exclusively on railway embankments.

V. Zemborzyce district, NE part. It grows there in 6 sites distinctly grouped in 3 sets of stations. The first 2 stations of the plant with several specimens occur near railway embankments, on loamy-rubble squares: one of them is located near Tęczowa road, the other near the former railway station. The third group station of the plant is to be found near the dam of the Bystrzyca lake. It grows there in mass on a loamy-gravel square

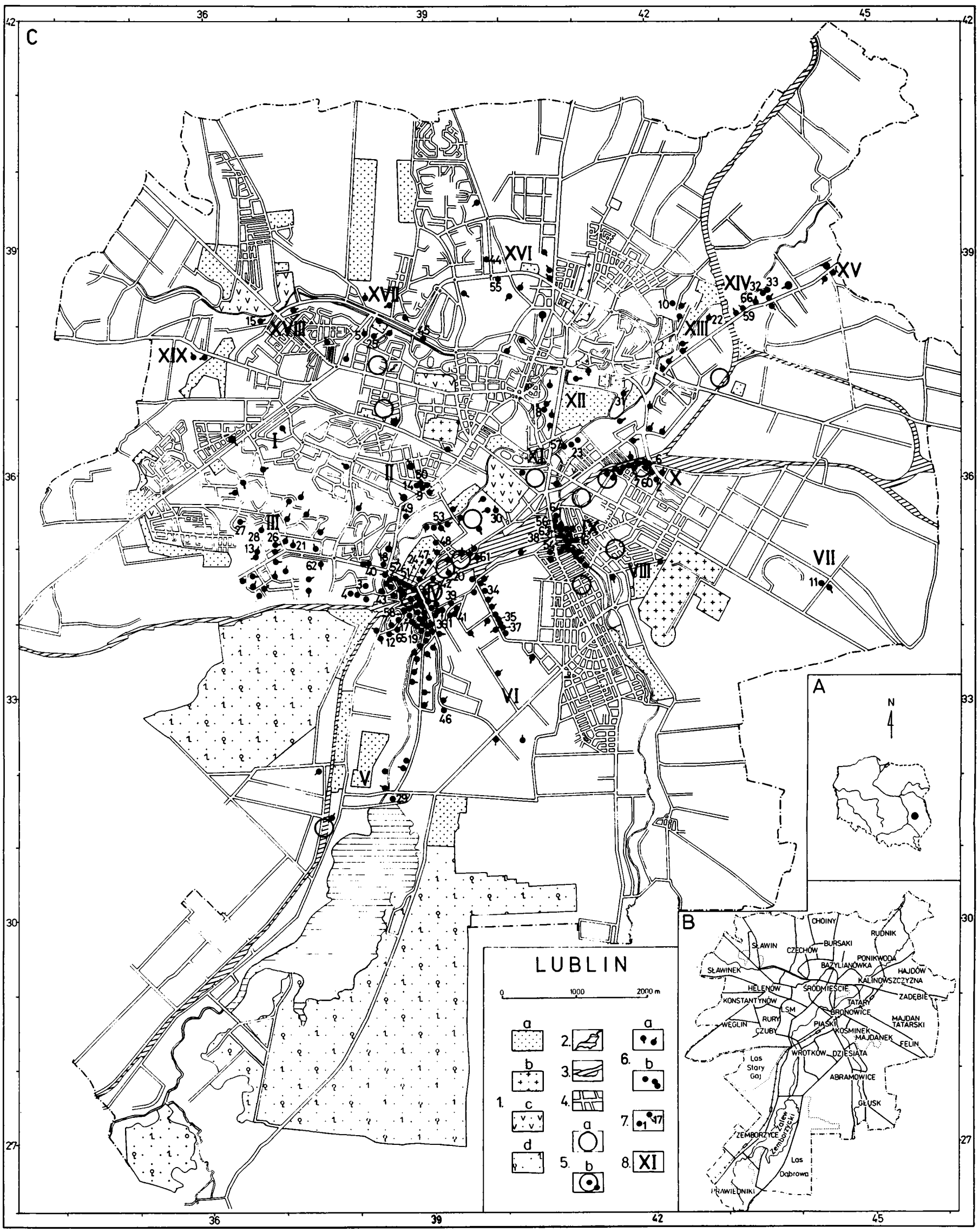

Fig. 1. Locational sketches of the city of Lublin: A — city's location on the map of Poland, B — city districts with major streets and facilities, C — city map. Explanations to the Lublin map (C): 1 — urban grean areas: garden plots (a), cemeteries (b), parks (c), natural forest complexes (d); 2 — water network; 3 — railway tracks; 4 — main and secondary streets; 5 — stations with *Iva xanthiifolia*, published (Fijałkowski 1963, 1968, 1978, Karczmarz, Kuc 1957, Karczmarz, Krzaczek 1960), no longer existing (a) and confirmed again (b); 6 — currently existing stations with *Iva xanthiifolia* in the form of single tufts or several-specimen groups (a) or as compact expanses of varying size (b); 7 — stations of 1–66 phytosociological records of communities with *Iva xanthiifolia* (Tables 1–5); 8 — main areas (I–XIX) of occurrence of stations with *Iva xanthiifolia*

near the dam of the lake and in 4 other places in small numbers on the ruderal rims of Nałkowskich and Żeglarska roads and near a field path along the Bystrzyca river. The *Iva xanthiifolia* station found near the former railway station can probably be identified with the earlier recorded site of the plant by Fijałkowski (5) ("on railway embankments").

VI. The border area between Dziesiąta and Abramowice districts. It occurs there on 4 stations very distant from one another, on loamy-gravel rims of the main and local roads. In all cases several specimens are in danger of extinction.

VII. Felin district, N part at the junction of W. Witos Ave. with Doświadczalna st. The plant grows there both in one dense cluster on a roadside gravel-loamy square and as sporadic specimens on the rim of a construction site.

VIII. Majdanek district, extreme NW part. On the loamy-gravel rim of the Wilcza road near garden-plots there are several specimens under threat of extinction.

IX. Kośminek district, NWW part. On the rims of Nadrzeczna, Szańcowa, Piaskowa, Pawia and Czeska streets. It grows there in a dozen-odd sites in masses or in scanty clusters, mainly on the rims of roads, near buildings and fences, and sporadically on the rim of an old fallow. Everywhere on the loosened, ruderal, loamy-rubble or loamy-gravel ground.

X. Majdan Tatarski district, NW part, in the vicinity of railway tracks near W. Witos (=Ave.) and Majdan, Pogodna and Wrońska streets. It grows on loamy-rubble squares between housing estates, in dozen-odd sites, in agglomerations or scattered. The earliest, very general information about this station of *Iva xanthiifolia* was given by Fijałkowski (6).

XI. Bronowice district, in the area of the junction of 5 main roads and the Bystrzyca river and its tributary — the Czerniejówka stream. It grows there on a loamy-rubble riverside square and the loamy-gravel rims of roads. In two stations it occurs in small and dense agglomerations and in two other stations there are only several specimens in each.

XII. The border area of Stare Miasto (Old Town), Bronowice and Tatary districts, in the vicinity of the Podzamcze garden-plots and the confluence of the Czechowianka stream and the Bystrzyca river. It grows in 9 stations in loose and scanty agglomerations. It is found on loamy-gravel squares, mainly near the roads, less often near fences or town buildings.

XIII. Tatary district, NW part. It is found on the loamy-gravel rims of Turystyczna st. and its by-roads and in the Bystrzyca valley on a loamy-rubble factory square. It grows there on 5 stations, in loose and scanty agglomerations. Moreover, there is one dense agglomeration over the Bystrzyca, on a loess slope.

XIV. Hajdów district, NWW part. On the loamy-gravel rims of Turystyczna st. and Hajdowska road and the rim of farmland on riverside alluvial soil on the Bystrzyca. It grows in 7 sites in scanty and loose agglomerations.

XV. Border area of Hajdów district and the village of Wólka. In the ditch at Turystyczna st., in 2 small, dense agglomerations.

XVI. The border area of Bursaki, Czechów and Śródmieście districts. In 10 sites it is found on dug-out loess construction sites and on loamy-gravel road rims. Moreover, it grows in 1 site on a loamy-gravel road green belt. It occurs most often in small, loose agglomerations, sporadically as single or in large and dense expanses.

XVII. The border area of Sławinek and Śródmieście districts. It grows on loosened loamy-rubble or loess squares near roads and town buildings. In 2 stations it grows in small but dense agglomerations and in 9 other stations there are only several specimens in each.

XVIII. Border line of Sławinek and Sławin districts, at Al. Tysiąclecia on sandy-loamy rim of the road and between Jaśminowa street and the Czechówka stream, on clayey-rubble heap. At both localities several specimens of this plant threatened by destruction.

XIX. Helenów district, W part. It grows there on 2 stations: on the gravel-loamy rim of Nałęczowska st. and on the dugout loess building site nearby. Several specimens in each are in danger.

The spatial arrangement of *Iva xanthiifolia* stations in Lublin has a shape of an interrupted ellipse with the circumference running through the centrifugal part of town. There is a marked absence of stations on the outskirts and in the city centre (Fig. 1).

The primary succession of stations of the original and current occurrence of *Iva xanthiifolia* in Lublin converges with the main pattern of the railway tracks. It must be stressed, however, that the plant is clearly receding from its original stations found on railway embankments (5, 16, 17). Currently, *Iva xanthiifolia* occurs at very different distances from the railway tracks, most often near main and secondary roads, less often far away from any transport routes (Fig. 1).

It is difficult to conclusively find the main causes of extinction and expansion of *Iva xanthiifolia* stations in the Lublin area. Due to progressing urban development and more and more orderly management of ruderal areas, numerous stations of the plant are irretrievably lost. This imposing, annual plant is very easy to weed out in field and garden stations. In ruderal habitats *Iva xanthiifolia* may not be able to withstand competition on the part of other, more expansive and long-lasting plants. As the habitat grows old and turfness develops, the plant successively loses the ability to self-sow from seeds.

On the other hand there is a clear spreading of *Iva xanthiifolia* going on newly developing, proper habitats with a newly-loosened or overlain ground. This is due to the construction of roads, embankments, buildings and other town facilities. The expansion of *Iva xanthiifolia* may be indirectly favoured by the progressive soil contamination and salinification. In these circumstance *Iva xanthiifolia* can spread because of limited competition from other plant species.

SURVEY OF PLANT COMMUNITIES WITH *IVA XANTHIIFOLIA*

Phytosociological taxonomy

The present phytosociological taxonomy covers all previously published (6, 7, 46) and currently characterized plant communities in Lublin, in which

Iva xanthiifolia is present (Tables 1–5). This comprises the following three groups of ruderal plant communities:A — those published earlier, but now with *Iva xanthiifolia* occurrence not confirmed; B — those published earlier with *Iva xanthiifolia* occurrence confirmed anew; C — communities with *Iva xanthiifolia* characterized for the first time.

With *Iva xanthiifolia* communities in groups A and B their basic bibliographic data were given. Ordinal numbers were appended only to those *Iva xanthiifolia* communities, which now require a more detailed characterization.

Class: *Bidentetea tripartiti* R. Tx., Lohm et Prsg. 1950
order: *Bidentetalia tripartiti* Br.-Bl. et R. Tx. 1943
alliance: *Chenopodion fluviatile* R. Tx. 1960
A. association: *Chenopodietum glauco-rubri* Lohm. 1950 (after Fijałkowski 1967, Table 2, records 51, 59)
Class: *Molinio-Arrhenatheretea* Tx. (1937) 1970
order: *Plantaginetalia majoris* Tx. et Prsg. 1950
alliance: *Lolio-Plantaginetum* Siss. 1969
A. subassociation: *Lolio-Plantaginetum "typicum"* (after Fijałkowski 1967, Table 4, records 156, 157 in *"Lolio-Plantaginetum"* association)
B. subassociation: *Lolio-Plantaginetum puccinellietosum* Tx. 1970
variant: with *Puccinellia distans*
facies: ruderal with *Puccinellia distans* and *Artemisia vulgaris* (after Święs 1992, Table 3, record 65)
Class: *Polygono-Poëtea annuae* Riv.-Mart. 1975
order: *Polygono-Poëtalia annuae* Tx. 1972
alliance: *Matricario-Polygonion avicularis* (Br.-Bl. 1931) Riv.-Mart 1975
B. subassociation: *Polygono-Matricarietum discoideae pucccinellietosum* Gütte (1966) 1972
variant: with *Polygonum aviculare*
facies: typical with *Puccinellia distans* and *Polygonum aviculare* (after Święs 1992, Table 4, record 87)
form: with *Sisymbrium loeselii* (after Święs 1992, Table 5, record 93)
C. subassociation 1.1. *Polygono-Matricarietum discoideae "typicum"*
form: 1.1.1. with *Plantago major*
form: 1.1.2. with *Atriplex nitens*
form: 1.1.3. with *Sisymbrium loeselii*
Class: *Chenopodietea* Oberd. 1957 em. Lohm., J. et R. Tx. 1961
order: *Sisymbrietalia* J. Tx. 1961
alliance: *Sisymbrion* R. Tx. Lohm. et Prsg. 1950
A. association: *Corispermo-Brometum tectorum* Krusem., Siss. et Westh. 1946 (after Fijałkowski 1967, Table 2, records 89, 91 in *"Bromo--Corispermetum"* association)
A. association: *Sisymbrietum sophiae* Kreh. 1925 (after Fijałkowski 1967, Table 2, records 69, 72, 75 in community with *Descurainia sophia* and *Bunias orientalis*)

A. community: with *Cannabis ruderalis* (after Fijałkowski 1967, Table 3, record 134)
C. association: 2. *Atriplicetum nitentis* Knapp 1945
variant: 2.1. with *Chenopodium album*
facies: 2.1.1. with *Polygonum aviculare*
facies: 2.1.2. typical with *Chenopodium album*
variant: 2.2. typical with *Atriplex nitens*
facies: 2.2.1. with *Iva xanthiifolia*
facies: 2.2.2. typical with *Atriplex nitens*
B. C. association: 3. *Erigeronto-Lactucetum* Lohm. 1950 (also after Fijałkowski 1967, Table 2, records 80, 85)
C. association: 4. *Chenopodietum ruderale* Oberd. 1957
variant: 4.1. *typical*
variant: 4.2. *segetal*
B. C. community: 5. with *Iva xanthiifolia*
form: 5.1. with *Polygonum aviculare* and *Agropyron repens*
form: 5.2. typical with *Iva xanthiifolia* (also after Fijałkowski 1967, Table 3, records 120–124 as *"Ivetum xanthiifoliae"* association)

Class: *Artemisietea vulgaris* Lohm., Presg. et Tx. in Tx. 1950
order: *Onopordetalia acanthii* Br.-Bl. 1926
alliance: *Onopordon acanthii* Br.-Bl. 1926
A. association: *Centaureo-Berteroëtum* Oberd. 1957 (after Fijałkowski 1967, Table 3, record 97)
A. association: *Potentillo-Artemisietum absinthii* Faliński 1965 (after Fijałkowski 1967, Table 3, records 103, 104)
A. association: *Onopordetum acanthii* Br.-Bl. (23 u.u.) 1936 (after Fijałkowski 1967, Table 3, record 105)
alliance: *Eu-Arction* R. Tx. 1937 em. Siss. 1946
C. association: 6. *Tanaceto-Artemisietum vulgaris* Br.-Bl. (1931) 1949
facies: 6.1. with *Ballota nigra* and *Agropyron repens*
facies: 6.2. with *Polygonum aviculare* and *Arctium lappa*
facies: 6.3. with *Artemisia vulgaris*
facies: 6.4. with *Carduus crispus* and *Amaranthus chlorostachys*
facies: 6.5. with *Tanacetum vulgare* and *Arctium tomentosum*
facies: 6.6. with *Urtica dioica*

GENERAL CHARACTERISTICS OF PLANT COMMUNITIES AND STATIONS OF PHYTOSOCIOLOGICAL RECORDS

The following data describe the 6 discussed communities characterized with the presence of *Iva xanthiifolia*, including two phytocenoses discribed earlier (6) — Tables 2 and 4 and the four currently identified plant communities of that type (Tables 1–3, 5).

1.1. *Polygono-Matricarietum discoideae "typicum"*
(Fig. 1, Tables 1 and 6)

This subassociation is primarily characterized with a constant dominance of *Polygonum aviculare* and with a fairly large percentage of *Iva xanthiifolia* at the same time, less often of other plant species. On the basis of definite single plant species co-dominant with the above two species, three floristic forms of the subassociation were distinguished: with *Plantago major*, with *Atriplex nitens* and with *Sisymbrium loeselii*.

Those three forms of plant communities were found on single expanses with an area of several up to a dozen-odd square meters. These occur on loamy squares with a loamy-gravel-sand surface levelled for a long time and strongly beaten at present.

Phytosociological records: 1. Ww, between the path Przy Bocznicy and Wrotkowska st. a loamy square with a loamy-gravel surface levelled for a long time and currently heavily beaten. 2. MT, in J. Rudlickiego st., the edge of a loamy square with a loamy — gravel surface levelled for a long time and heavily beaten at present. 3. Czy, between Turniowa and Wyżynna streets, a loess square with a loamy-gravel surface rather well beaten.

2. *Atriplicetum nitentis*
(Fig. 1, Tables 2 and 6)

The most characteristic feature of this association is a very dense growth of *Atriplex nitens*. What is also worth noting is the common presence, at different density, of many other plant species belonging to various plant levels, for example: *Iva xanthiifolia*, *Artemisia vulgaris*, *Sisymbrium loeselii*, *Agropyron repens*, *Achillea millefolium*, *Plantago major* and *Polygonum aviculare*.

In the studied association, 2 variants with two facies each were distinguished on the basis of clearly dominant, defined species groups.

The first variant with *Chenopodium album* is characterized with a permanent and numerically strong share of the plant with *Atriplex nitens*. Two facies can be clearly distinguished: with *Polygonum aviculare* and typical with *Chenopodium album*.

The other variant is defined as typical and is characterized with an exceptionally high density with *Atriplex nitens*. Two weak facies are distinguished: with *Iva xanthiifolia* and typical with *Atriplex nitens*.

The two distinguished variants in the association with *Atriplicetum nitensis* occur almost equally often in the expanses of up to several ares. They occur most often on littered loamy-silty slopes of loess scarps or

on various ruderal squares with newly overlain or loosened loamy-rubble surfaces.

Phytosociological records: 1. Czy, near Wyżynna st., a littered loess scarp with an eroded surface, with brick, marl and concrete grains. 5. Sk, in Puławska st., the rim of a loess construction site with a beaten-down, gravel-loamy surface. 6. MT, between Al. (Ave.) W. Witos and J. Rudlicki st., a ruderal square with a heap of loam with concrete and brick grains. 7. MT, the corner of Majdanek and Plage and Laśkiewicz streets, a ruderal square with a heap of loam and concrete and brick grains. 8. SM, at the wall of a building, the rim of the market loess square with a loosened loamy surface mixed with brick and marl grains. 9. LSM, in Nadbystrzycka st., the rim of a loess square with a loosened, loamy surface with marl, brick and concrete grains. 10. Pa, near Wrzosowa st., a littered, eroded loess scarp. 11. Fn, in Doświadczalna st., the loamy rim of the road with a levelled surface with gravel and brick grains. 12. Ww, in Koło st., an old, littered dumping ground of humus loam with numerous fine grains of brick and concrete.

3. *Erigeronto-Lactucetum* Lohm. 1950

(Fig. 1, Table 2)

This association was distinguished on account of the dense growth of *Lactuca serriola*. Among other plants the comparatively densest-growing were: *Polygonum aviculare, Sisymbrium loeselii* and *Artemisia vulgaris*. This association in the form with *Iva xanthiifolia* occurs very rarely, in small expanses of up to 0.5 are. It occupies newer and old loamy-rubble dumping grounds.

Phytosociological records: 13. Czy, near Tymiankowa st., a loess scarp with a littered, loosened surface with an admixture of gravel and concrete and brick grains. 14. LSM, the corner of Nowomiejska and Nadbystrzycka streets, the rim of a long-levelled loess square with a hard loamy surface with gravel, marl, brick and concrete grains.

4. *Chenopodietum ruderale*

(Fig. 3, Tables 3 and 6)

This association was distinguished primarily on account of the undivided dominance of *Chenopodium album*. It contains many other common plants with different density, for example: *Iva xanthiifolia, Atriplex patulum, Artemisia vulgaris, Polygonum aviculare* and *Agropyron repens*. Two variants, typical and segetal were distinguished in the association.

The typical variant represents the floristically richest and spatially the commonest form of the association. The main part is played by plants characteristic of various phytosociological units, for example: *Atriplex nitens, Chenopodium album, Polygonum aviculare, Iva xanthiifolia, Artemisia vulgaris* and *Agropyron repens*. It is found equally often both on the sliding

slopes of loess scarps and on various new loamy-rubble heaps (dumping grounds).

The segetal variant is characterized with the relatively most frequent occurrence of many particular species of segetal and ruderal plants, for example: *Galinsoga parviflora, G. quadriradiata, Cannabis sativa* and *Armoracia lapathifolia.* It is very rare, located only in two expanses on the rims of farmland, on sandy, humus alluvial river soil.

Phytosociological records: 15. Sk, between Jaśminowa st. and the Czechówka stream, a building site, on a heap of loess loam with marl and concrete grains. 16. Kk, the Czerniejówka valley, on the corner of Sucha and Wspólna streets, an old, ruderal fallow on silty-sandy alluvial humus soil. 17. Ww, the Bystrzyca valley, near Koło st., a ruderal loess square with a loosened surface with brick, concrete and marl grains. 18. Czy, the corner of Nadbystrzycka and Jan Paweł II streets, the slope of a littered, eroded, loess scarp. 19. Ww, between the Bystrzyca river and Medalionów st., a newly levelled, ruderal loess square with marl, concrete and brick grains. 20. Ww, the railway station area, between the ditch and the fence, the loess ground with a surface rich in concrete, brick and marl grains. 21. Wn, the corner of Armia Krajowa and Jan Paweł II streets, an old ruderal loess square with a loam heap, and concrete, brick and marl grains. 22. Hw, NWW part, between the Bystrzyca river and Turystyczna st., a square with a heap of loam and brick and concrete grains. 23. Be, between Bronowicka st. and the Bystrzyca river, a ruderal loamy square with a newly levelled surface with concrete, brick and marl grains. 24. Ww, on the corner of Diamentowa and Krochmalna streets, a ruderal square with a heap of loam and concrete, brick and marl grains. 25. Se, in the Skautów st., a loess scarp with loamy surface with an admixture of gravel and brick and concrete grains. 26. Czy, the corner of Armia Krajowa and Jan Paweł II streets, a torn-up loess with a surface rich in sand, gravel and concrete and plaster grains. 27. Wn, in Biedronki st., a ruderal loess square with a loamy surface with concrete, brick and marl grains. 28. Wn, between Tatarakowa and Bociania streets, a fallow with a loess substratum. 29. Ze, between the dam of the lake on the Bystrzyca river and K. Bryński st., the edge of a levelled loamy square with concrete, marl and brick grains. 30. Ww, near Krochmalna st., the area of the sugarplant's water settling tanks, the sloping road edge on the dyke with a sandy-loamy surface with marl grains. 31. Ty, in Działkowa st., a loess square with a littered surface with marl, concrete and brick grains. 32. Hw, NW part, on the Bystrzyca river, the edge of a potato field on a silty-sandy alluvial humus soil. 33. Hw, NW part on the Bystrzyca river, the edge of a potato field on a silty-sandy alluvial humus soil.

5. Community with *Iva xanthiifolia*

(Figs 1 and 3–6, Tables 4 and 6)

This community comprises expanses of ruderal plants with the highest degree of covering by *Iva xanthiifolia.* In terms of its plant species composition, this is very rich, dense and fairly homogeneous community. Out of a dozen-odd species with the highest class of perenniality, the most numerous, apart from *Iva xanthiifolia,* are *Agropyron repens, Polygonum aviculare,*

Chenopodium album, *Artemisia vulgaris*, *Tanacetum vulgare* and *Arctium lappa*.

In the association with *Iva xanthiifolia* 2 secondary forms of plant communities were distinguished. The first is characterized with exceptionally high percentages of *Polygonum aviculare* and *Agropyron repens* with *Iva xanthiifolia*. Worth noting is also the comparatively frequent presence of the following plants in this form of community: *Echium vulgare*, *Anchusa officinalis*, *Pastinaca sativa* and *Diplotaxis muralis*. The other secondary form of the community was defined as typical. It is mainly characterized by an undivided dominance of *Iva xanthiifolia*. It is necessary to emphasize an exceptionally frequent occurrence in this form of community of such plants as: *Capsella bursa pastoris*, *Matricaria discoidea*, *Urtica dioica* and *Ballota nigra*.

In Lublin the two described secondary community forms with a high percentage of *Iva xanthiifolia* occur very frequently. They grow most often on small expanses (up to one are), seldom on large ones (several ares in area). They occur almost equally often in different ruderal sites with newly overlain or loosened loamy-rubble or silty-loamy surfaces.

Phytosociological records: 34. Ww, the sloping rim of M. Smoluchowski st., littered, loamy with a hard surface with marl, brick and concrete grains. 35. Ww, in L. Kruczkowski st., the loamy rim of the road with a levelled, gravel-sandy-loamy surface. 36. Ww, between Wrotkowska st. and the Przy Bocznicy road, a ruderal loamy square with a surface with marl, concrete and brick grains. 37. Ww, in L. Kruczkowski st., the loamy rim of the road with a levelled, loamy-sandy-gravel surface. 38. Kk, the Czerniejówka valley in Pawia st., at the fence, a ruderal loamy square with a surface rich in concrete, marl and brick grains. 39. Ww, in Wrotkowska st., a ruderal loamy square with a surface mixed with concrete, brick and marl grains. 40. Czy, between Przytulna and Jan Paweł II st., the flat edge of a high loess slope with a surface with concrete and brick grains. 41. Ww, the corner of Przy Bocznicy and Inżynierska streets, a knoll-like bank of sandy loam with brick, concrete and marl grains. 42. Ww, at the fence, the sloping rim of Krochmalna st., loamy with a levelled, littered and sandy surface rich in concrete grains. 43. Czy, the corner of Wyżynna and Na Przełęczy streets, near the road, the edge of a loess construction site with a loosened surface mixed with gravel, concrete and brick grains. 44. Czw, the rim of an unnamed road: loess ground with a loosened surface mixed with sand, gravel, concrete and brick grains. 45. Czw, in Al. Tysiąclecia, a loess scarp with a loosened surface mixed with gravel and concrete and brick grains. 46. Ww, the rim of Diamentowa st., loess ground with a loosened surface mixed with sand and gravel and concrete grains. 47. Ww, the corner of Krochmalna and Diamentowa streets, the rim of a ruderal loamy square with a sandy surface with marl, concrete and brick grains. 48. Ww, the sloping rim of Przeskok st., at the fence of garden-plots, loamy ground with a littered surface with marl and concrete grains. 49. LSM, the flat rim of Wapienna st., loamy ground with a surface littered with marl, brick and concrete grains. 50. LSM, the sloping rim of Nowomiejska st., next to old building, loess ground with a sandy surface covered with concrete, plaster and brick grains. 51. Ww, the corner of Krochmalna and Diamentowa streets, a ruderal loamy

Table 1. Subassociation: 1.1. *Polygono-Matricarietum discoideae "typicum"* in form: 1.1.1. *Plantago major*, 1.1.2. with *Atriplex nitens*, 1.1.3. with *Sisymbrium loeselii*

No of community		1.			
		1.	2.	3.	
No of record		1	2	3	
Date		VI, X 1992	VI, IX 1992	VII, X 1992	Frequency
Area of plot in	m^2	25	25	30	
Cover the layer in %	c	100	100	100	
	d	.	5	.	
Number of species in record		24	29	25	
I. Ch: Cyperetalia fusci					
Gypsophila muralis		+	.	.	1
II. a - Molinio-Arrhenatheretea, b - Arrhenatheretalia, c - Cynosurion, d - Plantaginetalia majoris, Lolio-Plantaginetum					
a Achillea millefolium		+	r	+	3
a Trifolium pratense		.	+	.	1
b Taraxacum officinale		+	.	.	1
c Trifolium repens		+	+	.	2
d Plantago major (Ch: ass.)		3	+	r	3
d Lolium perenne (Ch: ass.)		+	+	+	3
III. Ch: Polygono-Poëtea annuae					
Polygonum aviculare		5	5	5	3
Matricaria discoidea (Ch: ass.)		+	r	+	3
Lepidium ruderale		+	.	.	1
Bryum caespiticium		.	+	.	1
Poa annua		.	.	+	1
IV. Ch: a - Aperetalia, b - Aphanion					
a Apera spica-venti		.	.	+	1
b Tripleurospermum inodorum		+	+	+	3
b Consolida regalia		.	.	+	1
b Vicia angustifolia		.	.	+	1
V. Ch: a - Chenopodietea, b - Polygono-Chenopodietalia, c - Sisymbrietalia, Sisymbrion					
a Atriplex patula		.	.	+	1
a Chenopodium album		.	.	+	1
b Sonchus arvensis		r	.	.	1
c Iva xanthiifolia		2	2	2	3
c Sisymbrium loeselii		+	+	2	3
c Atriplex nitens		.	3	+	2
c Sisymbrium officinale		.	+	+	2
c Cannabis ruderalis		.	+	.	1
c Lactuca serriola		.	+	.	1
c Descurainia sophia		.	.	+	1
c Malva neglecta		.	.	+	1
VI. Ch: a - Artemisietea vulgaris, b - Onopordion, c - Eu-Arction, d - Senecion fluviatilis					
a Daucus carota		+	+	.	2
a Artemisia vulgaris		+	1	+	3
a Carduus crispus		+	r	.	2
a Tanacetum vulgare		r	+	+	3
b Melilotus albus		+	+	.	2
b Echium vulgare		.	+	.	1
b Carduus acanthoides		.	.	r	1
c Arctium lappa		+	1	.	2
c Artemisia annua		.	+	.	1
d Solidago gigantea		+	.	+	2
VII. Ch: Agropyretea intermedi-repentis					
Cirsium arvense		+	+	.	2
Convolvulus arvensis		.	+	+	2
Equisetum arvense		+	.	.	1
VIII. Others species: a - heterogeneous synanthropic, b - mosses					
a Medicago lupulina		+	+	.	2
a Odontites rubra		+	.	.	1
a Medicago varia		.	+	.	1
a Helianthus tuberosus		.	+	.	1
a Erigeron canadensis		.	.	+	1
a Galeopsis tetrahit		.	.	+	1
b Barbula unguiculata		.	+	+	2

Table 2. Association: 2. *Atriplicetum nitens* in variants: 2.1. with *Chenopodium album* (facies: 2.1.1. with *Polygonum aviculare*, 2.1.2. typical with *Chenopodium album*), 2.2. typical with *Atriplex nitens* (facies: 2.2.1. with *Iva xanthiifolia*, 2.2.2. typical with *Atriplex nitens*). Association: 3. *Erigeronto-Lactucetum*

No of community		2.						3.		
		1.		2.						
		1.		2.		1.	2.			
No of record		4	5	6	7	8	9	10	11	12	13	14	
Date		VI, X 1992	VI, IX 1992	VI, X 1992	VI, IX 1992	VI, IX 1992	VI, IX 1992	VI, X 1992	VII, X 1992	VII, X 1992	VII, IX 1992	VI, IX 1992	Frequency
Area of plot in	m^2	60	50	60	35	50	80	30	30	30	30	25	
Cover the layer in %	c	100	100	100	100	100	100	100	100	100	100	100	
	d	5	.	20	5	.	5	.	.	.	5	5	
Number of species in record		35	28	30	35	25	45	28	35	30	36	42	
I. Ch: a - Bidentetea tripartiti, b - Cyperetalia fusci													
a Polygonum nodosum		.	+	.	.	.	.	.	.	+	.		1 1
b Plantago pauciflora		.	.	+	+	.	.	.	.	.	.		2 .
II. Ch: a - Molinio-Arrhenatheretea, b - Molinietalia, c - Filipendulo-Petasition, d - Arrhenatheretalia, e - Cynosurion, f - Arrhenatherion elatioris, g - Trifolio fragiferi-Agrostietalia, Agropyro-Rumicion crispi, h - Plantaginetalia majoris, Lolio-Plantaginetum													
a Achillea millefolium		+	1	+	+	r	r	+	+	+	2	1	9 2
b Deschampsia caespitosa		.	r	.	.	.	+	.	.	.	.	+	2 1
d Taraxacum officinale		+	.	+	+	+	r	+	+	+	+	+	8 2
d Dactylis glomerata		.	.	+	.	.	.	.	.	.	+	r	1 2
e Trifolium repens		+	.	.	.	.	+	.	.	.	.	.	2 .
f Pastinaca sativa		.	.	.	.	.	.	+	+	+	.	.	2 .
g Rumex crispus		+	.	+	+	.	.	+	+	+	+	.	6 1
g Agrostis alba		.	.	+	.	+	+	1	1	+	1	.	6 1
h Plantago major		+	+	+	r	+	+	+	+	+	r	+	9 2
h Lolium perenne		+	+	1	r	+	+	+	+	+	+	+	9 2
III. Ch: Polygono-Poëtea annuae													
Polygonum aviculare		3	4	4	2	1	1	2	2	2	2	2	9 2
Poa annua		+	.	+	.	.	+	.	+	+	+	+	5 2
Matricaria discoidea		.	+	.	.	.	.	.	.	+	.	.	2 .
Lepidium ruderale		.	2	+	.	.	.	.	.	.	.	+	2 1
Bryum caespiticium		.	.	1	.	.	.	.	+	.	.	.	2 .
Capsella bursa-pastoris		.	.	.	r	+	.	.	.	.	+	+	2 2
Ceratodon purpureus		.	.	.	.	+	.	.	.	.	+	+	1 2
Bryum argenteum		.	.	.	.	+	.	.	.	.	+	+	1 2
IV. Ch: a - Secalietea, b - Aphanion													
b Tripleurospermum inodorum		1	1	r	+	+	+	.	.	.	+	+	6 2
V. Ch: a - Chenopodietea, b - Polygono-Chenopodietalia, c - Panico-Setarion, d - Eu-Polygono-Chenopodiom, e - Sisymbrietalia, Sisymbrion													
a Atriplex patulum		+	r	+	+	+	+	.	+	+	.	.	8 .
a Chenopodium album		3	2	2	2	2	2	.	.	.	1	.	6 1
a Solanum nigrum		.	.	.	+	.	+	.	.	+	.	.	3 .
a Erysimum cheiranthoides		.	.	.	.	.	+	.	.	+	.	.	2 .
b Sonchus arvensis		+	+	+	.	.	+	.	+	.	+	.	5 1
e Atriplex nitens (Ch: ass.)		4	4	4	4	4	4	5	5	5	r	+	9 2
e Lactuca serriola (Ch: ass.)		+	+	.	+	1	+	+	.	+	5	5	7 2
e Sisymbrium loeselii		2	+	+	r	+	+	+	1	+	2	2	9 2
e Iva xanthiifolia		1	r	1	2	1	1	3	1	1	1	1	9 2
e Cannabis ruderalis		.	.	.	+	+	.	+	.	.	.	.	3 .
VI. Ch: a - Artemisietea vulgaris, b - Onopordion, c - Eu-Arction, d - Convolvuletalia sepium, e - Senecion fluviatilis													
a Daucus carota		1	1	+	1	+	+	+	+	.	+	+	8 2
a Tanacetum vulgare		+	1	.	+	+	.	+	1	.	.	+	6 1
a Artemisia vulgaris		1	1	2	2	+	r	1	2	1	2	1	9 2
a Carduus crispus		+	.	.	.	.	+	+	+	.	.	+	4 1
a Urtica dioica		.	.	.	.	+	.	.	.	+	r	r	3 2
b Melilotus albus		+	.	+	+	.	+	+	+	+	1	+	7 2
b Berteroa incana		.	.	.	.	.	.	.	.	+	+	.	1 1
c Arctium lappa		1	+	+	1	.	+	.	.	+	.	+	6 1
c Artemisia annua		.	.	+	+	.	+	.	.	.	.	+	3 1
c Ballota nigra		.	.	.	+	+	+	+	+	.	.	+	5 1
d Calystegia sepium		+	.	.	.	.	.	+	.	.	.	+	2 1
e Solidago gigantea		+	+	.	.	.	.	1	+	.	.	.	4 .
VII. Ch: Agropyretea intermedi-repentis													
Equisetum arvense		+	+	.	.	.	.	+	.	.	.	.	3 .
Cirsium arvense		+	.	+	.	.	+	+	+	.	+	+	5 2
Agropyron repens		1	+	+	1	+	2	1	2	+	1	1	9 2
Tussilago farfara		.	+	.	.	.	1	1	+	.	.	.	4 .
Convolvulus arvensis		.	.	.	.	.	.	+	.	+	.	+	2 1
VIII. Others species: a - heterogeneous synanthropic, b - thicket, forest, c - mosses													
a Sinapis arvensis		2	.	+	.	.	.	+	.	.	.	.	2 .
a Lapsana communis		+	.	.	.	.	.	.	+	.	.	.	2 .
a Polygonum convolvulus		+	.	.	.	.	+	.	+	.	.	+	3 1
a Erigeron canadensis		+	+	+	+	+	+	+	r	+	+	+	9 2
a Medicago lupulina		+	.	+	+	.	+	.	.	+	+	+	5 2
a Helianthus tuberosus		.	+	.	.	.	1	.	.	.	.	.	2 .
a Diplotaxis muralis		.	.	.	+	.	.	.	+	.	.	.	2 .
a Amaranthus retroflexus		.	.	.	+	.	.	.	1	.	.	.	2 .
a Picris hieracioides		.	.	.	.	+	.	.	.	.	+	.	1 1
a Erigeron annuus		.	.	.	.	.	+	.	.	.	.	+	1 1
a Galium aparine		.	.	.	.	.	+	.	.	.	.	+	1 1
c Barbula unguiculata		+	.	1	+	+	+	.	+	.	+	+	6 2

Species occurring in 1 record: I. a - Bidens tripartitus 9/+. II. a - Plantago lanceolata 5/+, Vicia cracca 13/+; c - Stachys palustris 4/+; d - Bromus mollis 7/+; g - Potentilla anserina 4/+, P. reptans 13/+, Ranunculus repens 13/+. IV. a - Papaver rhoeas 13/+; b - Aethusa cynapium 9/+. V. a - Chenopodium strictum 9/+, Geranium dissectum 9/+; c - Setaria viridis 14/+; d - Lamium purpureum 5/+, Sonchus asper 7/+, Oxalis stricta 9/+, Galinsoga hirsuta 9/+, G. parviflora 12/+; e - Descurainia sophia 8/+, Bunias orientalis 14/+, Malva neglecta 14/+, Sisymbrium officinale 14/+. VI. b - Verbascum thapsiforme 7/+, Carduus acanthoides 14/r; c - Lamium album 7/+, Chelidonium majus 9/+. VIII. a - Senecio vulgaris 7/+, Cichorium intybus 11/+, Cirsium lanceolatum 11/r, Linaria vulgaris 11/+, Pimpinella saxifraga 11/+, Parthenocissus quinquefolia 12/+, Stellaria media 13/+; b - Rubus caesius 10/+, Humulus lupulus 14/+.

Table 3. Association: 4. *Chenopodietum ruderale* in variants: 4.1. typical, 4.2. segetal

No of community		4. 1.																2.		
No of record		15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Date		VI, X 1992	V, IX 1992	VI, IX 1992	VI, IX 1992	V, IX 1992	VI, IX 1992	V, IX 1992	VI, IX 1992	V, IX 1992	VI, IX 1992	VI, IX 1992	VI, IX 1992	V, IX 1992	VI, IX 1992	V, X 1992	VI, IX 1992	VI, IX 1992	VI, IX 1992	V, IX 1992
Area of plot in	m^2	60	80	80	120	100	70	80	100	60	80	30	100	95	120	80	25	30	120	90
Cover the layer in %	c	100	100	100	100	100	100	95	100	100	100	100	100	100	100	100	100	100	100	100
	d	.	.	.	.	.	5	.	.	.	.	.	.	5	.	5	5	.	5	.
Number of species in record		27	50	32	36	31	30	31	33	38	32	20	25	40	36	40	29	32	41	37
I, Ch: a - Phragmitetea, b - Bidentetea tripartiti, c - Cyperetea fusci																				
a Phragmites communis		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	I
b Polygonum mite		+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	I
b Bidens cernuus		.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	I
b Polygonum nodosum		.	+	.	+	.	.	+	+	+	+	+	+	+	.	+	.	+	.	III
b Chenopodium glaucum		.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	I
c Plantago pauciflora		.	+	+	+	+	.	.	+	+	.	.	+	+	.	+	.	.	.	III
II. Ch: a - Molinio-Arrhenatheretea, b - Molinietalia, c - Filipendulo-Petasition, d - Arrhenatheretalia, e - Cynosurion, f - Arrhenatherion elatioris, g - Trifolio fragiferi-Agrostietalia, Agropyro-Rumicion crispi, h - Plantaginetalia majoris, Lolio-Plantaginetum																				
a Achillea millefolium		+	+	.	+	.	.	+	.	+	+	r	.	1	+	+	.	.	.	+
a Plantago lanceolata		.	.	.	+	.	.	+	.	.	+	.	.	.	+	.	.	.	.	.
a Trifolium pratense		.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	.	.	.	.
c Stachys palustris		.	.	.	+	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
d Dactylis glomerata		+	+	.	+	.	+	.	+	.	.	.	.	.	+	.	.	.	.	.
d Taraxacum officinale		.	+	+	+	r	+	+	+	+	+	.	.	+	+	+	+	.	r	+
e Trifolium repens		.	.	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.
g Rumex crispus		+	+	+	.	.	.	1	.	+	.	.	.	+	+	+	.	+	.	.
g Potentilla anserina		.	+	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	+
g Agrostis alba		.	.	.	.	.	.	.	+	.	+	.	.	.	+	.	+	.	+	.
h Plantago major		.	+	+	+	+	+	+	+	+	.	.	.	+	+	+	.	+	.	.
h Lolium perenne		.	.	+	.	+	+	.	.	+	+	.	.	1	+	1	.	+	.	.
III. Ch: Polygono-Poëtea annuae																				
Capsella bursa-pastoris		+	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	+	.	.
Polygonum aviculare		1	3	2	2	2	1	2	+	+	1	r	+	2	3	3	+	r	1	+
Bryum caespiticium		.	.	.	.	.	+	.	.	.	.	.	.	+	.	+	+	.	+	.
Lepidium ruderale		.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	+	.	.
Bryum argenteum		.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.
IV. Ch: a - Secalietea, b - Aperetalia, c - Aphanion																				
b Scleranthus annuus		.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.
c Aethusa cynapium		.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c Tripleurospermum inodorum		+	r	+	+	+	+	+	+	r	+	r	+	+	+	+	+	1	1	.
c Vicia tetrasperma		.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	.
V. Ch: a - Chenopodietea, b - Polygono-Chenopodietalia, c - Panico-Setarion, d - Eu-Polygono-Chenopodion, e - Sisymbrietalia, Sisymbrion																				
a Chenopodium album (Ch: ass.)		4	5	4	5	5	5	4	4	5	5	5	5	5	5	5	4	5	4	5
a Atriplex patulum		+	+	+	+	+	+	+	+	r	+	+	+	.	2	+	+	.	.	+
a Solanum nigrum		.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.
a Erysimum cheiranthoides		.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+
V. Ch: a - Chenopodietea, b - Polygono-Chenopodietalia, c - Panico-Setarion, d - Eu-Polygono-Chenopodion, e - Sisymbrietalia, Sisymbrion																				
a Chenopodium album (Ch: ass.)		4	5	4	5	5	5	4	4	5	5	5	5	5	5	5	4	5	4	5
a Atriplex patulum		+	+	+	+	+	+	+	+	r	+	+	+	.	2	+	+	.	.	+
a Solanum nigrum		.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.
a Erysimum cheiranthoides		.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+
b Sonchus arvensis		r	+	r	+	+	+	.	+	+	+	+	+	+	+	+	.	+	+	V
b Echinochloa crus-galli		.	+	.	.	+	.	+	.	+	.	+	.	+	.	.	+	3	2	III
c Setaria viridis		.	.	+	.	.	.	+	.	.	.	.	.	+	+	.	.	.	+	II
d Galinsoga quadriradiata		.	+	.	+	+	.	.	.	+	+	.	+	+	+	+	.	1	2	III
d Galinsoga parviflora		.	.	+	.	.	.	.	+	.	.	+	.	.	+	+	+	4	2	III
d Lamium purpureum		.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	I
d Euphorbia helioscopia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r
d Oxalis stricta		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r
e Lactuca serriola		2	+	+	.	.	+	1	.	.	.	+	.	.	2	+	+	.	.	III
e Sisymbrium loeselii		1	+	+	+	+	2	+	r	.	.	.	.	.	1	+	1	.	.	III
e Atriplex nitens		3	3	3	3	1	.	.	.	+	+	+	+	1	1	1	+	.	r	.
e Iva xanthiifolia		+	r	3	3	3	3	3	2	r	1	2	+	1	2	2	+	+	2	+
e Sisymbrium officinale		+	+	+	.	.	.	.	+	.	.	+	.	.	.	.	.	+	+	+
e Descurainia sophia		+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+
e Cannabis ruderalis		.	+	.	.	.	.	.	+	r	+	+	.	.	.	2	2	3	3	III
e Bunias orientalis		.	.	.	.	+	2	.	+	.	.	.	.	.	.	+	+	.	.	II
e Malva neglecta		.	.	.	.	+	.	.	+	.	.	.	.	+	+	.	.	+	+	II
e Chenopodium strictum (Ch: ass.)		.	.	.	.	.	+	.	.	r	.	.	.	.	.	+	.	.	.	I
VI. Ch: a - Artemisietea vulgaris, b - Onopordetalia acanthii, c - Onopordion, d - Eu-Arction, e - Convolvuletalia sepium, f - Senecion fluviatilis																				
a Tanacetum vulgare		+	+	1	+	+	.	1	+	+	.	.	.	+	.	1	.	.	.	III
a Artemisia vulgaris		1	1	2	+	1	2	1	1	2	1	+	+	2	1	2	2	+	2	1
a Urtica dioica		.	+	.	.	.	1	.	.	.	.	.	.	+	.	.	.	.	.	+
a Daucus carota		.	.	.	+	.	.	2	.	+	.	.	.	1	.	+	.	.	.	.
a Carduus crispus		.	.	.	.	.	+	.	+	.	.	.	.	.	+	+	+	.	+	.
c Onopordon acanthium		.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
c Melilotus albus		.	+	.	+	.	.	.	+	.	.	.	1	+	2	.	+	.	.	II
c Verbascum thapsiforme		.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	I
c Berteroa incana		.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	I
c Echium vulgare		.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	I
c Carduus acanthoides		.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r	I
d Arctium tomentosum		.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	I
d Ballota nigra		+	+	+	+	.	+	.	.	+	.	.	.	.	+	.	1	.	.	III
d Armoracia lapathifolia		+	.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	+	2	2
d Arctium lappa		.	+	.	+	.	.	+	.	+	.	.	.	.	+	+	.	+	+	III
d Artemisia annua		.	+	+	.	+	.	.	+	.	+	.	.	.	.	.	+	.	.	II
d Lamium album		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	I
f Solidago gigantea		+	.	.	+	.	.	.	+	.	.	.	.	.	.	+	.	.	.	II
VII. Ch: a - Agropyretea intermedi-repentis, b - Sedo-Scleranthetea, c - Festuco-Brometea																				
a Tussilago farfara		+	+	+	.	.	.	+	+	.	+	.	+	+	.	.	.	.	.	III
a Cirsium arvense		+	+	+	+	+	+	2	+	+	+	.	.	+	+	+	.	+	+	IV
a Agropyron repens		+	+	2	r	+	2	+	+	1	r	+	r	1	+	1	r	+	1	1
a Poa compressa		.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	I
a Convolvulus arvensis		.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+
a Equisetum arvense		.	r	.	.	.	1	+	.	.	.	2	.	.	.	.	.	+	+	II
VIII. Others species: a - heterogeneous synanthropic, b - thicket, forest, c - mosses																				
a Erigeron canadensis		+	+	+	.	+	.	+	.	.	+	.	+	+	+	+	+	.	.	III
a Polygonum convolvulus		+	+	+	.	+	+	.	+	.	+	.	.	+	.	.	.	.	+	.
a Medicago lupulina		.	+	+	r	+	.	+	.	+	+	.	.	.	+	.	.	.	.	II
a Helianthus tuberosus		.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.
a Brassica oleifera		.	+	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	+	.
a Amaranthus retroflexus		.	+	+	+	+	r	.	.	+	+	+	.	.	+	+	+	2	1	IV
a Linaria vulgaris		.	.	.	+	.	.	.	+	.	.	+	.	.	.	.	.	.	.	I
a Cichorium intybus		.	.	.	+	.	+	+	.	+	.	.	.	+	.	.	.	+	.	II
a Datura stramonium		.	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	.	I
a Cirsium lanceolatum		.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.
a Sinapis arvensis		.	.	.	.	.	.	r	.	+	.	.	+	r	r	.	.	+	r	+
a Trifolium hybridum		.	.	.	.	.	.	+	.	.	.	.	+	+	.	.	.	.	.	I
a Solanum tuberosum		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	1	1
a Cannabis sativa		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r
b Acer negundo b		.	1	.	+	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.
b Crataegus sp.		.	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
b Rubus caesius		.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	I
c Barbula convoluta		.	.	.	.	.	.	.	.	.	.	.	+	.	r	+	.	.	.	I

Species occurring in 1 record: I. b - Polygonum brittingeri 23/r, Bidens tripartitus 25/+, Chenopodium rubrum 26/+, Rumex maritimus 30/r; c - Gypsophila muralis 28/r. II b - Deschampsia caespitosa 16/+; d - Bromus mollis 27/r, Carum carvi 29/+; f - Pastinaca sativa 29/+; g - Rorippa silvestris 32/r. III - Poa annua 19/+, Matricaria discoidea - 31/+. IV. a - Papaver rhoeas 27/r. V. d - Chenopodium polyspermum 15/+; e - Lepidium densiflorum 24/r, Atriplex tatarica 28/+. VI. b - Artemisia absinthium 20/+; c - Anchusa officinalis 16/r, Melilotus officinalis 20/+; d - Leonurus cardiaca 16/r, Sicyos angulata 16/+; e - Calystegia sepium 16/+, f - Saponaria officinalis 18/+. VII. b - Potentilla argentea 24/+; c - Bromus inermis 20/+. VIII. a - Medicago varia 17/+, Helianthus annuus 19/+, Agrostis vulgaris 23/+, Asparagus officinalis 25/+, Stellaria media 25/+, Panicum sativum 26/+, Senecio vulgaris 26/+, Festuca heterophylla 27/1, Cirsium lanceolatum 32/+, Rumex confertus 32/+, Glechoma hederacea 33/+; b - Medicago falcata 27/+.

Table 4. Community: 5. with *Iva xanthiifolia* in facies: 5.1. with *Polygonum aviculare* and *Agropyron repens*, 5.2. typical with *Iva xanthiifolia*

No of community 5.	1.								2.																	
No of record	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Constancy
Date	VI, IX 1992	VII, IX 1992	VI, IX 1992	VI, IX 1992	V, IX 1992	VII, X 1992	VI, IX 1992	VI, IX 1992	V, VIII 1992	V, VIII 1992	VI, IX 1992	VI, VIII 1992	V, VIII 1992	V, VIII 1992	VI, IX 1992	V, VIII 1992	V, VIII 1992	V, VIII 1992	V, VIII 1992	VI, IX 1992	VI, IX 1992	VI, VIII 1992	VI, VIII 1992	VI, VIII 1992	V, VIII 1992	
Area of plot in m²	60	110	100	100	120	120	120	80	60	120	40	40	35	120	40	80	80	80	80	100	120	100	120	30	40	
Cover the layer in % c	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Cover the layer in % d	.	.	.	.	.	5	5	10	5	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	
Number of species in record	31	36	35	35	35	40	29	40	28	23	23	50	19	16	18	31	27	30	23	25	25	29	24	34	25	
I. Ch: a - Bidentetea tripartiti, b - Cyperetalia fusci																										
a Polygonum nodosum	.	.	.	.	+	.	.	+	.	.	+	.	.	.	.	.	+	.	.	+	.	.	+	.	.	II
a Chenopodium glaucum	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	I
b Plantago pauciflora	.	1	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
II. Ch: a - Molinio-Arrhenatheretea, b - Molinietalia, c - Filipendulo-Petasition, d - Arrhenatheretalia, e - Cynosurion, f - Arrhenatherion elatioris, g - Trifolio fragiferi-Agrostietalia, Agropyro-Rumicion crispi, h - Plantaginetalia majoris, Lolio-Plantaginetum																										
a Plantago lanceolata	.	+	+	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
a Achillea millefolium	+	+	.	+	+	+	+	+	+	1	1	+	+	.	.	.	.	+	+	.	.	+	r	.	1	IV
a Trifolium pratense	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	+	.	.	.	I
c Taraxacum officinale	+	.	+	.	+	+	+	+	.	.	+	+	.	+	+	+	+	.	.	+	+	.	.	+	+	IV
c Dactylis glomerata	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
e Trifolium repens	+	+	.	.	.	+	.	+	.	.	+	.	.	.	.	.	.	+	.	.	+	+	.	.	.	I
f Pastinaca sativa	+	+	+	+	.	+	.	+	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	II
g Rumex crispus	.	+	.	.	r	+	.	.	+	.	.	.	+	.	.	+	.	.	.	.	+	.	.	.	+	II
g Potentilla reptans	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	I
g Agrostis alba	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	I
h Plantago major	.	2	+	+	+	1	+	+	.	+	+	+	+	.	+	+	+	.	+	+	+	.	.	+	.	IV
h Lolium perenne	.	+	.	.	2	+	.	+	+	+	.	+	.	.	.	+	+	+	.	.	+	.	.	+	+	III
III. Ch: Polygono-Poëtea annuae																										
Lepidium ruderale	+	+	.	.	+	+	+	.	.	+	.	+	.	+	.	+	+	+	.	+	+	.	+	.	.	III
Polygonum aviculare	4	4	4	4	4	4	4	4	2	2	1	2	1	r	+	2	1	2	r	r	+	.	.	1	2	V
Bryum caespiticium	.	.	.	.	.	+	+	1	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	I
Poa annua	.	.	.	.	r	.	.	+	.	.	.	+	.	.	.	+	+	+	.	.	.	r	.	.	r	II
Matricaria discoidea	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	+	.	+	.	.	.	.	.	I
Capsella bursa-pastoris	.	.	.	.	.	.	.	.	.	1	+	+	+	.	.	+	+	.	+	.	+	+	+	+	+	III
IV. Ch: a - Aperetalia, b - Aphanion																										
a Apera spica-venti	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	I
b Tripleurospermum inodorum	+	+	+	+	+	+	+	.	+	1	.	+	.	.	.	.	+	.	+	+	.	+	.	+	.	IV
b Vicia tetrasperma	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	I
b Aethusa cynapium	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	+	+	.	I
b Consolida regalis	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
V. Ch: a - Chenopodietea, b - Polygono-Chenopodietalia, c - Panico-Setarion, d - Eu-Polygono-Chenopodion, e - Sisymbrietalia, Sisymbrion																										
a Chenopodium album	3	1	1	1	2	2	3	1	2	2	3	3	2	1	r	1	1	2	2	3	1	r	+	r	2	V
a Atriplex patulum	1	+	.	+	.	1	+	.	1	2	.	+	.	+	+	+	.	+	+	+	.	.	+	+	+	IV
a Erysimum cheiranthoides	.	.	+	.	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	I
b Sonchus arvensis	+	+	+	+	+	.	.	+	.	.	.	+	.	.	.	.	+	.	.	+	.	.	+	+	.	III
b Echinochloa crus-galli	.	.	.	.	+	.	+	+	.	.	.	.	+	.	.	.	.	.	.	+	+	+	+	.	.	II
c Setaria viridis	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	I
d Galinsoga parviflora	.	.	+	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	II
d Oxalis stricta	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
d Galinsoga quadriradiata	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	+	+	.	.	.	+	.	I
d Lamium purpureum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	I
e Bunias orientalis	+	1	+	r	.	+	.	.	+	.	.	.	.	.	r	.	+	+	+	+	.	.	.	.	.	III
e Lactuca serriola	+	+	r	+	.	1	+	.	+	1	.	+	.	.	.	.	.	.	.	.	+	+	.	2	.	III
e Sisymbrium loeselii	+	+	.	+	+	+	+	2	3	2	2	+	.	+	+	+	+	+	+	+	.	+	+	+	+	V
e Atriplex nitens	+	.	.	r	.	.	3	.	+	.	+	+	.	2	2	+	.	.	+	.	.	.	.	1	+	III
e Iva xanthiifolia (D: com.)	4	4	5	5	5	5	4	5	4	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	V
e Cannabis ruderalis	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	1	.	.	.	+	.	+	.	+	.	I
e Sisymbrium officinale	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	+	.	.	.	I
e Chenopodium strictum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	I
e Malva neglecta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	I
VI. Ch: a - Artemisietea vulgaris,,b - Onopordion, c - Eu-Arction, d - Alliarion, e - Convolvuletalia sepium, f - Senecion fluviatilis																										
e Iva xanthiifolia (D: com.)	4	4	5	5	5	5	4	5	4	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	V
e Cannabis ruderalis	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	1	.	.	.	+	.	+	.	+	.	I
e Sisymbrium officinale	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	+	.	.	.	I
e Chenopodium strictum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	I
e Malva neglecta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	I
VI. Ch: a - Artemisietea vulgaris,,b - Onopordion, c - Eu-Arction, d - Alliarion, e - Convolvuletalia sepium, f - Senecion fluviatilis																										
a Tanacetum vulgare	2	1	2	1	r	1	.	2	.	.	+	+	1	+	.	.	.	1	.	.	+	+	.	1	1	IV
a Daucus carota	1	1	1	1	.	+	+	+	+	.	.	+	+	+	+	.	.	.	.	.	.	+	.	+	.	III
a Artemisia vulgaris	r	2	r	1	3	1	+	3	3	1	+	+	+	1	1	1	1	1	2	2	3	1	1	3	3	V
a Urtica dioica	.	.	.	+	.	.	.	.	1	+	.	.	.	.	+	1	1	.	.	.	1	.	+	+	+	II
a Carduus crispus	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	I
b Onopordon acanthium	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
b Echium vulgare	+	+	+	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
b Anchusa officinalis	+	+	.	+	.	+	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	II
b Carduus acanthoides	+	+	+	.	+	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	+	r	II
b Melilotus albus	+	+	+	+	.	+	+	+	+	+	.	.	+	.	.	+	.	+	+	.	+	.	.	+	+	IV
b Berteroa incana	.	.	+	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
b Oenothera biennis	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
c Arctium lappa	2	+	2	+	1	+	+	.	1	+	+	.	.	.	+	2	+	+	+	.	.	.	.	1	+	IV
c Armoracia lapathifolia	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	1	.	+	.	.	.	+	.	.	r	II
c Artemisia annua	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	I
c Arctium tomentosum	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.	1	.	.	I
c Ballota nigra	.	.	.	.	.	.	.	.	1	+	.	.	.	.	+	2	.	+	+	.	.	+	.	.	+	II
c Leonurus cardiaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	I
d Impatiens parviflora	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
f Solidago gigantea	.	.	.	+	.	+	.	+	.	.	.	+	.	.	.	.	r	.	.	.	.	.	.	.	+	II
VII. Ch: a - Agropyretalia intermedi-repentis, b - Festuco-Brometea																										
a Equisetum arvense	.	+	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I
a Tussilago farfara	3	+	r	2	r	1	+	1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	II
a Cirsium arvense	+	+	+	+	+	+	.	1	.	.	.	+	.	.	+	+	+	+	.	+	.	+	.	1	.	IV
a Agropyron repens	2	2	2	2	1	2	1	1	+	+	+	+	1	+	r	+	+	+	+	+	+	+	r	2	1	V
a Poa compressa	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	.	I
a Convolvulus arvensis	.	.	.	.	.	.	.	+	1	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	+	I
VIII. Others species: a - heterogeneous synanthropic, b - thicket, forest, c - mosses																										
a Senecio vulgaris	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
a Erigeron canadensis	+	+	+	+	+	+	+	+	.	.	+	+	+	+	.	.	+	+	.	.	.	+	+	.	.	IV
a Amaranthus retroflexus	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	+	.	.	.	+	1	+	.	+	.	II
a Medicago lupulina	1	+	+	+	.	+	.	+	+	.	.	+	+	.	.	.	.	+	.	.	.	+	.	.	+	III
a Polygonum convolvulus	+	.	.	.	.	.	.	+	+	+	.	+	.	+	.	.	.	.	+	.	.	.	.	+	.	II
a Diplotaxis muralis	.	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	I
a Cichorium intybus	.	.	r	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	r	.	.	.	I
a Helianthus tuberosus	.	.	+	.	+	+	.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.	1	.	.	II
a Sinapis arvensis	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	I
a Thlaspi arvense	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	I
a Linaria vulgaris	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
a Datura stramonium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	I
b Rubus caesius	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	I
b Acer negundo b	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	I

Species occurring in 1 record: I. a - Bidens cernuus 34/+, Chenopodium rubrum 45/+; b - Gypsophila muralis 41/+. II. a - Symphytum officinale 49/+; b - Stachys palustris 38/+; d - Bromus mollis 35/+, Anthriscus silvester 49/+; e - Leontodon autumnalis 55/+; f - Arrhenatherum elatius 57/+, g - Potentilla anserina 49/+. III - Bryum argenteum 41/+. V. a - Solanum nigrum 53/+; c - Digitaria ischaemum 54/+; e - Atriplex tataricum 50/+, Lepidium densiflorum 50/+, e - Hordeum murinum 56/+. VI. b - Reseda lutea 37/+, Verbascum thapsiforme 37/+, Melandrium album 45/+; c - Chelidonium majus 45/+; d - Malachium aquaticum 45/+; e - Calystegia sepium 56/+; f - Saponaria officinalis 51/+. VII. b - Bromus inermis 36/+. VIII. a - Agrostis vulgaris 38/+, Polygonum amphibium var. terrestre 38/+, Puccinellia distans 38/r, Euphorbia esula 41/+, Galium aparine 45/+, Lupinus sp. 45/r, Silene inflata 45/r, Stellaria media 45/+, Atriplex hortense 49/+, Crepis tectorum 51/+, Atriplex hybridum 54/+, Malva alcea 54/+, Lapsana communis 55/+, Trifolium hybridum 55/+, Amaranthus chlorostachys 56/2, Anetum graveolens 56/+; b - Sambucus nigra b 48/2; c - Barbula unguiculata 51/+.

Table 5. Association: 6. *Tanaceto-Artemisietum vulgaris* in facies: 6.1. with *Ballota nigra* and *Agropyron repens*, 6.2. with *Polygonum aviculare* and *Arctium lappa*, 6.3. with *Artemisia vulgaris*, 6.4. with *Carduus crispus* and *Amaranthus chlorostachys*, 6.5. with *Tanacetum vulgare* and *Arctium tomentosum*, 6.6 with *Urtica dioica*

No of community 6.	1.	2.	3.		4.	5.	6.		
No of record	59	60	61	62	63	64	65	66	Frequency
Date	VI, IX 1992	VI, IX 1992	VI, IX 1992	V, VIII 1992	V, VIII 1992	V, VIII 1992	VI, IX 1992	VI, X 1992	
Area of plot in m²	25	45	25	25	30	25	25	25	
Cover the layer in % c	100	100	100	100	100	100	100	100	
Cover the layer in % d	.	5	40	40	20	10	.	.	
Number of species in record	34	31	34	43	42	36	22	31	
I. Ch: Bidentetea tripartiti									
Polygonum nodosum	.	.	.	+	.	.	.	r	2
II. Ch: a - Molinio-Arrhenatheretea, b - Arrhenatheretalia, c - Arrhenatherion elatioris, d - Trifolio fragiferi-Agrostietalia, Agropyro-Rumicion crispi, e - Plantaginetalia majoris, Lolio-Plantaginetum									
a Achillea millefolium	+	r	1	1	+	+	+	1	8
b Taraxacum officinale	+	+	+	+	+	+	+	+	8
b Dactylis glomerata	.	.	+	+	.	.	.	.	2
b Carum carvi	.	.	.	+	+	.	.	.	2
c Pastinaca sativa	.	+	.	+	.	.	.	.	2
d Agrostis alba	+	+	.	.	.	.	.	.	2
d Rumex crispus	+	.	.	.	1	+	.	+	4
d Ranunculus repens	.	.	.	+	.	+	.	.	2
e Lolium perenne	r	+	+	+	+	+	+	+	8
e Plantago major	+	+	+	+	+	+	.	.	6
III. Ch: Polygono-Poëtea annuae									
Lepidium ruderale	1	+	.	.	+	.	.	.	3
Polygonum aviculare	1	4	3	1	+	+	1	1	8
Capsella bursa-pastoris	r	.	.	+	+	+	.	+	5
Poa annua	.	.	.	+	+	+	+	+	5
Bryum caespiticium	.	+	+	1	+	.	.	.	4
Bryum argenteum	.	+	2	2	+	+	.	.	5
Ceratodon purpureus	.	.	.	.	+	+	.	.	2
IV. Ch: Aphanion									
Tripleurospermum inodorum	1	1	+	+	+	+	.	.	6
Aethusa cynapium	.	+	.	+	.	.	.	.	2
V. Ch: a - Chenopodietea, b - Polygono-Chenopodietalia, c - Panico-Setarion, d - Eu-Polygono-Chenopodion, e - Sisymbrietalia, Sisymbrion									
a Atriplex patulum	.	+	+	+	+	+	+	+	7
a Chenopodium album	.	.	.	2	1	2	2	1	5
b Sonchus arvensis	.	.	+	+	+	+	r	+	6
d Galinsoga parviflora	.	.	+	.	+	.	.	.	2
e Lactuca serriola	1	1	.	.	.	.	.	.	2
e Atriplex tataricum	+	.	.	.	+	.	.	.	2
e Sisymbrium officinale	.	+	.	.	+	.	.	.	2
e Atriplex nitens	2	2	.	1	.	.	.	r	4
e Cannabis ruderalis	1	+	.	.	+	.	.	r	4
e Iva xanthiifolia	1	2	1	1	2	2	3	+	8
e Sisymbrium loeselii	+	+	2	r	+	1	2	r	8
e Bunias orientalis	.	.	1	1	.	.	.	.	2
e Cannabis ruderalis	1	+	.	.	+	.	.	r	4
e Iva xanthiifolia	1	2	1	1	2	2	3	+	8
e Sisymbrium loeselii	+	+	2	r	+	1	2	r	8
e Bunias orientalis	.	.	1	1	.	.	.	.	2
VI. Ch: a - Artemisietea vulgaris, b - Onopordetalia acanthii, c - Onopordion, d - Eu-Arction, e - Convolvuletalia sepium, f - Senecion fluviatilis									
a Daucus carota	1	1	+	.	.	.	.	.	3
a Tanacetum vulgare (Ch: ass.)	2	1	1	1	r	4	2	1	8
a Artemisia vulgaris (Ch: ass.)	2	2	5	5	2	2	3	3	8
a Urtica dioica	.	.	.	+	1	1	4	4	5
a Carduus crispus	.	.	.	.	3	1	.	.	2
b Melandrium album	+	.	.	+	.	.	.	.	2
c Carduus acanthoides	1	+	+	.	.	.	.	.	3
c Melilotus albus	.	1	+	.	+	.	.	.	3
d Armoracia lapathifolia	+	.	.	.	r	.	.	.	2
d Arctium lappa	2	3	+	r	2	+	1	2	8
d Ballota nigra	2	.	.	.	1	2	2	1	5
e Calystegia sepium	.	.	.	+	+	.	.	.	2
f Solidago gigantea	.	.	+	r	+	+	+	r	6
VII. Ch: a - Agropyretea intermedi-repentis, b - Festuco-Brometea									
a Agropyron repens	3	1	1	1	1	1	1	2	8
a Cirsium arvense	+	+	+	+	1	1	+	+	8
a Convolvulus arvensis	+	.	.	.	.	.	+	r	3
b Plantago media	.	.	+	+	.	.	.	.	2
VIII. Others species: a - heterogeneous synanthropic, b - thicket, forest, c - mosses									
a Amaranthus retroflexus	+	.	.	.	.	r	.	.	2
a Helianthus tuberosus	1	+	.	.	.	+	.	.	3
a Erigeron canadensis	r	+	+	+	+	+	+	r	8
a Medicago lupulina	.	.	+	.	r	r	.	+	4
a Cichorium intybus	.	.	1	.	.	.	+	r	3
a Lapsana communis	.	.	.	+	r	+	r	+	5
c Funaria hygrometrica	.	.	1	2	.	1	.	+	4

Species occurring in 1 record: II. a - Prunella vulgaris 61/+; b - Chrysanthemum leucanthemum 59/+; c - Arrhenatherum elatius 66/+. V. b - Echinochloa crus-galli 63/+, c - Setaria viridis 63/+; d - Lamium purpureum 66/+; e - Malva neglecta 59/+, Chenopodium strictum 62/r, Hordeum murinum 64/+. VI. c - Berteroa incana 59/+, Echium vulgare 60/+, Melilotus officinalis 61/+, Verbascum thapsiformae 62/+; d - Artemisia annua 60/+, Chelidonium majus 62/+, Arctium tomentosum 64/2. VII. a - Tussilago farfara 59/+, Equisetum arvense 61/+, Poa compressa 61/+; b - Calamagrostis epigeios 62/+, Bromus inermis 63/+. 63/+. VIII. a - Potentilla intermedia 61/r, Puccinellia distans 61/+, Senecio vulgaris 62/+, Spergula arvensis 62/+, Amaranthus chlorostachys 63/2, Galium aparine 64/+, Polygonum amphibium var. terrestre 64/+, b - Acer platanoides b 62/+.

Table 6. Some granulometric and chemical properties of soils in Lublin area among ruderal communities with *Iva xanthiifolia* (Tables 1–5)

Number of profile community records	Depth of horizon in cm	Content of humus in %	pH in H2O/dest.	pH in 1n KCl	Content in mg/l N-NO3	P	K	Ca	Mg	Na	Cl	salinity in g KCl/l	Skeleton parts in %	Earth parts < mm in % 1-0,1	0,1-0,05	0,05-0,02	0,02-0,006	0,006-0,002	< 0,002	Mechanical composition*	Colour of soil**
1	2-10	3,13	7,4	7,8	11,5	75	80	5600	150	25	19,2	0,09	10	45	9	22	15	5	4	Cd	f
1.1.	20-30	2,29	7,4	7,4	11,7	75	35	6600	230	52	19,2	0,18	30	43	7	18	16	6	10	Ce	d
1	50-60	1,50	7,3	7,5	15,8	70	20	5840	180	47	20,4	0,60	20	39	8	22	15	6	10	Cb	d
2	2-10	1,79	7,8	8,3	15,8	80	240	4780	85	26	37,8	0,09	25	75	7	9	5	3	1	Ab	d
2.1.1.	20-30	1,42	7,7	8,3	14,7	85	105	4780	90	29	36,7	0,09	10	75	6	6	8	3	2	Ac	d
5	50-60	1,92	7,7	8,2	15,7	80	80	4600	160	80	35,6	0,12	10	48	7	22	14	5	4	Cd	d
3	2-10	0,79	7,4	7,5	12,9	20	10	6450	115	54	36,3	0,99	5	17	11	36	21	3	12	Bc	b
2.2.1.	20-30	0,75	7,6	7,8	12,8	20	10	6659	125	60	29,2	0,60	5	31	11	31	15	3	9	Bb	b
10	50-60	0,50	8,2	8,7	13,0	30	50	6440	75	29	17,1	0,09	5	31	13	30	17	4	5	Bb	b
4	2-10	2,02	7,6	8,2	13,5	80	110	4600	165	30	23,7	0,09	10	61	8	12	10	4	5	Ad	f
2.2.2.	20-30	2,06	7,6	8,2	12,5	70	50	4780	185	64	23,4	0,09	15	68	7	10	7	3	5	Ac	f
11	50-60	1,42	7,7	8,3	15,6	70	50	5000	95	80	26,4	0,12	20	58	8	14	11	4	5	Ad	c
5	2-10	5,84	7,4	7,8	17,6	20	140	6100	125	28	11,4	0,09	5	76	5	8	7	2	2	Ac	g
2.2.2.	20-30	5,43	7,5	7,5	21,4	30	60	6510	125	52	50,6	0,60	10	76	5	7	8	2	2	Ac	g
12	50-60	1,25	7,8	7,8	31,9	20	20	7020	70	56	92,3	1,20	20	67	8	9	10	2	4	Ad	g
6	2-10	1,42	7,7	7,8	12,9	20	90	5220	140	56	26,7	0,30	5	36	10	31	13	2	8	Bb	b
4.1.	20-30	1,04	7,6	7,8	11,6	20	15	4780	115	50	14,1	0,12	20	32	8	31	19	3	7	Cb	b
24	50-60	0,79	7,7	7,8	13,1	20	40	5300	125	60	21,2	0,33	15	31	8	30	17	5	9	Cb	b
7	2-10	0,71	7,6	8,1	12,5	90	50	4480	230	28	26,7	0,09	5	13	10	42	21	6	8	Bb	a
4.1.	20-30	0,33	7,5	7,9	11,9	80	40	4500	170	26	17,6	0,09	5	11	10	42	19	8	10	Bc	b
28	50-60	0,87	7,4	7,7	11,2	100	40	4200	250	26	12,6	0,09	5	10	7	41	25	5	12	Bc	b
8	2-10	1,23	7,6	8,2	16,3	70	75	4600	110	55	34,5	0,12	5	63	5	12	9	3	8	Ad	c
4.1.	20-30	2,15	7,4	7,9	14,6	45	65	4600	85	190	55,6	0,36	10	40	10	21	15	3	11	Cb	d
29	50-60	1,00	7,4	7,6	14,7	45	70	4780	105	205	275,0	3,60	10	66	5	9	8	3	9	Ad	d
9	2-10	2,08	7,2	7,3	12,9	100	50	2420	35	15	10,3	0,03	5	88	3	4	3	2	0	Aa	f
4.2.	20-30	0,73	7,5	7,7	10,7	80	15	2800	10	10	54,0	0,03	5	92	3	0	3	1	1	Aa	d
32	50-60	0,31	7,6	7,6	9,9	65	10	1700	5	5	11,9	0,03	5	96	1	0	1	2	0	Aa	d
10	2-10	3,80	7,6	7,8	12,1	40	80	6450	90	30	14,1	0,09	20	71	8	8	8	2	3	Ac	g
5.1.	20-30	5,05	7,7	7,8	11,4	50	60	6020	85	52	13,3	0,09	45	71	7	8	8	2	4	Ac	g
34	50-60	4,30	7,5	7,8	12,3	40	55	6450	145	55	16,2	0,12	30	70	7	6	10	3	4	Ad	g
11	2-10	2,29	7,5	7,7	11,9	40	70	6650	150	48	22,3	0,12	5	56	17	12	11	4	10	Ca	d
5.1.	20-30	1,63	7,3	7,5	12,2	50	50	5500	95	47	20,8	0,12	20	38	8	23	16	4	10	Cb	c
37	50-60	0,71	7,5	7,7	12,2	80	35	5700	100	54	24,1	0,12	10	48	8	20	12	2	10	Cd	b
12	2-10	3,00	7,3	7,7	11,0	50	40	5600	170	25	13,5	0,09	5	42	6	22	16	4	10	Cb	d
5.1.	20-30	1,38	7,4	7,8	15,0	80	20	5700	150	26	27,5	0,09	15	29	8	26	17	7	13	Cc	c
39	50-60	1,25	7,4	7,7	11,9	50	50	4610	120	25	22,0	0,30	10	36	7	16	17	7	17	Cf	c
13	2-10	1,38	7,4	7,5	17,5	20	95	4800	125	25	25,1	0,16	5	19	7	42	18	2	12	Bb	b
5.1.	20-30	0,62	7,4	7,7	13,4	20	20	4810	260	28	11,6	0,09	5	11	17	33	21	4	14	Bc	b
40	50-60	1,33	7,5	7,7	13,6	20	20	4920	190	46	16,4	0,09	5	22	14	32	18	3	11	Bb	b
14	2-10	1,83	7,7	7,7	23,5	90	125	6400	115	26	26,1	0,09	5	73	6	10	8	2	1	Ac	d
5.2.	20-30	3,21	7,7	7,8	22,5	70	15	7000	155	42	28,0	0,12	10	62	8	11	12	5	2	Ad	d
42	50-60	3,13	7,7	7,7	33,1	50	20	6930	125	64	40,5	0,33	10	61	8	11	13	4	3	Ad	d
15	2-10	0,46	7,3	7,8	9,9	20	115	4220	130	42	10,0	0,09	10	63	3	11	19	2	2	Ca	d
5.2.	20-30	0,46	7,5	7,8	10,2	20	80	3020	170	56	14,7	0,33	30	56	5	12	13	2	12	Ce	b
51	50-60	4,92	7,7	7,8	15,9	25	240	5300	90	140	46,1	0,39	20	55	9	15	13	4	4	Ca	b
16	2-10	8,87	7,6	7,9	18,8	70	120	4500	250	80	33,2	0,03	5	58	8	11	12	4	7	Ca	g
5.2.	20-30	7,41	7,6	7,8	23,7	85	80	4280	200	115	31,2	0,15	5	57	8	11	13	5	6	Ca	g
56	50-60	8,76	7,6	7,6	18,3	75	105	4380	200	120	62,1	0,30	10	57	8	11	12	6	6	Ca	g
17	2-10	3,63	7,3	8,1	22,5	120	1080	5030	250	26	15,6	0,24	5	63	8	8	7	2	1	Ab	g
5.2.	20-30	1,08	7,5	8,3	18,2	80	660	6000	125	28	13,3	0,12	5	56	5	8	6	2	2	Ab	f
58	50-60	1,17	7,6	7,6	91,1	70	490	7000	110	52	68,5	0,42	10	55	6	9	9	3	4	Ad	g
18	2-10	2,29	7,7	8,3	13,9	90	105	4830	110	50	17,2	0,06	5	81	6	4	5	2	2	Ab	f
6.1.	20-30	0,83	7,7	8,3	24,5	90	110	4750	85	115	27,7	0,09	5	75	7	7	6	3	2	Ac	d
59	50-60	2,19	7,6	8,3	26,6	100	170	4240	100	260	18,8	0,12	10	65	11	11	8	4	1	Ac	f
19	2-10	1,13	7,6	8,2	14,4	90	120	4800	135	30	23,7	0,09	10	71	5	10	7	3	4	Ac	d
6.2.	20-30	0,71	7,7	8,2	13,6	85	100	4800	85	42	21,5	0,06	20	77	3	9	5	3	3	Ac	d
60	50-60	1,83	7,6	8,0	15,2	90	75	4810	100	50	28,9	0,09	50	71	3	9	9	4	4	Ad	f
20	2-10	8,01	7,5	7,7	13,2	40	90	6450	90	28	18,5	0,09	45	70	7	5	9	6	3	Ad	g
6.3.	20-30	5,84	7,5	7,7	12,5	45	115	4600	240	26	13,0	0,09	30	74	6	4	8	4	4	Ad	g
61	50-60	5,43	7,5	7,7	11,6	40	70	5500	270	26	11,4	0,09	20	77	4	3	9	3	4	Ad	g

* Abbreviations for soil texture: A — sand: light-textured (a), medium (b), loamy (c), loamy strong (d); B — silt: ordinary (a), loamy (b), clayey (c); C — loam: sandy (a), light sandy (b), medium sandy (c), sandy-silty (d), light-textured (e), medium (f).

** Soil colours: a — light yellow, b — dark yellow, c — ashen, d — ash grey, e — light grey, f — grey, g — dark grey.

square with a levelled surface with marl, concrete and brick grains. 52. Czy, the sloping rim of Nadbystrzycka st., loess ground with a littered sandy surface with a large number of gravel and stones. 53. Ww, the Bystrzyca valley, between Przeskok and Dzierżawna streets a loamy ruderal square with a surface mixed with gravel, brick, concrete and marl grains. 54. Kk, the Czerniejówka valley, at the intersection of Chłodna and Skośna streets, the loamy rim of a road with a surface mixed with marl, brick and concrete grains. 55. Czw, the loess rim of Al. M. Smorawiński, with a loosened surface mixed with gravel, concrete and brick grains. 56. Kk, on the Czerniejówka stream at the exit of Szańcowa st. next to building wall, a littered loamy square with a loosened surface mixed with marl, concrete, brick and plaster grains. 57. Be, a steep slop of the Bystrzyca river dyke, loamy with an eroded, sandy surface with brick and concrete grains. 58. Ww, the Bystrzyca valley, at the fence, a ruderal loamy square with a sandy surface with brick and concrete grains.

6. *Tanaceto-Artemisietum vulgaris*

(Fig. 1, Tables 5 and 6)

This association is dominated at varying quantitative proportions by several high, perennial or annual plant species, the most frequent being: *Artemisia vulgaris, Arctium lappa, Urtica dioica,* less often *Chenopodium album* and *Iva xanthiifolia.* The plants that occur every time but at low density are: *Achillea millefolium, Lolium perenne, Taraxacum officinale, Erigeron canadensis, Sisymbrium loeselii* and *Cirsium arvense.*

6 facies were distinguished in this association on the basis of the domi-nant plants: with *Ballota nigra* and *Agropyron repens,* with *Polygonum aviculare* and *Arctium lappa,* with *Artemisia vulgaris,* with *Carduus crispus* and *Amaranthus chlorostachys,* with *Tanacetum vulgare* and *Arctium tomentosum* and with *Urtica dioica.*

In the Lublin area this is the rarest ruderal association with *Iva xanthiifolia.* It develops on small expanses of several square meters in area.

In the first 5 facies it occurs in various ruderal sites with surfaces with a quantitative predominance of gravel or concrete and brick grains over weakly humic, sandy loam. In the last facies with *Urtica dioica* it covers highly nitrophilous and humus-rich loamy-rubble areas lying near buildings or on road rims.

Phytosociological records: 59. Hw, Sw part, the flat rim of Turystyczna st., loamy with a littered, sandy surface with concrete, brick and marl grains. 60. MT, on W. Witos Al., ruderal loamy square with a surface with brick, concrete and marl grains. 61. Ww, the edge of the railway station, the beaten, gravel-sandy rim of the railway track. 62. Czy, near Szmaragdowa st., a ruderal loess square with a slightly sandy surface rich in gravel. 63. Kk, on the Czerniejówka stream, the littered road rim with a loamy surface mixed with sand and marl, concrete and brick grains. 64. Kk, at the exit of Szańcowa st., between the road on the Czerniejówka stream and the wall of a building, a ruderal loamy square with a surface mixed with gravel and concrete, brick and marl grains. 65. Ww, the

convex edge of Koło st. rim, loamy with a highly littered and slightly sandy surface. 66. Hw, Sw part, the flat loamy rim of Turystyczna st. with a highly humic and sandy surface rich in gravel.

PHYSICO-CHEMICAL SOIL PROPERTIES

The discussed ruderal communities are characterized with a permanent but highly diversified percentage of *Iva xanthiifolia*; they occur on typically anthropogenic soils tied with the natural loamy or loess subsoil at differing degree. They grow most often on newly-lain heaps 50–60 cm deep, composed of loam, silt and sand formation mixed in various ways with grains of limestone rock, concrete and bricks and with other industrial and municipal wastes. These communities grow less frequently on the natural loess or loamy subsoil with a newly levelled or loosened surface. In the latter case, these are mainly loamy-silty soil formations with a surface highly rich in sand or fine gravel and poor in larger rock grains.

No special distinct correlation was reported between the 6 primary and secondary forms of communities with differing percentages of *Iva xanthiifolia* and the physico-chemical properties of the soils on which they grow (Tables 1–6). These are generally compact and deep soil formations of mesotrophic, mesophilous, neutrophilous and basiphilous types. These soils, on account of their general physical properties are only slightly exposed to the dangers of eluviation or of periodic changes in their moisture or overdessication. On average, this is a subsoil rich in humus and Ca, K, P and Mg compounds, being at the same time fairly poor in Na and Cl compounds and with respect to general salinification with different salts (Table 6). It must also be stressed that these are edaphic grounds, most often with a neutral or alkaline *pH*, less often weakly acid.

As the profile depth increases, the general content of particular compounds either gradually increases (Na, Cl and general salinity) or decreases (P, Mg). Apart from that, the content of other studied compounds stays in the section of the whole soil profile either at more or less similar values (Ca, $N-NO_3$) or at considerably different.

It must be stressed for comparison that in Lublin considerable differences are reported between for example the currently studied soils of *Iva xanthiifolia* communities (Table 6) and earlier described soils in communities with *Puccinellia distans* (34). First of all the soil substratum in communities with *Iva xanthiifolia* is far richer in humus and in easily assimilated compounds than the soil substratum in *Puccinellia distans* communities. The soils in communities with *Iva xanthiifolia* possess considerably higher *pH* values

than it was found in the soils of *Puccinellia distans* communities. In the substratum of communities with *Iva xanthiifolia* there are decidedly fewer Na and Cl compounds and the total of salt compounds than in the substratum of communities with *Puccinellia distans*. Finally, the substratum under *Iva xanthiifolia* communities is more compact and less permeable than the substratum under communities with *Puccinellia distans*.

In Lublin, *Iva xanthiifolia*, just like *Puccinellia distans*, decidedly avoids habitats that are overshadowed or highly moistened or overdessicated for a long time.

SUCCESSION AND PHYTOSOCIOLOGICAL STRUCTURE OF COMMUNITIES WITH *IVA XANTHIIFOLIA*

The reported differences between the original and current state of occurrence of *Iva xanthiifolia* in ruderal plant communities in Lublin point to a strictly defined direction of regression and expansion of stations of this plant in the expanses of the local ruderal vegetation.

Over the last 50 years the occurrence of *Iva xanthiifolia* in Lublin has comprised 12 associations and 2 debatable communities ranking as associations and 4 subassociations of ruderal plants belonging to 5 classes, 5 orders and 6 association alliances.

It turned out that the occurrence of the plant was not confirmed again in the expanses of 8 phytocenoses published earlier by Fijałkowski (6): the *Lolio-Plantaginetum typicum* subassociation, in the associations of *Chenopodietum glauco-rubri, Corispermo-Brometum tectorum, Sisymbrietum sophiae, Centaureo-Berteroëtum, Onopordetum acanthii* and *Potentillo-Artemisietum absinthii* and in the community with *Cannabis ruderalis*.

In Lublin *Iva xanthiifolia* occurs currently in 4 associations and 3 subassociations and in its one basic plant community belonging to 4 classes, 4 orders and 5 alliances of associations.

In the earlier-published expanses of phytocenoses with *Iva xanthiifolia*, this still occurs only in 2 subassociations: *Lolio-Plantaginetum puccinellietosum* and *Polygono-Matricarietum discoideae puccinellietosum* (36), then in 1 association: *Erigeronto-Lactucetum* and in 1 most characteristic community or debatable association: *Ivetum xanthiifoliae*, where it is the main dominant plant (6, 7). However, phytocenoses were also described for the first time, characterized with a constant but quantitively different presence of *Iva xanthiifolia*, such as: *Polygono-Matricarietum discoideae typicum, Atriplicetum nitentis, Chenopodietum ruderale* and *Tanaceto-Artemisietum vulgaris*.

It must be emphasized that in Lublin *Iva xanthiifolia* grows most commonly in 2 associations only: *Atriplicetum nitentis* and *Chenopodietum ruderale* and in 1 community composed mainly of that plant. In other local phytocenoses, as in the case of 3 subassociations (*Lolio-Plantaginetum typicum, Lolio-Plantaginetum puccinellietosum* and *Polygono-Matricarietum discoideae puccinellietosum*) and 2 associations (*Erigeronto-Lactucetum* and *Tanaceto-Artemisietum*), *Iva xanthiifolia* occurs sporadically and probably only temporarily. It may also be of interest that the *Atriplicetum nitentis* association has not been described so far in the Lublin area (6).

All currently known local phytocenoses characterized with the presence of *Iva xanthiifolia* exhibit highly differentiation connections regarding the quantitative and species composition of plants (Tables 1–5). On the whole these phytocenoses have a rich and in fairly homogenous composition of plant species. They are composed of 154 species of vascular plants and of 5 bryophyte species. The most common plants found in the discussed phytocenoses are (Tables 1–5): of *Molinio-Arrhenatheretea* class together with *Plantaginetalia majoris*, order — *Achillea millefolium, Taraxacum officinale, Lolium perenne* and *Plantago major*, of *Polygono-Poëtea annuae* class — *Polygonum aviculare* and *Bryum caespiticium*, of *Secalietea* class — *Tripleurosperum inodorum*, of *Chenopodietea* class — apart from *Iva xanthiifolia* also *Chenopodium album, Atriplex patulum, A. nitens* and *Sisymbrium loeselii*, of *Artemisietea vulgaris* class — *Tanacetum vulgare, Artemisia vulgaris, Arctium lappa* and *Melilotus albus;* of *Agropyretea intermedi-repentis* class — *Agropyron repens, Cirsium arvense*, and of other synantropic plants — *Daucus carota, Erigeron canadensis, Medicago lupulina, Amaranthus retroflexus* and *Cirsium lanceolatum.*

The described primary and secondary forms of phytocenoses with *Iva xanthiifolia* were distinguished on the basis of particular, decidedly dominant plant species that are at the same time recognized as characteristic or differentiating species for the distinguished basic phytosociological units. With the 6 phytocenoses under discussion (Tables 1–5) these are mainly such characteristic dominants as: in *Lolio-Plantaginetum* and *Polygono-Matricarietum discoideae* associations — *Plantago major* and *Polygonum aviculare*, in *Atriplicetum nitentis* association — *Atriplex nitens*, in *Erigeronto-Lactucetum* association — *Lacuta serriola*, in *Chenopodietum ruderale* association — *Chenopodium album*, in *Tanaceto-Artemisietum vulgaris* association — *Artemisia vulgaris* and *Tanacetum vulgaris*, and in the community with *Iva xanthiifolia* — only this plant species.

Among the seven earlier (6, 36) and currently described (Tables 1–5) basic phytosociological units with a permanent presence of *Iva xanthiifolia*,

worth noting are 19 secondary community forms that were distinguished on the basis of similar groups of dominant plant species recognized at the same time as diagnostic species for highly different basic ruderal phytocenoses. This primarily concerns the following dominants: *Plantago major, Polygonum aviculare, Chenopodium album, Iva xanthiifolia, Atriplex nitens, Lactuca serriola, Artemisia vulgaris, Arctium lappa* and *Urtica dioica.* Thus, similar dominant groups of plant species in separate basic ruderal phytocenoses with *Iva xanthiifolia* indicate both a high internal dynamics of these communities and various successive connections obtaining between these ruderal phytocenoses.

It turns out that *Iva xanthiifolia* did not grow in the past or does not grow currently in 12 other early known local ruderal associations (6, 7, 36). This applies primarily to 2 specific forms of ruderal communities found either in particular habitats, e.g. highly moist and nitrophilous or characterized with dense and perennial vegetation and the substratum with a very hard surface. Examples of the former are: *Polygono-Bidentetum, Potentilletum anserinae* and *Urtico-Malvetum neglectae,* and of the latter: *Leonuro-Arctietum tomentosi, Helianthetum tuberosi, Hordeo-Brometum* and *Anthrisco-Lycietum halimifolii.*

Special attention is due to phytocenoses characterized with a massive presence of *Iva xanthiifolia.* These ruderal communities, described successively at home and abroad, are most often counted as a separate *Ivetum xanthiifoliae* association (4, 6, 7, 14, 24, 32), less often as a phytosociologically indeterminate association composed mainly of *Iva xanthiifolia* (10, 13, 19, 38). According to Krippelowa (20), the community with a massive presence of *Iva xanthiifolia* in the Koszycka Kotlina in Slovakia forms only a separate facies with this plant in the *Atriplicetum tataricae* association. In Poland, debatable phytocenoses with *Iva xanthiifolia* of that type are known primarily from the Lublin (6, 7, 24) and Łódź (32) macro-regions and from the Warsaw area (15, 33). Outside Poland, ruderal communities related to the debatable association with *Iva xanthiifolia* are reported mainly from very few stations, primarily from Hungary and Slovakia (4, 10, 13, 19, 20, 38 and *op. cit.*). It turns out that the *Ivetum xanthiifoliae* association first distinguished by Fijałkowski (6) and then described by him (7) and by other botanists (4, 14, 15, 24, 33) does not deserve to be classified as a sufficiently differentiated association. This is a classic form of a derivative community (18), as has already been pointed out by Sudnik-Wójcikowska (33). The association in question would actually be characterized only with a massive presence of *Iva xanthiifolia.* This plant cannot be practically recognized as a characteristic species of the *Ivetum xanthiifoliae* association

because it has a very wide ecological and phytosociological amplitude. It should also be noted that the plant in question is found in different classes of permanence and quantity in a dozen-odd separate associations belonging to all basic classes, orders and association alliances of ruderal vegetation. Moreover, *Iva xanthiifolia* occurs in various ruderal phytocenoses far more frequently as an ephemerophyte than as epecophyte. In the studied area a very similar ecological and phytosociological amplitude like *Iva xanthiifolia* was also reported with such species as *Cannabis ruderalis* and *Atriplex nitens*.

The expanses of *Ivetum xanthiifoliae* association or a community with a massive presence of *Iva xanthiifolia*, described so far are most often assigned to the *Eu-Arction* alliance of *Artemisietea vulgaris* class (6, 7, 15, 24, 32) or less frequently to the *Sisymbrion* alliance of *Chenopodietea* class (4, 14), or to an entirely intermediate community of *Sisymbrion* and *Eu-Arction* alliances of *Chenopodietea* and *Artemisietea vulgaris* classes (10, 19, 33). A more precise phytosociological analysis of all so far known stations of communities with a massive presence of *Iva xanthiifolia* indicates that phytocenoses of that type should be most often assigned only to the *Sisymbrion* alliance of *Chenopodietea* class. At the same time *Iva xanthiifolia* should be recognized as one of the main species characteristic of the *Sisymbrion* alliance. In Lublin the distinguished phytocenosis with a massive occurrence of *Iva xanthiifolia* may as well be regarded either as secondary successive forms of *Chenopodietum ruderale* or *Atriplicetum nitentis* associations, or as an entirely separate community but of ephemeral type.

REFERENCES

1. Chałubińska A., Wilgat T.: Podział fizjograficzny województwa lubelskiego. Przew. V Zjazdu Pol. Tow. Geogr. Lublin 1954.
2. Czerwiakowski J.R., Warszewicz J. [ed.]: Catalogus plantarum quae in C. R. Horto Botanico Cracoviensi anno 1864 ab erecta C. R. Universitatae Studionem Jagiellonica quinquentessimo. Typis Univ. Jagiell. Cracoviae 1864, s. XV, 470.
3. Czuba R. [red.]: Metody badań laboratoryjnych w Stacjach Chemiczno-Rolniczych. Część I. Badania gleb. Wrocław 1969.
4. Eliaś P.: *Sambucetum ebuli* a ine ruderalne spolećenstva v meste Trnave. Preślia **50** (3), 225–252 (1978).
5. Fijałkowski D.: Wykaz rzadszych roślin Lubelszczyzny. Część 6. Fragm. Flor. et Geobot. **9** (2), 219–237 (1963).
6. Fijałkowski D.: Zbiorowiska roślin synantropijnych Lublina. Ann. Univ. Mariae Curie-Skłodowska, sectio C **22**, 195–233 (1967).
7. Fijałkowski D.: Synantropy roślinne Lubelszczyzny. PWN, Warszawa–Łódź 1978.

8. Froebe H. A., Oesan A.: Zur Soziologie und Propagation von *Iva xanthiifolia* und Stadtgebiet von Mainz Decheniana. **122**, 147–157 (1969).
9. Голицин С. В.: *Iva xanthiifolia* Nutt. и её ареал в СССР. Сов. Бот. **15** (2), 94–95 (1947).
10. Grüll F.: Výskyt a charakteristica rostlinného společenstva s *Iva xanthiifolia* v Brně. Zpr. Čs. Bot. Společ. **18**, 141–144 (1983).
11. Guzik J., Sudnik-Wójcikowska B.: Badania nad zasięgami roślin synantropijnych. 6. *Iva xanthiifolia* Nutt. w Polsce. Fragm. Flor. et Geobot. **34** (3–4), 255–276 (1989).
12. Gudzhinskas Z.: The immigration and distribution of *Iva xanthiifolia* Nutt. in Lithuania. Thaiszia **1**, 43–48 (1991).
13. Hejný S.: *Iva xanthiifolia* Nutt. v ČSR. Prispevek k studiu karanténich pleveli. Acta Facult. Rerum Natur. Univ. Comenianae Bot. **2** (7–9), 323–342 (1958).
14. Hejný S., Kopecký K., Jehlik V., Krippelova T.: Přehled ruderalnich rostlinnych společenstev Československa. Rozpravy ČSAV. **89**, 3–100 (1979).
15. Janecki J.: Człowiek a roślinność synantropijna miasta na przykładzie Warszawy. Rozpr. Nauk. Monogr. Wyd. SGGW-AR, Warszawa 1983.
16. Karczmarz K., Kuc M.: Nowe stanowiska *Iva xanthiifolia* Nutt. (*Cyclachaena xanthiifolia* Fresen) w Polsce. Ann. Univ. Mariae Curie-Skłodowska, sectio C **12**, 25–31 (1957).
17. Karczmarz K., Krzaczek T.: Nowe stanowiska rzadszych roślin na Lubelszczyźnie. Fragm. Flor. et Geobot. **6** (3), 245–251 (1960).
18. Kopecký K., Hejný S.: Die Anwendung einer deduktiven Methode syntaxonomischer Klassifikation bei der Bearbeitung der strassenbegleitenden Pflanzengesellschaften Nordostböhmens. Vegetatio **36**, 43–51 (1978).
19. Krippelova T.: Verbreitung der *Iva xanthiifolia* Nutt. und ihr Vorkommen in den Pflanzengesellschaften in der ČSSR. Biológia **24** (10), 738–759 (1969).
20. Krippelová T.: Synanthrophe Vegetation des Beckens Košická kotlina. Vegetácia ČSSR, B4. Veda, vyd. Slov. akad. vied. Bratislava 1981.
21. Kukier U.: Stan zanieczyszczenia metalami ciężkimi wierzchniej warstwy gleb Lublina. Ann. Univ. Mariae Curie-Skłodowska, sectio B **40**, 219–228 (1985).
22. Kuc M.: *Iva xanthiifolia* Nutt. (*Cyclachaena* Fresen, *Denira* Adams., *Euphrosyne* Gray.) — w południowej Polsce. Kosmos, seria A **4** (15), 617–619 (1955).
23. Lublin, plan miasta. PPWK, Warszawa–Wrocław 1986, 1992.
24. Łuczycka-Popiel A.: Roślinność synantropijna Lubartowa. Ann. Univ. Mariae Curie-Skłodowska, sectio C **48** 179–196 (1993).
25. Matuszkiewicz W.: Przewodnik do oznaczania zbiorowisk roślinnych Polski. PWN, Warszawa 1981.
26. Meyer K.: Über den gegenwärtigen Stand der Bahnhofsfloristik in Schlesien. 2. Die Breslauer Güterbanhöfe im Jahre 1931. Jahresber. Schles. Gesell. Vaterl. Cultur. **104** (1931), 85–91 (1992).
27. Oberdorfer E..: Süddeutsche Pflanzengesellschaften. III. Pflanzensoziologie **10**, 1–455 (1983).
28. Ochyra R., Szmajda P.: An Annotated List of Polish Mosses. Fragm. Flor. et Geobot. **24** (1), 93–145 (1978).

29. Pawłowski B.: Skład i budowa zbiorowisk roślinnych oraz metody ich badania. [in:] Szata roślinna Polski, pod red. Szafera W. i Zarzyckiego K. PWN, **1**, Warszawa 1972, 237–269.

30. Rivas-Martinez S.: Sobre la nueva clase *Polygono-Poëtea annuae*. Phytocoenologia **2** (1–2), 123–140 (1975).

31. Scoggan H. J.: The flora of Canada. 4. National Museum of Natural Sciences Nat. Mus. of Canada, Publ. in Botany, Ottawa **7** (4), 1117–1711 (1979).

32. Sowa R.: Flora i roślinne zbiorowiska ruderalne na obszarze województwa łódzkiego ze szczególnym uwzględnieniem miast i miasteczek. Uniwersytet Łódzki, Łódź 1971.

33. Sudnik-Wójcikowska B.: *Iva xanthiifolia* Nutt. and its communities within Warsaw. Acta Soc. Bot. Pol. **56** (1), 155–167 (1978).

34. Szafer W., Kulczyński S., Pawłowski B.: Rośliny polskie. PWN, Warszawa 1976.

35. Щербина А. Ф.: К экологии *Iva xanthiifolia* Nutt. по наблюдениям в окрестностях Воронежа. Бот. Журн. **34** (1), 76–84 (1949).

36. Święs F.: Expansion of *Puccinellia distans* (L.) Parl. in the Area of Lublin. Ann. Univ. Mariae Curie-Skłodowska, sectio C **47**, 147–167 (1992).

37. Tacik T.: *Iva L.* [in:] Flora polska. Pod red. B. Pawłowskiego i A. Jasiewicza. PAN, Inst. Bot. **12**, Warszawa–Kraków (1971), 216–217.

38. Trepó-Pomogyi M.: Az *Iva xanthiifolia* Nutt. Közép-Európai megtelepedeśe és elterjedeśe. Bot. Közlem. **62**, 19–23 (1975).

39. Turski R., Flis-Bujak M., Misztal M.: Wpływ środków stosowanych do usuwania śliskości pośniegowej jezdni na gleby zieleńca Lublina. Ann. Univ. Mariae Curie-Skłodowska, sectio E **27**, 89–105 (1973).

40. Turski R., Wójcikowska-Kapusta A.: Ocena zanieczyszczenia środowiska w Lublinie na przykładzie zawartości Pb, Cu, Zu, B, Ni, Cr i V w glebach i roślinach. Ann. Univ. Mariae Curie-Skłodowska, sectio E **35**, **36**, 261–268 (1980, 1981).

41. Tüxen R.: Zur Syntaxonomiae des europäischen Wirtschafts-Grünlandes (Wiesen, Weiden, Triff- und Flutrasen). Bev. Naturhist. Ges. **114**, 77–84 (1970).

42. Zinkiewicz W., Warakomski W.: Zarys klimatu Lublina. Ann. Univ. Mariae Curie-Skłodowska, sectio B **14**, 47–131 (1959).

STRESZCZENIE

Na terenie miasta Lublina opracowano rozmieszczenie *Iva xanthiifolia* oraz stosunki fitosocjologiczne i ekologiczne zbiorowisk roślin z różnorodnym ilościowym jej udziałem. Zwrócono uwagę na główne przyczyny miejscowego zanikania i rozprzestrzeniania stanowisk tej rośliny.

Iva xanthiifolia jest rośliną rodzimą w północno-zachodniej części Stanów Zjednoczonych. W wyniku przypadkowego zawleczenia rozprzestrzenia się na siedliskach ruderalnych na znacznych obszarach Ameryki Północnej, Europy i północno-zachodniej Azji. Na kontynencie europejskim po raz pierwszy opisano jej występowanie w latach 1858–1935 jako rośliny hodowanej w ogrodach botanicznych lub z przypadkowego zawleczenia występującej na siedliskach ruderalnych. Podobnie rozprzestrzenia się w Polsce, a pierwsze wzmianki o występowaniu jej w kraju pochodzą z lat 1842, 1913 i 1935.

Na terenie miasta Lublina *Iva xanthiifolia* pojawiła się prawdopodobnie pod koniec II wojny światowej. Przede wszystkim sprzyja jej rozwojowi dość suchy i ciepły klimat. *Iva xanthiifolia* początkowo rosła na tym terenie nielicznie i to głównie w rejonie torowisk kolejowych. Obecnie występuje na terenie miasta w 19 rejonach z jednostkowymi i grupowymi stanowiskami, w tym w 4 rejonach wcześniej znanych i 15 innych dopiero obecnie odkrytych (ryc. 1). Okazuje się, że po Warszawie jest to największe w skali krajowej zgrupowanie stanowisk *Iva xanthiifolia*. Lokalnie omawiana roślina występuje najczęściej na świeżych zwałach gliniasto-gruzowiskowych albo na naturalnym podłożu lessowym lub gliniastym o świeżo zruszanej nawierzchni. Najczęściej są to siedliska typu mezotroficznego, mezofilnego, bazyfilnego lub neutrofilnego (tab. 6). Nadto *Iva xanthiifolia* na terenie Lublina, podobnie jak i w innych okolicach Polski, zdecydowanie unika siedlisk ocienionych lub trwale czy okresowo bardzo uwilgotnionych, albo przesuszonych.

Interesujący jest stwierdzony zanik tej rośliny na 6 stanowiskach wcześniej opisanych, w pobliżu aktualnych miejsc jej występowania (ryc. 1). Zasadnicze przyczyny zanikania stanowisk z *Iva xanthiifolia* to sukcesywna zabudowa i porządkowanie miejsc ruderalnych oraz przypadkowe lub celowe mechaniczne niszczenie jej okazów. Nadto roślina ta w większości miejscowych zbiorowisk ruderalnych nie wytrzymuje konkurencji innych roślin, bardziej ekspansywnych i trwałych.

W przeciągu 50 lat obecność gatunku *Iva xanthiifolia* na terenie miasta Lublina stwierdzono w 16 podstawowych fitocenozach ruderalnych. Aktualnie występuje ona najpospoliciej tylko w 3 fitocenozach: *Atriplicetum nitentis, Chenopodietum ruderale* oraz w bliżej nie określonym zbiorowisku, w którym jest głównym dominantem (tab. 2–4). *Iva xanthiifolia* w płatach innych 5 fitocenoz, jak *Lolio-Plantaginetum puccinellietosum, Polygono-Matricarietum discoideae puccinellietosum, P.-M. d. "typicum", Erigeronto-Lactucetum* i *Tanaceto-Artemisietum vulgaris* występuje sporadycznie i prawdopodobnie tylko przejściowo (tab. 1, 5). Zatem wyżej wymienione 2 grupy fitocenoz odnoszą się do 5 zespołów i do 1 podstawowego zbiorowiska z *Iva xanthiifolia* z wydzielonymi 3 podzespołami, 6 wariantami, 12 facjami i 16 podrzędnymi postaciami zbiorowisk (tab. 1–5). Podstawowe i podrzędne postacie zbiorowisk z *Iva xanthiifolia* wyodrębniono na podstawie dominujących gatunków roślin, uznawanych najczęściej za gatunki charakterystyczne lub wyróżniające dla podstawowych i podrzędnych postaci zbiorowisk ruderalnych (tab. 1–5).

Obecnie na terenie Lublina nie potwierdzono występowania gatunku *Iva xanthiifolia* w płatach wcześniej opisanych 8 fitocenoz ruderalnych z różnym ilościowym udziałem wymienionej rośliny: *Chenopodietum glauco-rubri, Lolio-Plantaginetum, Corispermo-Brometum tectorum, Sisymbrietum sophiae, Centaureo-Berteroëtum, Potentillio-Artemisietum absinthii, Onopordetum acanthii* i do zbiorowiska z *Cannabis ruderalis*.

Okazuje się, że *Iva xanthiifolia* w innych, wcześniej opisanych, miejscowych 12 fitocenozach ruderalnych nie występowała ani w przeszłości, ani nie rośnie w nich obecnie. W tej sytuacji dotyczy to przede wszystkim specyficznych 2 grup zbiorowisk roślin ruderalnych występujących albo na siedliskach szczególnych, głównie silnie uwilgotnionych lub nitrofilnych, albo też cechujących się tylko bardzo zwartą i trwałą roślinnością występującą na podłożu o silnie utrwalonej nawierzchni. Przykładem ich są w pierwszym przypadku — *Polygono-Bidentetum, Potentilletum anserinae* i *Urtico-Malvetum neglectae*, w drugim zaś — *Leonuro-Arctietum tomentosi, Helianthetum tuberosi, Hordeetum murini* i *Anthrisco-Lycietum halimifolii*.

Pod względem syntaksonomicznym na szczególną uwagę zasługuje zbiorowisko z gromadnym udziałem *Iva xanthiifolia*, zaliczane do zespołu *Ivetum xanthiifoliae* lub jako bliżej nie określone zbiorowisko z dominującą *Iva xanthiifolia*. Na podstawie rozpatrywanego

materiału zdjęć fitosocjologicznych (tab. 4) stwierdzono, że zbiorowisko to nie zasługuje na rangę odrębnego zespołu. Przede wszystkim omawiane zbiorowisko nie posiada dostatecznie swoistej tzw. charakterystycznej kombinacji gatunków ani też nie wyróżnia się jakimkolwiek "dobrym" gatunkiem charakterystycznym. Wprawdzie w tym dyskusyjnym zbiorowisku wyjątkowo dużą rolę odgrywa *Iva xanthiifolia* (tab. 4), to jednak gatunek ten ze względu na swą bardzo szeroką amplitudę fitosocjologiczną (tab. 1–3, 5) nie może być uznany za charakterystyczny dla ewentualnego zespołu *Ivetum xanthiifoliae*. Nadto należy podkreślić, że *Iva xanthiifolia* jest stosunkowo łatwo wypierana ze zbiorowisk ruderalnych przez inne bardziej trwałe i ekspansywne rośliny. Przy okazji charakterystyki fitosocjologicznej miejscowych zbiorowisk ruderalnych z *Iva xanthiifolia* (tab. 1–5) zwrócono również uwagę, że *Iva xanthiifolia* powinna być uznawana za roślinę charakterystyczną raczej dla związku *Sisymbrion* z klasy *Chenopodietea* niż dla związku *Eu-Arction* z klasy *Artemisietea vulgaris*.

Na badanym terenie bardzo podobną skalę wierności fitosocjologicznej, jak *Iva xanthiifolia*, wykazuje *Cannabis ruderalis* i *Atriplex nitens*.

Wśród obecnie scharakteryzowanych zbiorowisk ruderalnych na uwagę zasługuje również zespół *Atriplicetum nitentis* (tab. 2). Nie był on wcześniej opisany wśród dokładnie zbadanej roślinności ruderalnej na terenie miasta Lublina (6). Obecnie należy on do najpospolitszych miejscowych fitocenoz ruderalnych (ryc. 1, tab. 2). Należy podkreślić również, że *Iva xantiifolia* na terenie Lublina sukcesywnie rozprzestrzenia się tylko w obrębie dwóch typów antropogenicznych siedlisk i zbiorowisk roślin: ruderalnych — pospolicie, a nawet segetalnych — sporadycznie, co jest bardzo interesujące (tab. 3, zdj. 32 i 33).

Fig. 2. Lublin. Wrotków, between Diamentowa st. and Nałkowskich st. *Iva xanthiifolia* succession on loes scarp
Photo by F. Święs

Fig. 3. Lublin, Czuby, Nadbystrzycka st. at the intersection with Diamentowa st., a trampled expanse of *Iva xanthifolia* on the pavement

Photo by F. Święs

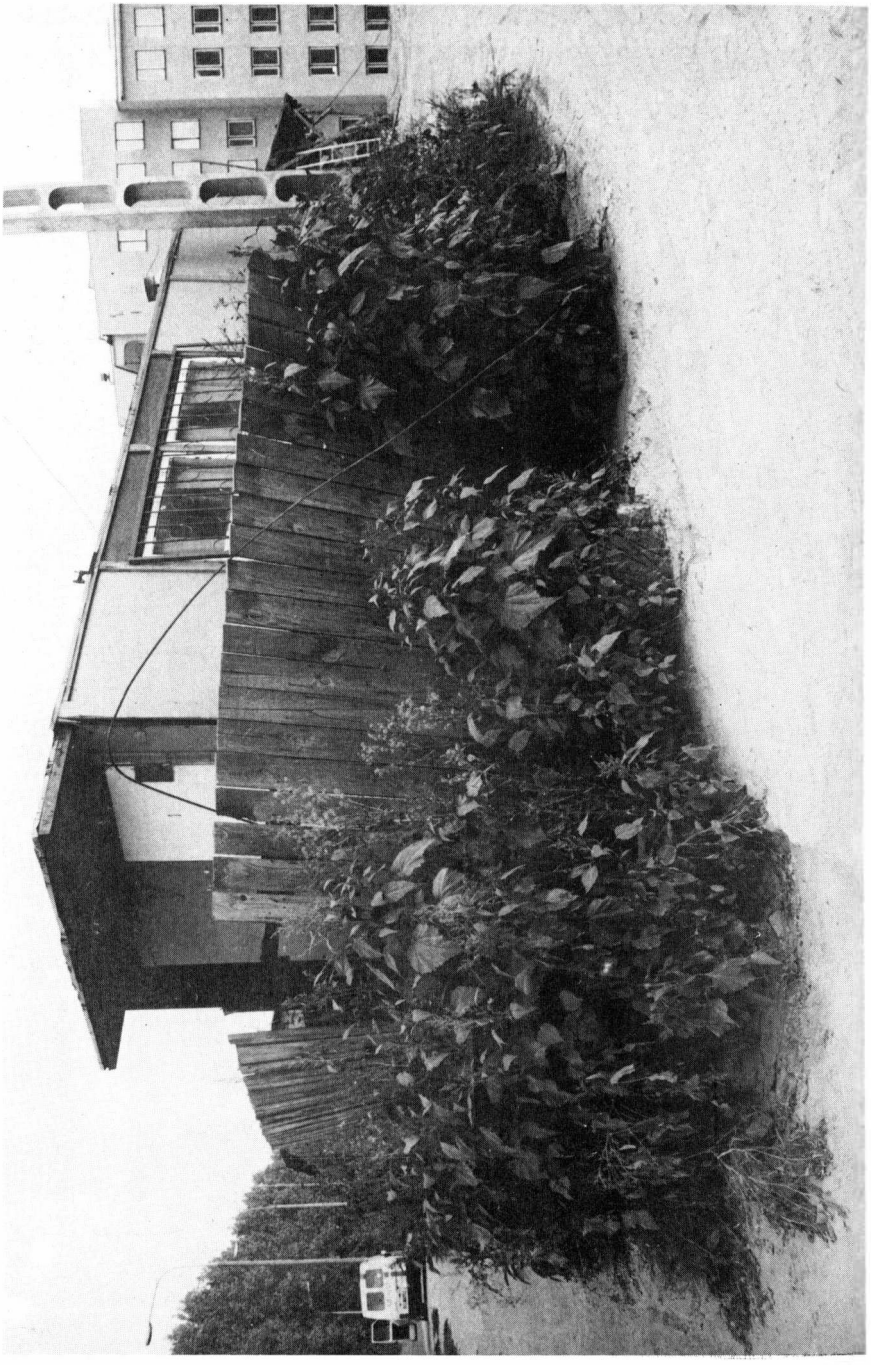

Fig. 4. Lublin, Wrotków, in Diamentowa st., the remainder of *Iva xanthiifolia* tufts on the edge of a building site
Photo by F. Święs

Fig. 5. Lublin, Wrotków, in M. Smoluchowskiego st., communities with *Iva xanthiifolia* in the form with *Polygonum aviculare* and *Tussilago farfara* on the edge of a loamy-rubble square

Photo by F. Święs

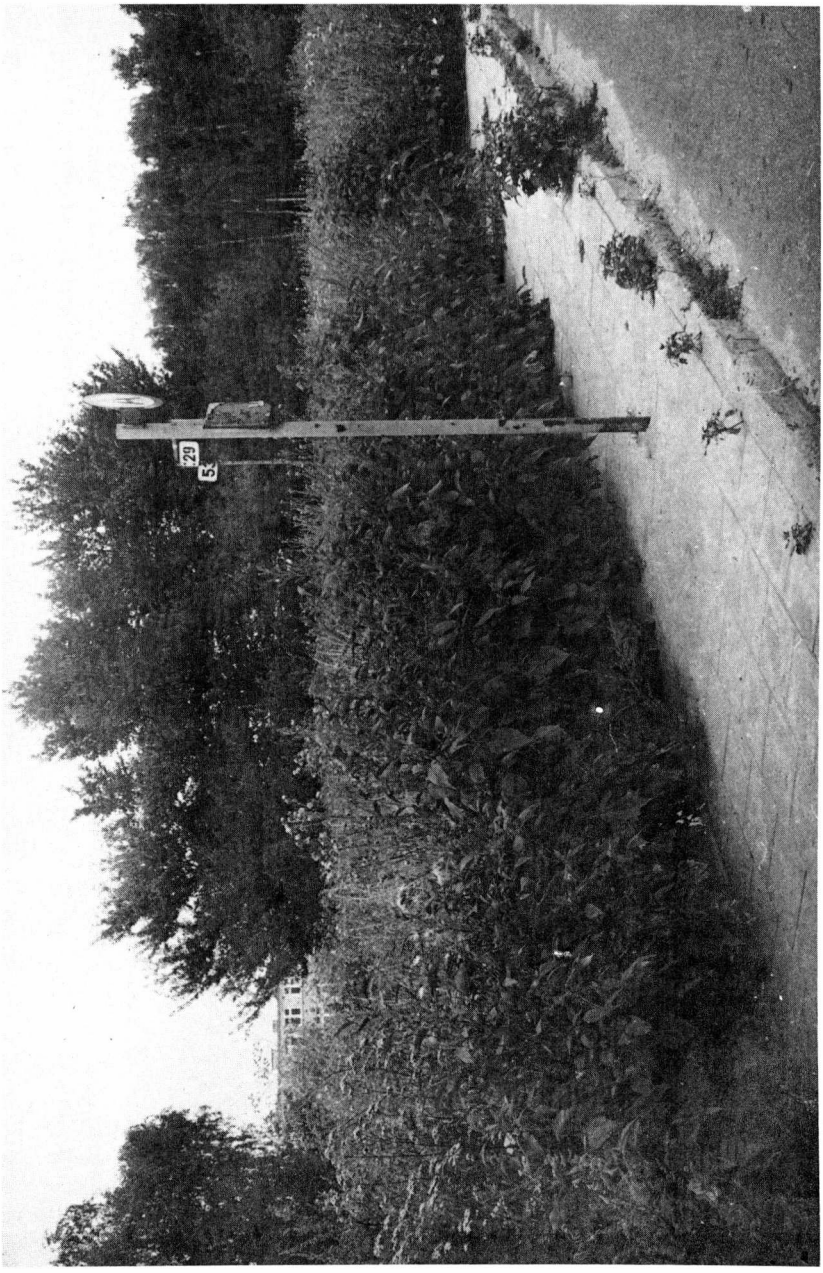

Fig. 6. Lublin, Wrotków, in L. Kruczkowskiego st., a community with *Iva xanthiifolia* in the form with *Polygonum aviculare* on the edge of a levelled loamy-rubble square. Moreover, visible tufts of this plant in pavement fissures
Photo by F. Święs

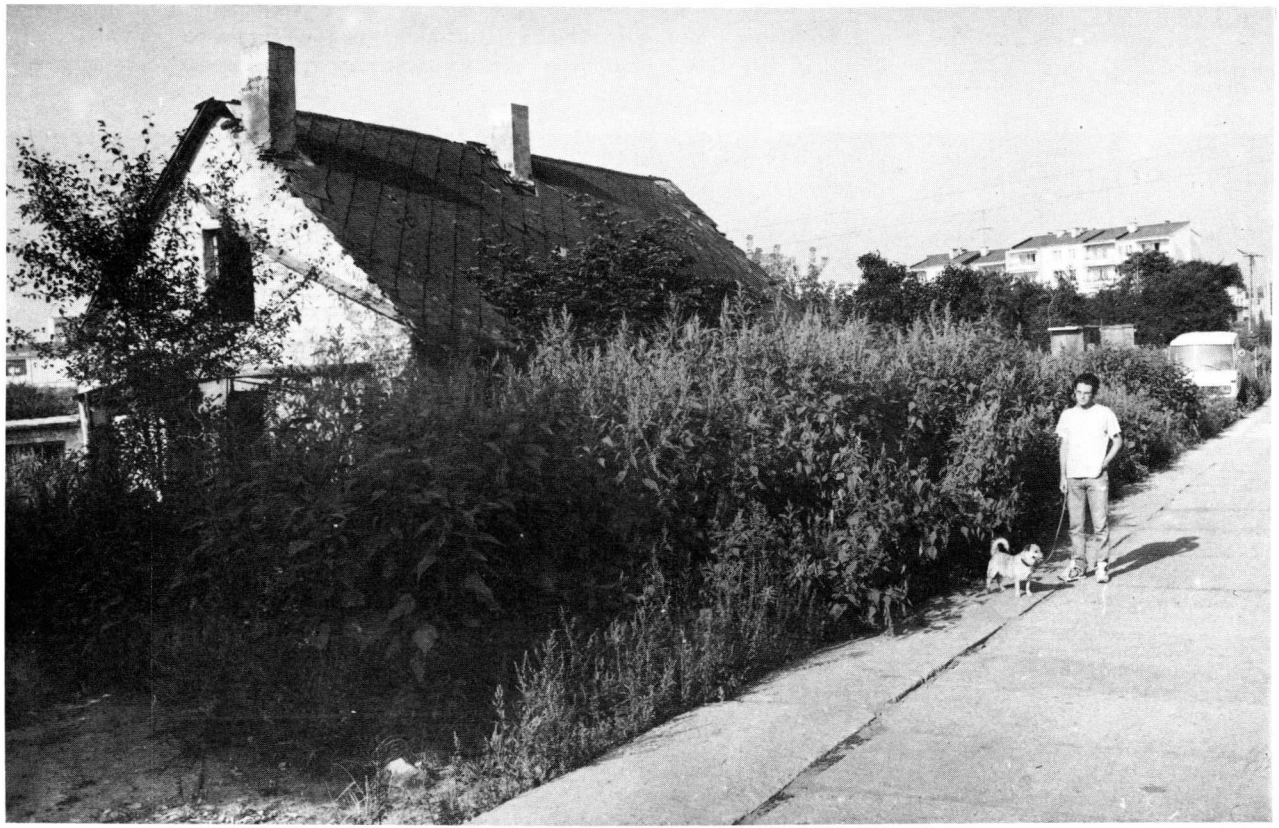

Fig. 7. Lublin, LSM, at the exit of Nowomiejska st., a community with *Iva xanthiifolia* in the typical form on the ruderal, rubble-loess rim of a deserted building. The station with the most exuberant specimens of *Iva xanthiifolia* up to 3.30 m high

Photo by F. Święs