



## LICHENS OF CIECHANOWIEC AND ITS ENVIRONS (EASTERN POLAND)

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**ABSTRACT.** A paper presents a list of 114 species found in Ciechanowiec and its environs. Of these, 22 species are considered to be threatened in Poland. The lichens occur on all substrate types: soil surface, decaying wood (natural and antropogenic), bark of all trees and shrubs species, boulders, concrete, brickwork and mortar, bryophytes and other substrate – agricultural machinery and ceramics. Valuable components of the lichen biota belong mostly to the group of threatened species not only on the regional, but also on the national scale. There are: *Aspicilia gibbosa*, *Bryoria crispa*, *Buellia alboatra*, *Cladonia macroceras*, *Melanohalea exasperata*, *Pleurosticta acetabulum*, *Ramalina fastigiata* and others.

**KEY WORDS:** lichens, floristics, distribution, Ciechanowiec, Eastern Poland

## INTRODUCTION

The lichen biota of Ciechanowiec has not been studied yet. Several lichen species from the Ciechanowiec cemetery have been reported by CIEŚLIŃSKI (2003 a). Investigations on lichens in Poland have been carried out in a large number of big and small towns, frequently of a health-resort character, situated in the lowlands as well as the mountains. On the territory of Poland lichen biota has been compiled for big cities, such as Lublin (RYDZAK 1953), Radom (CIEŚLIŃSKI 1974), Warszawa (ZIMNY and KUCIŃSKA 1974), Kielce (TOBOROWICZ 1976), Kraków (KISZKA 1977), Gdańsk, Sopot, Gdynia (FAŁTYNOWICZ et AL. 1991), Rzeszów (PUSTELNIAK 1991), Przemyśl (KISZKA 1999) Olsztyn (KUBIAK 2001), Białystok (MATWIEJUK 2007). However, data concerning small towns populated by up to a few thousand inhabitants are not numerous, e.g. for Muszyna, Wisła (RYDZAK 1956 a), Wołczyn (RYDZAK 1956 b), Białowieża (RYDZAK 1957), Duszniki Zdrój, Polanica Zdrój (RYDZAK 1959), Limanowa (JAGIEŁŁO 1983), Drezdenko (LIPNICKI 1984).

The aim of the study was to present flora documentation illustrating biodiversity of lichen biota in the area of Ciechanowiec and its surroundings, taking into consideration the habitat conditions of species.

The investigations in the area of Ciechanowiec and its surroundings were carried out in the years 2003-2004, on 47 research stands (Fig. 1, 2). The alphabetical list of lichen species has been compiled. For each taxon we have specified the type of substratum it can be found on and the numbers of stands. Several lichen species from the Ciechanowiec cemetery (stand 26) have been reported by CIEŚLIŃSKI (2003 a). The species confirmed by our own studies on that stand have been marked (and CIEŚLIŃSKI 2003 a). The species which have not

been identified in the course of our own studies have been marked CIEŚLIŃSKI (2003 a). The species have been named according to FAŁTYNOWICZ (2003), genera *Bryoria* and *Usnea* according to BYSTREK (1986, 1994) and genus *Melanelia* according to BLANCO et AL. (2004).

The lichen material has been deposited at the Herbarium of the Institute of Biology, University of Białystok.

## STUDY AREA

Ciechanowiec is a town situated in the Podlaskie Province, the Wysokomazowieckie county, with the population of 5000 inhabitants. It is one of the oldest towns of Podlasie. It is located on the Mazowiecko-Podlaska Lowland (Nizina Mazowiecko-Podlaska) which constitutes eastern part of the Great Valleys Zone (Pas Wielkich Dolin), bordering on the Siedlecka Upland (Wysoczyzna Siedlecka) in the south and on the Bielska Upland (Wysoczyzna Bielska) in the east, which forms the watershed of the Narew and Bug rivers (KONDRACKI 1994). The Nurzec river flows through the town, constituting the right tributary of the Bug. Clay-sandy soil, mainly boulder clay prevails here. The adjacent forests are gathered in small communities and comprise approximately 18% of the total area of arable land. These are the remnants of the Biała Primeval Forest (Puszcza Biała), having previously stretched in this area, comprising together with the Zielona Primeval Forest (Puszcza Zielona) a huge Kurpiowska Primeval Forest (Puszcza Kurpiowska) complex. In the vicinity of Ciechanowiec pine woodlands are prevalent.

Within the town and county protected objects of considerable natural values can be found, including the Protected Landscape Areas of the Bug and Nurzec

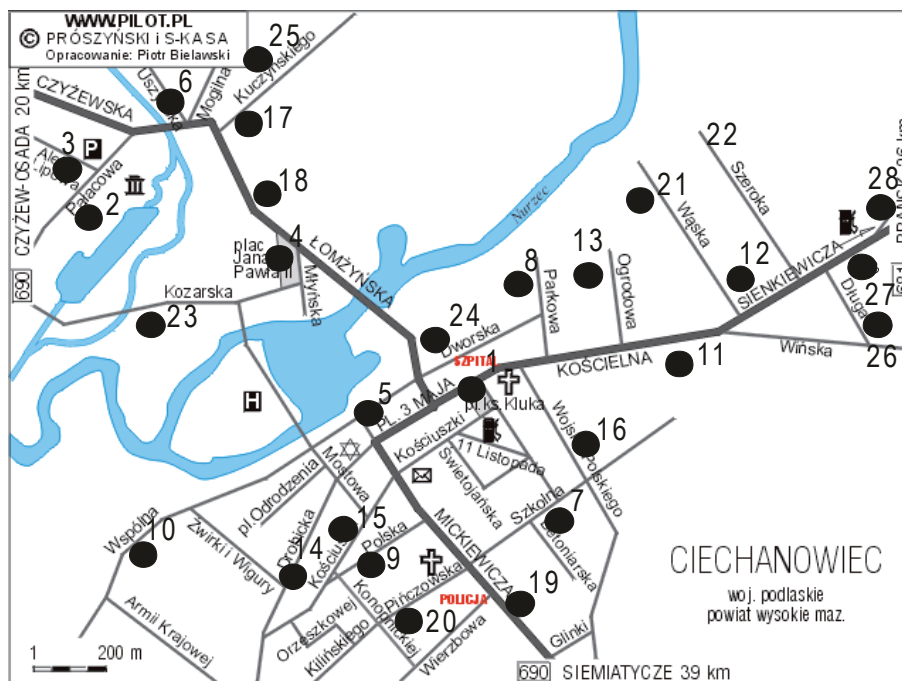


FIG. 1. Distribution of stands in Ciechanowiec



FIG. 2. Distribution of stands in environ of Ciechanowiec

Valleys (Obszar Chronionego Krajobrazu Dolina Bugu i Nurca), nature monuments (about 40). The buildings of cultural interest in Ciechanowiec include: the parish church complex (first half of 18th century), the monastery complex (18th century), the synagogue (first half of 19th century), the Orthodox church (second half of 19th century), as well as the palace-park complex (second half of 19th century) – the seat of the Rev. Krzysztof Kluk Agricultural Museum (Muzeum Rolnictwa im. Krzysztofa Kluka) (USZYŃSKI 1996, GÓRSKI et AL. 2006).

It is assumed that Ciechanowiec was founded in the 10th century. Urban privileges were granted to Ciechanowiec in the year of 1429. In 1592 Ciechanowiec was transferred to the ownership of the nobles Radziwiłł. The river Nurzec crosses Ciechanowiec and divides it into two parts. Ciechanowiec has experienced many turns of fate. By the end of the 16th century, the town was also divided administratively and each part became a separate administrative body. The part to the right of the river was called Nowe Miasto (the new city) and the left part was called Stare Miasto (the old city). The separation between the two parts of the town was kept until World War I. Ciechanowiec became famous for its botanical garden founded in the place, by the nature researcher Krzysztof Kluk. During the first partition of Poland, in the year 1772, the “old city” was included into Russia and the “new city” was transferred to the government of Prussia (WIŚNIEWSKI 1964). In the 19th century, the “old city” played an important economical role. The economy of the “new city” was based mostly on agricultural products and only by the second half of the 19th century, industry plants were erected there as well, a flourmill, potash incinerator, beer brewery, soap workshop and other workshops. During World War I, under the government of the Germans, the two parts of the city were united (TOMASZEWSKI 1995). During World War II nearly 70 percent of the town was destroyed and half of its population was killed.

In our times, Ciechanowiec is not a big urbanized area. The residential buildings in the town are low, surrounded by a large number of greenery. There are no high-tension wires or railway running through the town. It also lacks big industrial plants. The roads within Ciechanowiec and its surroundings are of local character.

## RESULTS

In Ciechanowiec and its surroundings we have reported 114 species and a few taxa of lower rank from 47 genera. The most abundant numbers of species represented here are those of genera *Cladonia* (21), *Lecanora* (14), *Physcia* and *Ramalina* (5 each).

Within the administrative boundaries of the town lichen biota is represented by 92 species, and by 83 species in the vicinity of Ciechanowiec.

Lichens colonize all the possible substrata – the bark of deciduous and coniferous trees and shrubs, decaying wood in the forest, timber structures, bryophytes, soil, erratic boulders, stones, concrete, mortar, bricks, asbestic tiles, ceramics, metal constructions and devices, and animal bones.

Lichens are represented by all morphological forms. In the biota of the investigated area, the most dominant lichens are the ones which form different types of crustose thalli. They make up 43% of the overall number of the species. They can be found in shaded and moist places. Amongst the crustose lichens there is a significant number of pioneer species colonizing anthropogenic rock substrata, smooth tree bark and freshly-exposed soil. The second largest group consists of fruticose lichens (30%). In this group terricolous cup-mosses prevail. As a rule, lichens with foliose thalli require a higher light exposure, for that reason they mainly occupy exposed areas. They comprise a less numerous group with 23% of the total biota. The participation of lichens from other morphological groups is insignificant and amounts to around 4%.

The bark of trees (14 species) and shrubs (three species) is a substratum for numerous lichens. Of all the 114 lichen species registered in the investigated area, 55 colonized tree bark, including 17 obligatory epiphytes. In Ciechanowiec and its surroundings roadside trees dominate together with slowly growing trees in the farmland landscape. The richest lichen biota has been found on the bark of deciduous trees. The lichen biota of coniferous trees and shrubs – *Pinus sylvestris* (14 species), *P. nigra* (2), *Larix decidua* (11) and *Juniperus communis* (1) – is comparatively poor and shows little diversity. The epiphytic biota of the linden tree is of great interest. A high concentration of that tree species can be found within the boundaries of the Palace Park at the Rev. Krzysztof Kluk Agricultural Museum (Park Pałacowy przy Muzeum Rolnictwa im. Krzysztofa Kluka). Rare taxa have been found on the trees there, e.g. *Bryoria crispa*, *Parmelina tiliacea*, *Ramalina farinacea*, *R. motykana* and *R. pollinaria*.

Nitrophilous macrolichens of genus *Physcia* (*P. adscendens*, *P. dubia*, *P. stellaris*, *P. tenella*), *Physconia* (*P. enteroxantha*, *P. perisidiosa*), *Ramalina* (*R. farinacea*, *R. fastigiata*, *R. fraxinea*) and *Xanthoria* (*X. candelaria*, *X. parietina*, *X. polycarpa*) exhibit a high distribution frequency in lichen biota on most roadside trees. Worth mentioning here are a rare species of *Bryoria crispa* (stand 2), *Parmelina tiliacea* (stands 2, 29, 30, 39), *Physconia perisidiosa* (stand 2), *Pleurosticta acetabulum* (stands 2, 26), *Ramalina fastigiata* (stand 28) and *Strangospora ochrophora* (stand 43).

They comprise the second largest habitat group – 50 species, of which nine are exclusive epixyloous lichens. In Ciechanowiec and in the built-up area lichens are mainly bound up with man-made wooden structures (fences, poles, crosses and farm buildings). They become colonized by numerous species (46). *Hypogymnia physodes*, *Lecanora conizaeoides*, *L. varia*, *Parmelia sulcata*, *Phaeophyscia orbicularis* and *Xanthoria parietina* are the most common. Among them, lichens preferably populating rock substratum have been observed: *Caloplaca decipiens*, *C. holocarpa*, *Candelariella vitellina*, *Lecanora umbrina*, *Physcia caesia* and *Protoparmeliopsis muralis*. *Imshaugia aleurites*, *Micarea denigrata*, *Parmeliopsis ambigua*, *Placynthiella icmalea* and *Thelocarpon laureri* has been found on wooden structures exclusively.



Rotten wood of natural source in the adjacent forests is a substratum colonized by few lichens (13 species). These are mainly species of genus *Cladonia*.

Epilythich lichens are represented by 41 species. They grow on substrata of natural and anthropogenic origin. Erratic boulders and stones can be found both in open farmland landscape and within the town and built-up areas (matzevas, walls, underpinnings and gravestones). The obligatory species here are, e.g. *Buellia alboatra*, *Neofuscelia loxodes*, *N. pulla*, *Physcia dubia* var. *teretiuscula*.

Rich lichen biota has also been found on artificial substrata which exhibit properties resembling those of rocks, such as concrete, mortar and bricks. They have been populated by calciphilous species and those tolerating the presence of calcium carbonate, e.g. *Caloplaca citrina*, *C. decipiens*, *C. saxicola*, *Lecanora albescens*, *L. dispersa* and *Xanthoria parietina*. They have been accompanied by numerous nitrophilous species of family *Physciaceae*.

The secondary rock substratum has also been colonized by lichens which show preference for tree bark, e.g. *Evernia prunastri*, *Hypocenomyce scalaris*, *Hypogymnia physodes*, *Melanohalea exasperatula*, *Parmelia sulcata*.

22 species of four genera grow on soil. Cup-mosses dominate markedly (*Cladonia* – 17 species). Species such as *Cladonia arbuscula*, *C. portentosa* and *C. rangiferina* (under partial protection) form large patches of 50 cm in diameter. The exclusive terricolous lichens comprise 18 species. The terricolous lichens in the investigated area can be found outside urban settlements, in parts of pine forests, wasteland and road sides.

Four lichen species have been noted on the layer of moss growing on the cemetery stone wall. The obligatory epibryophytes among them are: *Lepraria lobificans* and *Mycobilimbia tetramera*.

In the area under study we have observed the tendency of common species (*Caloplaca holocarpa*, *Lecanora dispersa*, *Melanohalea exasperatula*, *Phaeophyscia orbicularis*, *Physcia adscendens*, *P. caesia*, *P. dubia*, *Physconia enteroxantha*, *Protoparmeliopsis muralis* and *Xanthoria parietina*) to occupy unusual substrata, such as chemically preserved metal devices and constructions, asbestic tiles, ceramics and animal bones.

#### Participation of vulnerable and protected lichens

Of the 114 lichen species identified in Ciechanowiec and its environs, 22 species have been put on the Red List of extinct and vulnerable lichens of Poland (CIEŚLIŃSKI ET AL. 2003), including one species in the category of critically endangered – CR (*Melanohalea exasperata*), six species in the endangered category – EN (*Aspicilia gibbosa*, *Bryoria crispa*, *Physconia perisidiosa*, *Pleurosticta acetabulum*, *Ramalina fastigiata*, *R. fraxinea*), nine species in the vulnerable category – VU (*Buellia alboatra*, *Cetraria chlorophylla*, *C. islandica*, *Cladonia macroceras*, *Parmelina tiliacea*, *Ramalina farinacea*, *R. pollinaria*, *Strangospora ochrophora*, *Usnea hirta*), five species in the category of near threatened – NT (*Cetraria ericetorum*, *Evernia prunastri*, *Hypogymnia tubulosa*, *Neofuscelia pulla*, *Vulpicida pinastri*) and one species in the category of data deficient – DD (*Ramalina motykana*), as well as 10 species on the Red List of lichens vulnerable in north-east

Poland (CIEŚLIŃSKI 2003 a), including two species in the category of critically endangered – CR (*Buellia alboatra*, *Strangospora ochrophora*), one – EN (*Melanohalea exasperata*), one – VU (*Cetraria ericetorum*), one – NT (*Cladonia portentosa*) and five – DD (*Cladonia polydactyla*, *C. ramulosa*, *C. rei*, *Physcia dubia* var. *teretiuscula*, *Ramalina motykana*).

The level of threat for lichens in north-east Poland, compared to other regions in lowland Poland is lower, which is reflected in a small number of vulnerable lichens in Ciechanowiec placed on the local Red List (CIEŚLIŃSKI 2003 b) compared to the national Red List (CIEŚLIŃSKI ET AL. 2003).

The species of the category EN and VU on the national List are not placed as endangered or vulnerable on the local Red List. However, two vulnerable species (*Buellia alboatra* and *Strangospora ochrophora*) – VU according to the national List have been recorded as critically endangered – CR in north-east Poland (CIEŚLIŃSKI 2003 b).

Of all the 114 lichen species of Ciechanowiec and its surroundings, 26 have been put under legal protection, 19 of which are totally and seven of which are partially protected. *Usnea hirta* is a species which requires a protection zone to be established within a 50-metre radius from the stand border.

#### Index of stands

##### Ciechanowiec

1. Plac ks. Krzysztofa Kluka – roadside trees, concrete posts, brickwork bases, mortar and wooden fences;
2. Park Pałacowy near Muzeum Rolnictwa im. ks. Krzysztofa Kluka – trees, gravestones, boulders, brick wall and mortar, agricultural machinery, ceramics, wooden fences and soil;
3. Pałacowa – roadside trees, concrete posts, brickwork bases, mortar and asbestic tile;
4. Plac Jana Pawła II – roadside trees, concrete posts, brickwork bases and mortar;
5. Plac 3 Maja – roadside trees, concrete posts, brickwork bases, mortar and asbestic tile;
6. Uszyńska – roadside trees, concrete posts and asbestic tile;
7. Szkolna – roadside trees, concrete posts, brickwork bases, mortar and asbestic tile;
8. Parkowa – roadside trees, concrete posts, brickwork bases, mortar and wooden fences;
9. Polska – roadside trees, concrete posts, brickwork bases, mortar and asbestic tile;
10. Wspólna – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile and wooden fences;
11. Kościelna – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile and wooden fences;
12. Henryka Sienkiewicza – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile;
13. Ogrodowa – roadside trees, concrete posts and wooden fences;
14. Drohicka – roadside trees, concrete posts, brickwork bases, mortar, gates made of wrought iron;
15. Tadeusza Kościuszki – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile;
16. Wojska Polskiego – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile;

17. Kuczyńska – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile and wooden fences;
18. Łomżyńska – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile;
19. Adama Mickiewicza – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile and wooden fences;
20. Pińczowska – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile and wooden fences;
21. Wąska – roadside trees, concrete posts, brickwork bases, mortar, boulders, asbestic tile and wooden fences;
22. Szeroka – roadside trees and shrubs, concrete posts, brickwork bases, mortar, asbestic tile and wooden fences;
23. Kozarska – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile, gates of wrought iron;
24. Dworska – roadside trees, concrete posts, brickwork bases, mortar, asbestic tile, gates of wrought iron;
25. Housing estate between Uszyńska and Kuczyńska;
26. Cmentarz Miejski – trees, stone wall, concrete posts, gravestones, wood, bryophytes and soil;
27. Young trees near Cmentarz Miejski – soil;
28. Road Ciechanowiec–Białystok, bus stop, 0.2 km from Cmentarz Miejski – roadside trees and soil;
- Environs of Ciechanowiec**
29. Cross-road: Antonin–Brańsk (environs of Bujenka) – Winna – free-standing trees, wooden constructions, boulders, foundations of old house and well;
30. Cross-road: Ciechanowiec–Kosiorki–Tworkowice – roadside trees;
31. Dąbczyn, forest 0.1 km on W from village – roadside trees, pine wood, soil and decaying wood;
32. Dąbczyn, forest 0.1 km on SE from crossroad: Dąbczyn–Ciechanowiec–Tworkowice – forest and wooden barn;
33. Tworkowice, 0.1 km on W from village – forest and soil;
34. Cross-road: Dąbczyn–Ciechanowiec–Tworkowice – forest and soil;
35. Forest “Choinki”, 1.2 km on SE from Ciechanowiec – pine forest, decaying wood and soil;
36. Dąbczyn, forest from 2 km on S from Ciechanowiec – pine forest, decaying wood and soil;
37. Cross-road: Tworkowice–Dąbczyn, “Droga Młynowa” – roadside trees and decaying wood;
38. Cross-road: Ciechanowiec–Kosiorki–Pszybyszyn – roadside trees;
39. Zadobrze, 1 km from village on NE near river Nurzec – trees and soil;
40. Mixed forest, 0.2 km from cross-road: Ciechanowiec–Małkinia–Czyżew;
41. Nowodwory, 2 km on NW from Ciechanowiec – roadside trees and decaying wood;
42. Kuczyn, “Kapliczka”, 0.1 km on SW near village – roadside trees;
43. Road Kuczyn–Gródek, 0.1 km on N from Kuczyn – roadside trees;
44. Road to “Kolonja Zadobrze”, forest before Antonin, 0.3 km NE from road Ciechanowiec–Bujenka – forest, decaying wood and soil;
45. Environs of Zadobrze – wooden constructions, concrete posts and walls;
46. Road Ciechanowiec–Siemiatycze, 0.2 km on SE from Ciechanowiec – roadside trees and forest;
47. Pine forest “Księżowizna”, 1 km on SW from Ciechanowiec – forest, decaying wood and bones of animal.
- Species index*
- Acarospora fuscata* (Nyl.) Arnold – brickwork base and mortar  
Stand: 29
- Amandinea punctata* (Hoffm.) Coppins & Scheid. – bark of trees and wooden construction  
Stands: 1, 2, 3, 4, 10, 11, 12, 13, 14, 17, 19, 20, 22, 23, 24, 26, 28, 29, 30, 33, 38, 42, 45, 47
- Aspicilia cinerea* (L.) Körb. – stone wall  
Stand: 26 (and CIEŚLIŃSKI 2003 a)
- Aspicilia gibbosa* (Ach.) Körb. – CIEŚLIŃSKI (2003 a)
- Buellia alboatra* (Hoffm.) Th. Fr. – stone wall  
Stand: 26 (and CIEŚLIŃSKI 2003 a)
- Buellia griseovirens* (Turner & Borrer ex. Sm.) Almb. – wooden constructions  
Stand: 2
- Bryoria crispa* (Mot.) Bystr. – bark of *Tilia cordata*  
Stand: 2
- Caloplaca citrina* (Hoffm.) Th. Fr. – brickwork base, stone wall, boulder, gravestones, mortar, bricks and concrete posts  
Stands: 1, 2, 3, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29, 32, 45
- Caloplaca decipiens* (Arnold) Blomb. & Forss. – concrete posts, mortar, bricks, brickwork bases, boulders and wooden constructions  
Stands: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29
- Caloplaca holocarpa* (Hoffm.) A.E. Wade – bark of *Populus nigra*, *Aesculus hippocastanum*, wooden constructions, concrete posts, mortar, brickwork bases, gravestones, boulder and ceramics  
Stands: 2, 3, 4, 6, 11, 14, 16, 17, 18, 19, 20, 22, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 38, 45
- Caloplaca saxicola* (Hoffm.) Nordin – concrete posts, mortar, bricks, brickwork bases, gravestones, stone wall and boulder  
Stands: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 45
- Candelaria concolor* (Dicks.) Stein – bark of trees, wooden constructions, stone matzeva and concrete post  
Stands: 1, 2, 3, 5, 11, 12, 13, 17, 19, 20, 22, 26, 28, 29, 30
- Candelariella aurella* (Hoffm.) Zahlbr. – boulders, stone matzeva, stone brickwork bases, wall, mortar and concrete posts  
Stands: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29, 30, 32, 45
- Candelariella vitellina* (Hoffm.) Müll. Arg. – stone matzeva, stone wall, boulder, gravestones and wooden constructions  
Stands: 2, 10, 11, 13, 17, 21, 26 (and CIEŚLIŃSKI 2003 a), 29, 32
- Candelariella xanthostigma* (Ach.) Lettau – bark of trees and wooden constructions

- Stands: 2, 4, 5, 10, 12, 13, 14, 17, 19, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 46  
*Cetraria aculeata* (Schreb.) Ach. – soil  
 Stands: 27, 31, 47  
*Cetraria chlorophylla* (Willd.) Vain. – bark of *Quercus robur* and *Acer platanoides*  
 Stands: 26, 28  
*Cetraria ericetorum* Opiz – soil  
 Stand: 31  
*Cetraria islandica* (L.) Ach. – soil  
 Stands: 2, 31, 33, 34, 35, 36, 44, 47  
*Cladonia arbuscula* (Wallr.) Flot. em. Ruoss subsp. *mitis* (Sandst.) Ruoss – soil  
 Stands: 31, 33, 47  
*Cladonia arbuscula* (Wallr.) Flot. em. Ruoss subsp. *squarrosa* (Wallr.) Ruoss – soil  
 Stands: 31, 35, 44  
*Cladonia cervicornis* (Ach.) Flot. subsp. *verticillata* (Hoffm.) Ahti – soil  
 Stand: 31  
*Cladonia chlorophaea* (Flörke ex Sommerf.) Spreng. – soil and bryophytes growing on boulder  
 Stands: 26, 27, 31, 33, 34, 39, 47  
*Cladonia coniocraea* auct. – bark of *Tilia cordata*, decaying wood and wooden barn  
 Stands: 16, 31, 32, 33, 36, 47,  
*Cladonia cornuta* (L.) Hoffm. – soil  
 Stands: 27, 31, 33, 47  
*Cladonia fimbriata* (L.) Fr. – bark of *Tilia cordata*, *Salix alba*, *Robinia pseudacacia* and wooden fence  
 Stands: 2, 3, 11, 23  
*Cladonia furcata* (Huds.) Schrad. – soil  
 Stands: 27, 31, 33, 34, 35, 36, 47  
*Cladonia glauca* Flörke – soil  
 Stands: 31, 36, 47  
*Cladonia macilenta* Hoffm. – decaying wood and wooden constructions  
 Stands: 32, 33, 35, 47  
*Cladonia macilenta* Hoffm. subsp. *floerkeana* (Fr.) – bark of *Betula pendula*, *Pinus sylvestris*, soil and decaying wood  
 Stands: 31, 33, 34, 35  
*Cladonia macilenta* Hoffm. subsp. *macilenta* – bark of *Betula pendula*, decaying wood and soil  
 Stands: 31, 33, 34, 41  
*Cladonia macroceras* (Delise) Ahti – soil  
 Stand: 44  
*Cladonia ochrochlora* Flörke – decaying wood  
 Stand: 35  
*Cladonia phyllophora* Hoffm. – soil  
 Stands: 27, 31, 33, 35, 47  
*Cladonia polydactyla* (Flörke) Spreng. – soil  
 Stand: 31  
*Cladonia portentosa* (Dufour) Coem. – soil  
 Stands: 34, 47  
*Cladonia pyxidata* (L.) Hoffm. – bark of *Tilia cordata*, decaying wood, wooden constructions and soil  
 Stands: 11, 31, 32, 33, 35, 36, 37, 47  
*Cladonia ramulosa* (With.) J.R. Laundon – soil  
 Stand: 39  
*Cladonia rangiferina* (L.) Weber in F.H. Wigg. – soil  
 Stands: 31, 33, 47  
*Cladonia rangiformis* Hoffm. – soil  
 Stand: 31  
*Cladonia rei* Schaer. – bark of *Betula pendula*, soil, wooden constructions, decaying wood, concrete posts and boulder  
 Stands: 13, 18, 19, 20, 21, 22, 23, 24, 27, 29, 30, 31, 32, 33, 37, 39, 41, 44, 45, 47  
*Cladonia subulata* (L.) Weber in F.H. Wigg. – decaying wood and soil  
 Stands: 27, 31, 33, 35, 47  
*Cladonia uncialis* (L.) F.H. Wigg. – soil  
 Stands: 31, 33, 47  
*Evernia prunastri* (L.) Ach. – bark of trees, wooden constructions, decaying wood and stone matzeva  
 Stands: 2, 3, 11, 12, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 33, 39, 40, 41, 45, 47  
*Hypocenomyce scalaris* (Ach.) Choisy – bark of trees, wooden constructions, decaying wood and boulder  
 Stands: 1, 2, 8, 13, 22, 26, 29, 31, 32, 33, 37, 41, 44, 47  
*Hypogymnia physodes* (L.) Nyl. – bark of trees, wooden constructions, decaying wood, boulders, stone matzevas, stone brickwork bases, mortar, concrete post and gates of wrought iron  
 Stands: 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 16, 17, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 32, 33, 35, 36, 37, 39, 40, 45, 47  
*Hypogymnia tubulosa* (Schaer.) Hav. – bark of trees and wooden fences  
 Stands: 2, 5, 12, 19, 30, 33  
*Imshaugia aleurites* (Ach.) S.L.F. Meyer – wooden constructions  
 Stand: 2  
*Lecanora albescens* (Hoffm.) Flörke – walls, concrete posts and boulders  
 Stands: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29, 32, 45, 47  
*Lecanora allophana* (Ach.) Nyl. – bark of *Populus nigra* and *Sorbus aucuparia*  
 Stands: 23, 30  
*Lecanora carpinea* (L.) Vain. – bark of trees  
 Stands: 2, 5, 11, 15, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 46  
*Lecanora conizaeoides* Nyl. in Cromb. – bark of trees, wooden constructions and decaying wood  
 Stands: 2, 13, 14, 22, 24, 26, 28, 29, 31, 32, 45, 47  
*Lecanora dispersa* (Pers.) Sommerf. – walls, brickwork bases, concrete posts, boulders and ceramics  
 Stands: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 23, 26 (and CIEŚLIŃSKI 2003 a)  
*Lecanora expallens* Ach. – bark of *Populus nigra*, *Fraxinus excelsior*, *Alnus glutinosa*, *Salix alba*, *Pinus sylvestris* and wooden constructions  
 Stands: 11, 29, 30, 31, 42, 43, 46,  
*Lecanora hagenii* (Ach.) Ach. – bark of *Populus tremula*, *Betula pendula*, stone brickwork bases, mortar, boulder and wooden construction  
 Stands: 26 (and CIEŚLIŃSKI 2003 a), 29, 31  
*Lecanora polytropa* (Ehrh. ex Hoffm.) Rabenh. – boulders, stone matzevas, stone brickwork bases, mortar and concrete posts  
 Stands: 2, 3, 11, 14, 17, 20, 24, 29, 30, 31, 32  
*Lecanora pulicaris* (Pers.) Ach. – bark of trees and wooden constructions



- Stands: 2, 5, 8, 11, 14, 19, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29, 30, 31, 33, 34  
*Lecanora rupicola* (L.) Zahlbr. – stone wall  
 Stand: 26 (and CIEŚLIŃSKI 2003 a)  
*Lecanora saligna* (Shrad.) Zahlbr. – CIEŚLIŃSKI (2003 a)  
*Lecanora saligna* (Shrad.) Zahlbr. var. *sarcopis* (Ach.) Hillmann – decaying wood  
 Stand: 44  
*Lecanora symmicta* (Ach.) Ach. – bark of *Salix alba* and concrete post  
 Stands: 11, 26 (and CIEŚLIŃSKI 2003 a), 29  
*Lecanora umbrina* (Ach.) A. Massal. – concrete post, mortar, stone wall and wooden constructions  
 Stands: 3, 4, 29, 45  
*Lecanora varia* (Hoffm.) Ach. – bark of *Betula pendula*, *Sorbus aucuparia*, *Pinus sylvestris*, *Populus tremula*, *Tilia cordata*, *Ulmus laevis* and wooden constructions  
 Stands: 2, 3, 10, 11, 13, 14, 15, 26 (and CIEŚLIŃSKI 2003 a), 29, 31, 32, 33, 39, 41, 45  
*Lecidella carpathica* (Fr.) Körb. – CIEŚLIŃSKI (2003 a)  
*Lecidella elaeochroma* (Ach.) Choisy – bark of trees and wooden fence  
 Stands: 1, 2, 3, 4, 8, 11, 14, 20, 22, 29, 30, 31, 38  
*Lecidella stigmatea* (Ach.) Hertel & Leuckert – stone matzeva, stone brickwork bases, mortar, gravestones, boulder and concrete posts  
 Stands: 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 32, 45  
*Lepraria incana* (L.) Ach. – bark of *Alnus glutinosa*, *Pinus sylvestris*, *Betula pendula* and bryophytes growing on stone wall  
 Stands: 26, 29, 31  
*Lepraria lobificans* Nyl. – bryophytes growing on stone wall  
 Stand: 26  
*Melanohalea exasperata* (De Not.) O. Blanco et al. – CIEŚLIŃSKI (2003 a)  
*Melanohalea exasperatula* (De Not.) O. Blanco et al. – bark of trees, wooden constructions, stone matzeva, boulder and agricultural machinery  
 Stands: 2, 3, 5, 8, 11, 12, 13, 17, 23, 26 (and CIEŚLIŃSKI 2003 a), 28, 30, 45  
*Melanelixia fuliginosa* (Fr. ex Duby) O. Blanco et al. – bark of *Tilia cordata*, *Fraxinus excelsior* and wooden constructions  
 Stands: 2, 26 (and CIEŚLIŃSKI 2003 a)  
*Micarea denigrata* (Fr.) Hedl. – wooden fences  
 Stands: 2, 29  
*Mycobilimbia tetramera* (De Not.) Vitik., Ahti, Kuusinen, Lommi & T. Ulvinen ex Hafellner & Türk – bryophytes growing on stone wall  
 Stand: 26  
*Neofuscelia loxodes* (Nyl.) Essl. – boulder and stone wall  
 Stands: 26, 31  
*Neofuscelia pulla* (Ach.) Essl. – boulders  
 Stands: 26 (and CIEŚLIŃSKI 2003 a), 31, 33  
*Parmelia saxatilis* (L.) Ach. – boulder  
 Stand: 29  
*Parmelia sulcata* Taylor – bark of trees, wooden constructions, stone matzeva, stone brickwork base, mortar and boulder  
 Stands: 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 34, 40, 43, 45, 46  
*Parmelina tiliacea* (Hoffm.) Hale – bark of *Salix alba*, *Tilia cordata*, *Aesculus hippocastanum*, *Populus nigra* and *Betula pendula*  
 Stands: 2, 29, 30, 39  
*Parmeliopsis ambigua* (Wulfen in Jacq.) Nyl. – wooden constructions  
 Stand: 2  
*Pertusaria albescens* (Huds.) Choisy & Werner in Werner – bark of *Tilia cordata*  
 Stand: 2  
*Pertusaria amara* (Ach.) Nyl. – bark of *Populus nigra*  
 Stand: 30  
*Phaeophyscia orbicularis* (Neck.) Moberg – bark of trees, wooden constructions, concrete posts, mortar, stone brickwork bases, stone wall, gravestones, boulders, ceramics and asbestic tile  
 Stands: 1, 2, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 42, 45  
*Physcia adscendens* (Fr.) H. Olivier – bark of trees, wooden constructions, concrete posts, mortar, stone brickwork bases, stone wall, gravestones, boulders and gates made of wrought iron  
 Stands: 1, 2, 3, 4, 5, 7, 8, 11, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 42, 43, 45  
*Physcia caesia* (Hoffm.) Fürnrohr – bark of *Tilia cordata*, *Sorbus aucuparia*, wooden constructions, concrete posts, mortar, stone brickwork bases, stone wall, gravestones, boulders and gates made of wrought iron  
 Stands: 1, 2, 3, 4, 7, 9, 10, 12, 13, 14, 16, 17, 19, 21, 22, 23, 24, 26, 29, 30, 32, 45  
*Physcia dubia* (Hoffm.) Lettau – bark of trees, wooden constructions, concrete posts, mortar, bricks, stone brickwork bases, stone wall, gravestones, stone matzevas, boulders, agricultural machinery, ceramics and gates made of wrought iron  
 Stands: 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 33, 45, 46  
*Physcia dubia* (Hoffm.) Lettau var. *teretiuscula* (Ach.) Clauzade & Cl. Roux – boulder  
 Stand: 30  
*Physcia stellaris* (L.) Nyl. subsp. *stellaris* – bark of *Alnus glutinosa*, *Salix alba*, *Populus nigra*, *P. tremula*, wooden constructions and boulder  
 Stands: 22, 28, 29, 30, 31, 40, 46,  
*Physcia tenella* (Scop.) DC. in Lam. & DC. – bark of trees, wooden constructions, concrete posts, stone matzeva and boulders  
 Stands: 2, 4, 5, 12, 13, 15, 17, 18, 19, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29, 30, 31, 38, 39, 45  
*Physconia enteroxantha* (Nyl.) Poelt – bark of trees, wooden constructions, concrete posts, mortar, stone brickwork bases, stone matzeva, boulders and gates made of wrought iron  
 Stands: 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 26, 29, 30, 31, 32, 45  
*Physconia grisea* (Lam.) Poelt – CIEŚLIŃSKI (2003 a)

- Physconia perisidiosa* (Erichsen) Moberg – bark of *Salix alba* and wooden constructions  
Stand: 2
- Phlyctis argena* (Ach.) Flot. – bark of trees and wooden constructions  
Stands: 2, 3, 4, 7, 8, 11, 12, 14, 15, 17, 23, 26, 28, 29
- Placynthiella icmalea* (Ach.) Coppins & P. James – wooden fences  
Stand: 2
- Placynthiella uliginosa* (Schrad.) Coppins & P. James – soil  
Stands: 31, 44
- Platismatia glauca* (L.) W.L. Culb. & C.F. Culb. – bark of *Betula pendula* and wooden constructions  
Stand: 2
- Pleurosticta acetabulum* (Neck.) Elix & Lumbsch in Lumbsch, Kothe & Elix – bark of *Quercus robur* and *Acer pseudoplatanus*  
Stands: 2, 26
- Porpidia crustulata* (Ach.) Hertel & Knoph in Hertel – boulders  
Stands: 21, 29
- Protoparmeliopsis muralis* (Schreb.) Choisy var. *muralis* – asbestic tile, mortar, concrete posts, stone brickwork bases, stone matzevas, boulders, bricks and wooden constructions  
Stands: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 29, 30, 31, 32, 45
- Pseudevernia furfuracea* (L.) Zopf – bark of trees and wooden constructions  
Stands: 2, 10, 26 (and CIEŚLIŃSKI 2003 a), 29, 30, 31, 32, 33, 35, 41
- Ramalina farinacea* (L.) Ach. – bark of trees  
Stands: 2, 26, 30
- Ramalina fastigiata* (Pers.) Ach. – bark of *Acer platanoides*  
Stand: 28
- Ramalina fraxinea* (L.) Ach. – bark *Quercus robur*, *Acer platanoides*, *Salix alba*, *Populus nigra* and *Pinus sylvestris*  
Stands: 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 34, 42, 46
- Ramalina motykana* Bystrek – bark of *Tilia cordata*  
Stand: 3
- Ramalina pollinaria* (Westr.) Ach. – bark of *Acer platanoides*, *Fraxinus excelsior*, *Ulmus laevis* and *Tilia cordata*  
Stands: 2, 3, 28
- Rhizocarpon distinctum* Th. Fr. – CIEŚLIŃSKI (2003 a)
- Rhizocarpon obscuratum* (Ach.) A. Massal. – boulders, stone brickwork bases, mortar and concrete posts  
Stands: 1, 2, 10, 11, 15, 16, 21, 26
- Sarcogyne regularis* Körb. – boulder, stone brickwork base, mortar and concrete posts  
Stands: 2, 10, 14
- Scoliciosporum chlorococcum* (Graeve ex Stenh.) Vězda – bark of trees and wooden constructions  
Stands: 1, 2, 6, 17, 26 (and CIEŚLIŃSKI 2003 a), 29, 30, 31, 33
- Scoliciosporum umbrinum* (Ach.) Arnold – boulder  
Stand: 29
- Scoliciosporum umbrinum* (Ach.) Arnold var. *corticola* (Anzi) Clauzade & Cl. Roux. – bark of *Populus tremula*  
Stand: 31
- Strangospora ochrophora* (Nyl.) R.A. Andersen – bark of *Fraxinus excelsior*  
Stand: 43
- Thelocarpon laureri* (Flot.) Nyl. – wooden fence  
Stand: 2
- Trapeliopsis granulosa* (Hoffm.) Lumbsch – soil  
Stand: 31, 34
- Usnea hirta* (L.) Mot. in Bystr. – bark of *Alnus glutinosa*, *Pinus sylvestris*, *Betula pendula* and wooden constructions  
Stands: 2, 29, 31
- Verrucaria muralis* Ach. – concrete posts and mortar  
Stands: 1, 2, 3, 6, 7, 8, 13, 15, 16, 19, 20, 24, 26 (and CIEŚLIŃSKI 2003 a)
- Vulpicida pinastri* (Scop.) J.-E. Mattsson & M.J. Lai – bark of *Acer platanoides*  
Stand: 2
- Xanthoparmelia conspersa* (Ach.) Hale – boulders and stone wall  
Stands: 26, 30, 31, 33
- Xanthoria candelaria* (L.) Th. Fr. – bark of *Populus nigra*, *Salix alba* and *Alnus glutinosa*  
Stands: 29, 30, 46
- Xanthoria parietina* (L.) Th. Fr. – bark of trees, wooden constructions, stone brickwork bases, stone wall, boulders, mortar, gravestones, concrete posts, gates made of wrought iron, asbestic tile and bones of animals  
Stands: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 31, 32, 33, 34, 40, 45, 47
- Xanthoria polycarpa* (Hoffm.) Rieber – bark of trees, wooden constructions, concrete posts and boulders  
Stands: 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 24, 26 (and CIEŚLIŃSKI 2003 a), 28, 29, 30, 39, 45.

## DISCUSSION

As far as the number of lichen biota species of Ciechanowiec is concerned – 114 is close to that of Drezdenko – 133 (LIPNICKI 1984), a small town situated in the Lubuskie Province on the border of the Drawska Primeval Forest (Puszcza Drawska) and the Notecka Primeval Forest (Puszcza Notecka). The lichen biota of other towns with a similar number of inhabitants as Ciechanowiec documented in literature (RYDZAK 1956 a, b, 1957, 1959, JAGIEŁŁO 1983), is characterized by a poorer species composition of lichens. The analysed towns differ due to a significant number of species growing on the bark of trees and shrubs (Białowieża – 68 species, Limanowa – 60, Ciechanowiec – 55, Drezdenko – 39). Among the lichens colonizing secondary rock substrata the most frequently represented habitat group are calcilophilous lichens bound up with concrete. Terricolous lichens have been found outside urban settlements, primarily in forest fragments. Ciechanowiec, just as many other towns has preserved in its centre old buildings and other timber structures connected with them. These have been colonized by lichens which exhibit preference for organic substrata. In all of the towns, a group of spe-



cies can be differentiated, the ones which have found here optimal living conditions. These are common nitrophylous lichens, coniophilous lichens of order *Buelliales* and of family *Lecanoraceae*, frequently growing in large populations. The lichen biota of Ciechanowiec is unique for its large number of now rare and vulnerable species, which were registered by RYDZAK (1956 a, b, 1957, 1959) in small towns of Poland over half a century ago. These are the species which are currently absent in large urban areas.

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