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VEGETATION OF THE PROPOSED „BAŻANTKA" NATURE RESERVE ON GŁUBCZYCE PLATEAU IN THE LIGHT OF CURRENT THREATS TO THE FORESTED HABITATS

ROŚLINNOŚĆ PROJEKTOWANEGO REZERWATU PRZYRODY „BAŻANTKA" NA PŁASKOWYŻU GŁUBCZYCKIM W ŚWIETLE WSPÓŁCZESNYCH ZAGROŻEŃ ŚRODOWISK LEŚNYCH

Key words: forest fragmentation, biodiversity, ancient woodlands, forest habitats, disturbance.

Summary: The vegetation cover of a small isolated woodland located in the agricultural landscape of the Głubczyce Plateau was studied. The following forest communities of natural character were present there: *Ribeso nigri-Alnetum*, *Fraxino-Alnetum* and *Tilio cordatae-Carpinetum betuli*. The main evidence of transformation of the vegetation cover of the woodland is the presence of the *Picea abies-Impatiens parviflora* secondary community and the abundant occurrence of Impatiens parviflora in some parts of the natural communities. Another expansive species which, like *Impatiens parviflora*, contributes to a decrease in the biodiversity of the herb layer, is *Carex brizoides*. Although some evidence of past disturbance was noticed, the vegetation cover of the wood is relatively well preserved. A proposal has been made to protect the whole woodland as a nature reserve.

Słowa kluczowe: fragmentacja pokrywy leśnej, bioróżnorodność, stare lasy, siedliska leśne, zaburzenia

Streszczenie: Przeprowadzono badania nad roślinnością małego, izolowanego przestrzennie lasu, położonego w rolniczym krajobrazie Płaskowyżu Głubczyckiego. Stwierdzono tu obecność następujących zbiorowisk leśnych o charakterze naturalnym: *Ribeso nigri-Alnetum, Fraxino-Alnetum* oraz *Tilio cordatae-Carpinetum betuli*. Głównymi przejawami transformacji pokrywy roślinnej badanego obszaru była obecność zbiorowiska zastępczego *Picea abies-Impatiens parviflora*, rosnącego na siedlisku grądu oraz masowe występowanie *Impatiens parviflora* w niektórych partiach lasu. Innym ekspansywnym gatunkiem, który tak jak i niecierpek drobnokwiatowy, przyczynia się do spadku bogactwa gatunkowego w warstwie runa, jest *Carex brizoides*. Pomimo przejawów działających w przeszłości zaburzeń o charakterze antropogenicznym pokrywa roślinna badanego obiektu jest stosunkowo dobrze zachowana. Z tych względów proponuje się objąć go ochroną rezerwatową.

INTRODUCTION

Głubczyce Plateau, covered with loess and a typical agricultural area, is one of the least wooded areas of Poland (4% of the area) [Kondracki, 1994]. Woodlands are confined to small fragments, distributed in places that are unsuited to agricultural purposes, such as on steep slopes, ravines and wet, muddy, low-lying areas with stagnating water. These isolated patches of forest are the remains of natural, forested cover. This cover started to shrink in the Neolithic Age as a result of human settlement and the development of agriculture [Orczewska, 2003]. They are the last refugia of woodland flora in this area and thus contribute to local biodiversity. Such woodlands deserve particular protection as valuable elements in the agricultural landscape.

The study site of 40,5 ha is located on the borders of Dzierżysławice village, which is situated a few kilometres from Głogówek town. It developed in the wet, flat and extensive valley of the Osobłoga river and its tributary the Młynówka. Only the southern and south-western part of the woodland encroaches the steep escarpment, at the top of which is the ridge that forms the border of the woodland studied. On the north the wood reaches the railway track, which runs along the valley of the river. The deep amelioration ditch and a field track are the western borders of the woodland. The study site is surrounded by arable fields and wet meadows. The biggest complex of meadows is on the northern side of the woodland. They intrude in the form of a V-shaped wedge into the edge of the wood (Fig. 1). The woodland is cut by many tracks. Some of them, which also mark the borders of forest divisions, especially in the flat and wettest part of the wood, are overgrown with vegetation and no longer used. The soils of the woodland are predominantly brown alluvial soils and brown leached soils (Plan urządzenia gospodarstwa leśnego. Nadleśnictwo Prudnik, obręb Prudnik. 1998-2007).

METHODS

52 phytosociological records were taken using the Braun-Blanquet method, reflecting the phytocoenotic diversity of the study site. In this paper, only examples of relevés representing all types of communities present in the field are shown. On the basis of the list of vascular plant species present in these records, the representation of Raunkiaer life forms [Zarzycki, 2003] and Grime life strategies [Grime *et al.* 1996] were counted. A list of protected species of vascular plants and a list of species regarded as ancient woodland indictors [Dzwonko i Loster 2001] are given. The nomenclature of vascular plants follows that of Mirek *et al.* [2002], liverworts after Grolle [1983)], and the names of mosses are after Ochyra *et al.* [1992]. The names of the phytosociological units are those proposed by Matuszkiewicz [2001].

RESULTS

Within the area of the proposed "Bażantka" nature reserve the following forest communities were present:

Class: *Alnetea glutinosae* BR.-Bl. et R. Tx. 1943
Order: *Alnetalia glutinosae* R. Tx. 1937
Alliance: *Alnion glutinosae* (MALC. 1929) MEIJER DREES 1936
Association: *Ribeso nigri-Alnetum* SOL.-GÓRN. (1975) 1987
Class: *Querco-Fagetea* BR.-BL. et VLIEG. 1937
Order: *Fagetalia sylvaticae* PAWŁ. In PAWŁ., SOKOŁ. Et WALL. 1928
Alliance: *Alno-Ulmion* BR.-BL. et R. TX. 1943
Suballiance: *Alnenion glutinoso-incanae* OBERD. 1953
Association: *Fraxino-Alnetum* W. MAT. 1952
Suballiance: *Ulmenion minoris* OBERD. 1953
Alliance: *Carpinion betuli* ISSL. 1931 em. OBERD. 1953
Association: *Tilio cordatae-Carpinetum betuli* TRACZ. 1962
Subassociation: *T-C stachyetosum*
Subassociation: *T-C corydaletosum*
Subassociation: *T-C typicum*
Variant with: *Carpinus betulus, Fraxinus excelsior, Carex brizoides*
as well as *Impatiens parviflora*

The presence of the secondary community *Picea abies-Impatiens parviflora*, developing of the site of the oak-hornbeam association was also recorded.

The *Ribeso nigri-Alnetum* association is not extensive and is limited to very wet, muddy areas, located in the lowest part of the woodland. Its characteristic feature is a long period of water stagnation, which can often last until late summer. Floristic composition of the association is illustrated by Relevé 1.

Relevé 1. *Ribeso nigri-Alnetum* Sol.-Górn. (1975) 1987
Date 30.06.1996, forest division 1f, relevé area 100 m^2, tree layer cover 55%, shrub layer cover 10%, herb layer cover 35%, moss layer cover 0,5%, number of species in relevé 27; **Ch. Cl. *Alnetea glutinosae* + Ch. Ass. *Ribeso nigri-Alnetum***: *Alnus glutinosa* (a) 3; (c) +; *Ribes nigrum* (b) 1; *Lycopus europaeus* +; **Ch. All. *Alno-Ulmion***: *Fraxinus excelsior* (a) +; (b) 1; (c) 1; *Padus avium* (a) 1; (b) 2; (c) +; *Circaea lutetiana* +; *Carex remota* r; **Ch. O. *Fagetalia*, All. *Fagion + Carpinion***: *Impatiens noli-tangere* +; *Isopyrum thalictroides* r; **Ch. Cl. *Phragmitetea***: *Carex acutiformis* 3; *Iris pseudacorus* 1; *Galium palustre* +; **Ch. Cl. *Rhamno-Prunetea***: *Cornus sanguinea* (b) +; (c) r; **Ch. Cl. *Molinio-Arrhenatheretea***: *Geum rivale* r; *Caltha palustris* +; *Lysimachia vulgaris* +; *Myosotis palustris* +; **Ch. Cl. *Artemisietea***: *Urtica dioica* 1; *Impatiens parviflora* r; *Glechoma hederacea* +; *Rubus caesius* 1; **Accompanying species**: *Humulus lupulus* (c) +; *Galanthus nivalis* 1; *Lysimachia nummularia* +; *Ranunculus repens* r; *Brachythecium rutabulum* (d) r; *Hypnum cupressiforme* (d) +;

The riverside carr – the *Fraxino-Alnetum* association – develops in local depressions with a high level of groundwater, often stagnating. This association often

occurs in close contact with the *Ribeso nigri-Alnetum*. The tree layer of the *Fraxino-Alnetum* association is dominated by *Alnus glutinosa* and its herb layer by species of nitrophilous habitats (relevé 2). Some patches represent a community relating to the *Fraxino-Alnetum* association. In such cases the tree layer is dominated by *Populus nigra*, not growing spontaneously here but planted.

Relevé 2. *Fraxino-Alnetum* W. Mat. 1952
Date 15.06.1995, forest division 1f, relevé area 100 m^2, tree layer cover 70%, shrub layer cover 70%, herb layer cover 70%, moss layer cover 20%, number of species in relevé 18; **Ch.All. *Alno-Ulmion***: *Padus avium* (b) 4; (c) 2; *Ribes spicatum* (c) 1; **Ch. Cl. *Alnetea glutinosae* + Ass. *Ribeso nigri-Alnetum***: *Alnus glutinosa* (a) 4; (c) r; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion + Carpinion***: *Acer pseudoplatanus* (c) +; *Milium effusum* +; *Impatiens noli-tangere* 3; *Carex sylvatica* +; *Galeobdolon luteum* 3; *Eurhynchium striatum* (d) 2; **Ch. Cl. *Molinio-Arrhenatheretea***: *Geum rivale* +; **Ch. Cl. *Artemisietea***: *Urtica dioica* +; *Impatiens parviflora* +; *Glechoma hederacea* 1; *Melandrium rubrum* +; **Accompanying species**: *Galanthus nivalis* 1; *Carex brizoides* 3; *Athyrium filix-femina* 1; *Galeopsis speciosa* r.

The majority of the vegetation in the woodland studied is represented by the oak-hornbeam (*Tilio cordatae-Carpinetum betuli)* community. Different subassociations and variants of that community are present there (relevés 3-9).

Relevé 3. *Tilio cordatae-Carpinetum betuli stachyetosum* Tracz. 1962
Date 15.06.1995, forest division 1i, relevé area 100 m^2, tree layer cover 80%, shrub layer cover 70%, herb layer cover 65%, moss layer cover 30%, number of species in relevé 51; **Ch. All. *Alno-Ulmion***: *Fraxinus excelsior* (a) 4; (b) 1; (c) +; *Padus avium* (b) 4; (c) 2; *Ribes spicatum* (c) +; *Ficaria verna* +; *Stachys sylvatica* 2; *Rumex sanguineus* +; *Plagiomnium undulatum* (d) 1; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion + Carpinion***: *Tilia cordata* (a) 3; (b) +; (c) +; *Acer pseudoplatanus* (b) +; *A. campestre* (b) +; (c) +; *Corylus avellana* (b) 2; *Milium effusum* 2; *Impatiens noli-tangere* 1; *Pulmonaria obscura* 1; *Aegopodium podagraria* r; *Carex sylvatica* 1; *Dactylis polygama* 1; *Scrophularia nodosa* r; *Viola reichenbachiana* 1; *Mercurialis perennis* +; *Campanula trachelium* r; *Ranunculus lanuginosus* 1; *Atrichum undulatum* (d) 1; **Ch. Cl. *Rhamno-Prunetea***: *Carpinus betulus* (a) 2; (b) 1; (c) +; *Cornus sanguinea* (b) +; (c) +; *Crataegus laevigata* (b) 1; (c) +; *Poa nemoralis* +; **Ch. Cl. *Molinio-Arrhenatheretea***: *Taraxacum officinale* 1; **Ch. Cl. *Artemisietea***: *Galium aparine* 1; *Urtica dioica* 1; *Impatiens parviflora* 2; *Geum urbanum* 3; *Moehringia trinervia* +; *Glechoma hederacea* 2; *Rubus caesius* +; *Geranium robertianum* +; *Melandrium rubrum* +; *Chelidonium majus* r; *Chaerophyllum aromaticum* 1; *Rumex obtusifolius* 1; **Accompanying species:** *Quercus robur* (c) +; *Sambucus nigra* (b) +; *Aesculus hippocastanum* (b) +; (c) r; *Lamium maculatum* (3); *Symphytum tuberosum* +; *Anthriscus nitida* 1; *Rubus idaeus* +; *Agrostis stolonifera* +; *Carex pallescens* r; *Brachythecium rutabulum* (d) 2; *Kindbergia praelonga* (d) 2.

Relevé 4. *Tilio cordatae-Carpinetum betuli corydaletosum* Tracz. 1962
Date 29.06.1996, forest division 1d, aspect NW, slope 5°, relevé area 100 m^2, tree layer cover 70%, shrub layer cover 45%, herb layer cover 80%, moss layer cover 5%, number of species in relevé 46; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion* + *Carpinion***: *Tilia cordata* (a) 3; (b) 2; (c) +; *Acer pseudoplatanus* (a) 2; (b) 1; (c) 1; *A. platanoides* (c) 1; *Corylus avellana* (c) r; *Milium effusum* 1; *Impatiens noli-tangere* 1; *Pulmonaria obscura* +; *Aegopodium podagraria* 3; *Carex sylvatica* r; *Anemone nemorosa* 2; *Polygonatum multiflorum* 1; *Galeobdolon luteum* 1; *Scrophularia nodosa* +; *Primula elatior* +; *Corydalis cava* 1; *Mercurialis perennis* 3; *Lilium martagon* 1; *Isopyrum thalictroides* +; *Atrichum undulatum* (d) +; **Ch. Cl. *Alno-Ulmion***: *Fraxinus excelsior* (a) 2; (b) +; (c) +; *Padus avium* (b) +; (c) r; *Ficaria verna* 1; *Gagea lutea* r; *Stachys sylvatica* +; **Ch. Cl. *Rhamno-Prunetea***: *Carpinus betulus* (c) r; *Stellaria holostea* 1; **Ch. Cl. *Artemisietea***: *Galium aparine* 1; *Urtica dioica* 1; *Impatiens parviflora* 1; *Geum urbanum* 2; *Moehringia trinervia* r; *Melandrium rubrum* 1; *Chelidonium majus* +; **Accompanying species**: *Quercus robur* (c) r; *Sambucus nigra* (b) 3; (c) 1; *Stellaria media* r; *Lamium maculatum* 3; *Galanthus nivalis* 2; *Symphytum tuberosum* 2; *Anthriscus nitida* 1; *Convallaria majalis* 1; *Oxalis acetosella* r; *Brachythecium rutabulum* (d) 1; *Eurhynchium hians* (d) 1; *Plagiothecium laetum* (d) +.

Relevé 5. *Tilio cordatae-Carpinetum betuli typicum* Tracz. 1962
Date 30.06.1996, forest division 1r, relevé area 100 m^2, tree layer cover 60%, shrub layer cover 70%, herb layer cover 45%, moss layer cover 0,5,%, number of species in relevé 40; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion* + *Carpinion***: *Tilia cordata* (a) 3; (b) 3; (c) 2; *Acer pseudoplatanus* (c) r; *A. campestre* (c) 2; *Corylus avellana* (b) +; *Milium effusum* 2; *Impatiens noli-tangere* +; *Pulmonaria obscura* +; *Carex sylvatica* 1; *Anemone nemorosa* r; *Brachypodium sylvaticum* (d) +; *Dactylis polygama* 1; *Scrophularia nodosa* +; *Paris quadrifolia* +; *Mercurialis perennis* +; **Ch. All. *Alno-Ulmion***: *Padus avium* (b) 1; *Circaea lutetiana* +; *Stachys sylvatica* +; *Carex remota* r; **Ch. Cl. *Rhamno-Prunetea***: *Carpinus betulus* (a) +; (b) 2; (c) 2; *Cornus sanguinea* (c) +; *Stellaria holostea* r; **Ch. Cl. *Artemisietea***: *Galium aparine* r; *Urtica dioica* 1; *Impatiens parviflora* 1; *Geum urbanum* +; *Glechoma hederacea* +; *Mycelis muralis* r; *Lapsana communis* r; **Accompanying species**: *Betula pendula* (a) 3; *Lamium maculatum* 1; *Anthriscus nitida* r; *Athyrium filix-femina* r; *Rubus idaeus* +; *Lysimachia nummularia* +; *Viola riviniana* r; *Fragaria vesca* 1; *Dicranella heteromalla* (d) r; *Eurhynchium hians* (d) r; *Hypnum cupressiforme* (d) +.

Relevé 6. *Tilio cordatae-Carpinetum betuli typicum* variant with *Carpinus betulus*
Date 4.07.1996, relevé area 100 m^2, tree layer cover 80%, shrub layer cover 15%, herb layer cover 40%, moss layer cover 0,5%, number of species in relevé 37; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion* + *Carpinion***: *Tilia cordata* (a) 2; (b) 2; (c) r; *Acer pseudoplatanus* (c) +; *Cerasus avium* (c) +; *Acer platanoides* (c) +; *A. campestre* (c) 1; *Milium effusum* +; *Pulmonaria obscura* +; *Aegopodium podagraria* 1; *Carex sylvatica* +; *Brachypodium sylvaticum* (d) r; *Dactylis polygama* 1; *Primula elatior* +; *Viola reichenbachiana* +; *Campanula trachelium* 1; *Atrichum undulatum* (d) r; **Ch. All. *Alno-Ulmion***: *Fraxinus excelsior* (c) 2; *Padus avium* (b) 1; (c) +; **Ch. Cl. *Rhamno-***

Prunetea: *Carpinus betulus* (a) 4; (b) +; (c) +; *Prunus spinosa* (b) +; (c) 1; *Crataegus monogyna* (c) +; *Euonymus europaea* (c) r; *Rhamnus cathartica* (a) +; *Poa nemoralis* 1; **Ch. Cl. *Artemisietea***: *Galium aparine* r; *Impatiens parviflora* 2; *Geum urbanum* +; *Moehringia trinervia* r; **Ch. Cl. *Molinio-Arrhenatheretea***: *Anthriscus sylvestris* r; *Taraxacum officinale* +; **Accompanying species:** *Quercus robur* (c) +; *Populus tremula* (b) +; *Stellaria media* r; *Symphytum tuberosum* 1; *Veronica chamaedrys* +; *Pohlia nutans* (d) +; *Eurhynchium hians* (d) r; *Hypnum cupressiforme* (d) r;

Relevé 7. *Tilio cordatae-Carpinetum betuli typicum* TRACZ. 1962 variant with *Fraxinus excelsior* (degenerated form)
Date 28.06.1996, forest division 1d, aspect N, slope 5°, relevé area 100 m^2, tree layer cover 40%, shrub layer cover 65%, herb layer cover 80%, moss layer cover 5%, number of species in relevé 30; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion* + *Carpinion***: *Tilia cordata* (a) 1; (b) 2; (c) +; *Acer pseudoplatanus* (c) +; *Cerasus avium* (c) r; *Acer platanoides* (a) 1; (c) 3; *Fagus sylvatica* (c) r; *Milium effusum* 1; *Impatiens noli-tangere* 1; *Anemone nemorosa* 1; *Polygonatum multiflorum* +; *Dactylis polygama* 1; *Corydalis cava* +; **Ch. All. *Alno-Ulmion***: *Fraxinus excelsior* (a) 3; (b) 1; (c) 1; *Ficaria verna* 2; **Ch. Cl. *Rhamno-Prunetea***: *Poa nemoralis* +; **Ch. Cl. *Artemisietea***: *Impatiens parviflora* 5; *Moehringia trinervia* +; *Galeopsis pubescens* +; *Geranium robertianum* +; **Accompanying species:** *Sorbus aucuparia* (c) r; *Sambucus nigra* (b) 4; (c) 1; *Stellaria media* +; *Galanthus nivalis* 1; *Symphytum tuberosum* 1; *Poa annua* +; *Plagiothecium nemorale* (d) +; *P. laetum* (d) +; *Hypnum cupressiforme* (d) +; *Brachythecium velutinum* (d) +; *Plagiomnium affine* (d) +; *Herzogiella seligeri* (d) +.

Relevé 8. *Tilio cordatae-Carpinetum betuli typicum* variant with *Impatiens parviflora*
Date 11.08.1994, private, aspect S, slope 10°, relevé area 100 m^2, tree layer cover 100%, shrub layer cover 40%, herb layer cover 80%, moss layer cover 5%, number of species in relevé 31; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion* + *Carpinion***: *Tilia cordata* (a) 2; (c) 1; *Acer campestre* (c) +; *Ulmus glabra* (b) 1; (c) +; *Corylus avellana* (b) 3; (c) 1; *Milium effusum* 1; *Pulmonaria obscura* +; *Aegopodium podagraria* 2; *Dactylis polygama* 2; *Viola reichenbachiana* +; *Campanula trachelium* r; *Atrichum undulatum* (d) +; **Ch. Cl. *Rhamno-Prunetea***: *Carpinus betulus* (b) 1; (c) 1; *Crataegus monogyna* (a) +; (b) 1; (c) +; *Cornus sanguinea* (b) 1; (c) +; *Euonymus europaea* (c) 2; *Poa nemoralis* +; **Ch. All. *Alno-Ulmion***: *Fraxinus excelsior* (c) 1; *Padus avium* (b) 2; **Ch. Cl. *Artemisietea***: *Galium aparine* 2; *Impatiens parviflora* 3; *Geum urbanum* 3; *Allaria petiolata* 1; **Accompanying species**: *Quercus robur* (a) 5; *Sambucus nigra* (b) 1; (c) 1; *Lamium maculatum* 2; *Lysimachia nummularia* 1; *Viola riviniana* +; *Hypericum perforatum* r; *Dicranella heteromalla* (d) +; *Pohlia nutans* (d) +; *Plagiothecium laetum* (d) 1.

Relevé 9. *Tilio cordatae-Carpinetum betuli typicum* variant with *Carex brizoides*
cover 30%, herb layer cover 80%, moss layer cover 0,5%, number of species in relevé 37; **Ch. Cl. *Querco-Fagetea*, O. *Fagetalia*, All. *Fagion + Carpinion***: *Tilia cordata* (b) 2; (c) r; *Carpinus betulus* (b) +; (c) +; *Acer pseudoplatanus* (b) 2; (c) +; *A. platanoides* (a) 2; (b) 1; (c) 2; *Fagus sylvatica* (a) 3; (c) +; *Dryopteris filix-mas* r; *Milium effusum* +;

Anemone nemorosa 2; *Impatiens noli-tangere* +; *Polygonatum multiflorum* +; *Stellaria holostea* +; **Ch. All.** ***Alno-Ulmion***: *Fraxinus excelsior* (b) 1; (c) 2; *Padus avium* (b) +; (c) 1; *Circaea lutetiana* +; *Carex remota* +; **Ch. Cl.** ***Artemisietea***: *Impatiens parviflora* 1; *Urtica dioica* +; *Gagea lutea* +; *Galeopsis pubescens* r; **Accompanying species:** *Quercus robur* (a) 2; (c) +; *Betula pendula* (b) 1; (c) r; *Sambucus nigra* (b) 1; (c) +; *Alnus glutinosa* (b) 2; (c) +; *Rubus idaeus* 1; *R. nessensis* 1; *Stellaria media* r; *Athyrium filix-femina* +; *Maianthemum bifolium* +; *Senecio ovatus* r; *Carex brizoides* 5; *Oxalis acetosella* +; *Lamium maculatum* +; *Chamaenerion angustifolium* +; *Galanthus nivalis* +; *Hedera helix* r; *Dicranella heteromalla* (d) r; *Brachythecium rutabulum* (d) +.

The *Tilio-Carpinetum* variants with *Carex brizoides*, *Impatiens parviflora* and *Fraxinus excelsior* belong to degenerated communities. The main evidence of this is the dominance of the herb layer by either *Carex brizoides* or *Impatiens parviflora*, which are very expansive. *Impatiens parviflora* is an invasive species of alien origin. Both *C. brizoides* and *I. parviflora* contribute to the floristic impoverishment of the herb layer in forest ecosystems. Disturbance of the ecological balance in the woodland communities, in most cases as a consequence of forest management, facilitates the entry of invasive species into those communites. Fortunately, the occurrence of such transformed communities was not very extensive within the area studied. Well preserved oak-hornbeam communites, and in the lowest locations of the wood the riverside carrs and alder carrs, which are rich in species of woodland flora, dominate in this location. A high proportion of the forest cover is old-growth woodland, with the size of many trees achieving that of monuments of nature.

The most drastic evidence of the negative effects of forest management practices is the presence of pure, even-aged spruce plantations, situated on the habitat of an oak-hornbeam community (relevé 10). The planting of conifers is preceded by clear cutting, which causes habitat degradation and loss of woodland species from the shrub and herb layers. The growth of spruce continues to degrade the soil by acidification. For such reasons the *Picea abies-Impatiens parviflora* community is very poor in species. Although species from the *Querco-Fagetea* class are still present there, the herb layer is dominated by *Impatiens parviflora*.

Relevé 10. Secondary community *Picea abies-Impatiens parviflora*
Date 1.07.1996, forest division 1g, relevé area 100 m^2, tree layer cover 50%, shrub layer cover 35%, herb layer cover 65%, moss layer cover 0,5%, number of species in relevé 29; **Ch. Cl.** ***Querco-Fagetea***, **O.** ***Fagetalia***, **All.** ***Fagion + Carpinion***: *Tilia cordata* (a) 1; (b) 1; (c) +; *Carpinus betulus* (c) +; *Acer pseudoplatanus* (a) 1; (c) +; *A. campestre* (c) +; *Euonymus europaea* (c) r; *Milium effusum* +; *Impatiens noli-tangere* 1; *Aegopodium podagraria* 1; *Mercurialis perennis* +; *Atrichum undulatum* (d) r; **Ch. All.** ***Alno-Ulmion***: *Fraxinus excelsior* (b) 1; (c) 2; *Padus avium* (b) 1; (c) +; *Circaea lutetiana* +; **Ch. Cl.** ***Artemisietea***: *Impatiens parviflora* 3; *Moehringia trinervia* +; *Urtica dioica* 1; *Geum urbanum* +; *Rubus caesius* +; *Glechoma hederacea* 1; **Ch. Cl.** ***Molinio-Arrhenatheretea***: *Anthriscus sylvestris* r; **Accompanying species**: *Quercus robur* (a) 2; *Picea abies* (a) 3; *Sambucus nigra* (b) 2; (c) 1; *Crataegus monogyna* (c) r;

Alnus glutinosa (a) 1; (c) +; *Stellaria media* r; *Lamium maculatum* +; *Polygonum hydropiper* r;

Within the communities the presence of 174 plant species, including 18 mosses, was recorded. Among the vascular flora a high representation of geophytes was noted (13%) (Table 1), which is a sign of the good condition of the habitats. A decrease in representation of species from that group is observed in woodlands with heavily transformed vegetation. Another reaction to disturbance is an increase in the number of species representing R life strategy (disturbance tolerating species), accompanied by a decrease in stress tolerant species (S strategy). However, such a tendency was not observed in the woodland studied, as species of S strategy have high representation in the flora of vascular plants (Table 2). Thus, the habitats of the woodland are relatively undisturbed. Compared to typical ruderal communities, forest ecosystems are much more resistant to disturbance, but far less resilient [*sensu* Grime 1988]. This means that after disturbance they return to the pre-disturbance state much more slowly and with greater difficulty. Thus, the protection of forest habitats in the woodland studied is desirable.

Over one third of the vascular plant species in the wood are regarded as ancient woodland indicator species (List 1), which is also evidence that the habitats are well preserved. Although protected plants represent only 7,7% of the total list of species present in the records (List 2), the population of some of them is large (for example *Galanthus nivalis, Lilium martagon, Convallaria majalis* and *Primula elatior*).

List 1.
Ancient woodland indicator plant species: *Adoxa moschatellina, Aegopodium podagraria, Ajuga reptans, Anemone nemorosa, Anthriscus nitida, Athyrium filix-femina, Brachypodium sylvaticum, Campanula trachelium, Carex remota, Carex sylvatica, Circaea intermedia, Circaea lutetiana, Convallaria majalis, Corydalis cava, Dactylis polygama, Daphne mezereum, Dryopteris carthusiana, Dryopteris dilatata, Dryopteris filix-mas, Epipactis helleborine, Festuca gigantea, Ficaria verna, Gagea lutea, Galanthus nivalis, Galeobdolon luteum, Galium odoratum, Geum urbanum, Hedera helix, Impatiens noli-tangere, Isopyrum thalictroides, Lilium martagon, Maianthemum bifolium, Melica nutans, Mercurialis perennis, Milium effusum, Moehringia trinervia, Mycelis muralis, Oxalis acetosella, Paris quadrifolia, Phyteuma spicatum, Poa nemoralis, Polygonatum multiflorum, Primula elatior, Pulmonaria obscura, Ranunculus auricomus, Ranunculus lanuginosus, Ribes nigrum, Ribes spicatum, Ribes uva-crispa, Rumex sanguineus, Scrophularia nodosa, Stachys sylvatica, Stellaria holostea, Symphytum tuberosum, Viola reichenbachiana, Viola riviniana.*

List 2.
Strictly protected vascular plant species: *Daphne mezereum, Epipactis helleborine, Galanthus nivalis, Hedera helix, Lilium martagon.*
Partly protected vascular plant species: *Convallaria majalis, Frangula alnus, Galium odoratum, Primula elatior, Ribes nigrum, Viburnum opulus, Climacium dendroides.*

Table 1. Representation of species of different Raunkiaer life forms

Phanerophytes [%, n]	Hemicrypto-phytes	Chamaephytes	Geophytes	Therophytes	Semiparasites	Species with unspecified status
29,5% 46	43% 67	5% 8	13% 20	6% 9	0,5% 1	3% 5

Table 2. Representation of species of different Grime life strategies

C [%, n]	S	R	C-S	S-R	C-R	C-S-R	Species with unspecified status
23% 36	11% 17	4% 6	19% 30	2% 3	11,5% 18	17,5% 27	12% 19

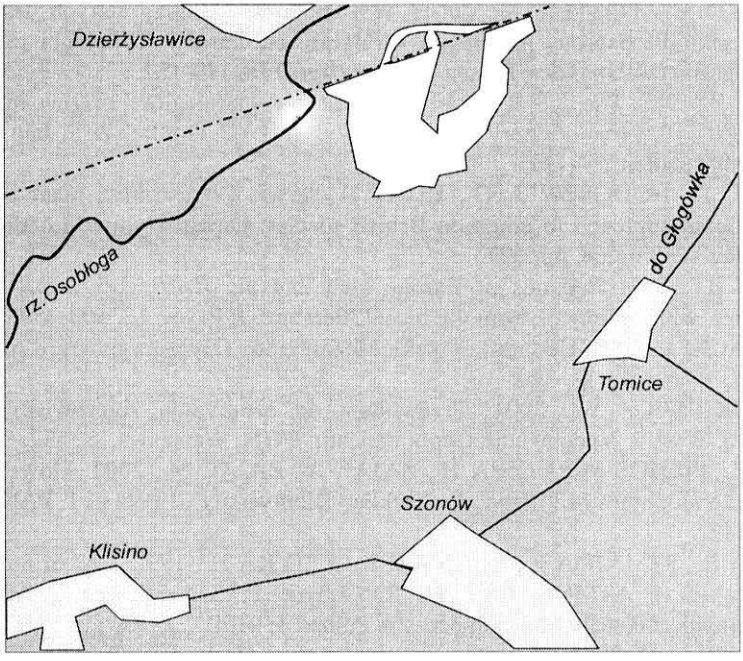

Fig. 1. Location of the proposed „Bażantka" nature reserve

CONCLUSIONS

One of the main threats to the woodland is the presence of *Impatiens parviflora*. Invasive species entering disturbed habitats are extremely dangerous to the structure and

functioning of the vegetation communities. They may intensify erosion processes, cause changes in biogeochemical and hydrological cycles, and make it more difficult or impossible for native species to regenerate [Usher, 1988]. Thus, conservation of woodland flora depends on the type of forest management practices and on the level of disturbance. Intensive management and heavy disturbance always lead to a loss of the stenotopic woodland flora and their replacement by eurytopic and expansive species [Orczewska, 2002]. Bearing in mind how damaging human-generated disturbance can be, the incidence of that factor should be reduced as much as possible. Processes that are activated when disturbance takes place may lead to irreversible changes in the natural environment of the proposed nature reserve. Small, isolated woodlands are particularly susceptible to such habitat damage.

REFERENCES

DZWONKO Z., LOSTER S., 2001: Wskaźnikowe gatunki starych lasów i ich znaczenie dla ochrony przyrody i kartografii roślinności. Typologia zbiorowisk i kartografia roślinności w Polsce. Prace Geogr. 178, 119-132.

GRIME J. P., 1988: The C-S-R model of primary plant strategies – origins, implications and tests. [In:] Evolutionary plant biology. Eds. L. D. Gottlieb & S. Jain. Chapman & Hall, London, 371-393.

GRIME J. P., HODGSON J. G., HUNT R., 1996: Comparative plant ecology. A functional approach to common British species. Unwin Hyman, London-Boston-Sydney-Wellington. pp. 697.

GROLLE R., 1983: Hepatics of Europe including the Azores: an annotated list of species, with synonyms from the recent literature. J. Bryol. 12, 403-459.

KONDRACKI J., 1994: Geografia Polski. Mezoregiony fizyczno-geograficzne. Wyd. 1. PWN, Warszawa. ss. 339.

MATUSZKIEWICZ W., 2001: Przewodnik do oznaczania zbiorowisk roślinnych Polski. Wyd. 2. Vademecum Geobotanicum. PWN, Warszawa, ss. 537.

MIREK Z., PIĘKOŚ-MIRKOWA H., ZAJĄC A., ZAJĄC M., 2002: Flowering plants and pteridophytes of Poland. A checklist. Biodiversity of Poland 1. PAN, Kraków, pp. 442.

OCHYRA R., SZMAJDA P., BEDNAREK-OCHYRA H., 1992: List of mosses to be published in ATMOS. [In:] W: R. Ochyra, P. Szmajda (eds.). Atlas of the geographical distribution of mosses in Poland 8, 9-14.

ORCZEWSKA A., 2002: The effect of disturbance on the herb layer composition of isolated woodlands. Acta Biol. Silesiana 36(53), 138-157.

ORCZEWSKA A., 2003: Postglacjalna historia lasów południowej Opolszczyzny. Natura Silesiae Superioris 7, 79-88.

Plan Urządzenia Gospodarstwa Leśnego. Nadleśnictwo Prudnik, obręb Prudnik. Okr. gosp. od 1 I 1998 r. do 31 XII 2007 r. Tom II. Szczegółowe dane inwentaryzacyjne. RDLP Katowice.

USHER M., 1988: Biological invasions of nature reserves. A search for generalisations. Biol. Conserv. 44, 119-135.

ZARZYCKI K., TRZCIŃSKA-TACIK H., RÓŻAŃSKI W., SZELĄG Z., WOŁEK J., KORZENIAK U., 2003: Ecological indicator values of vascular plants of Poland. Biodiversity of Poland 2, PAN, Kraków, pp. 183.