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**ZMIANY W UŻYTKOWANIU ZIEMI
NA OBSZARZE OJCOWSKIEGO PARKU NARODOWEGO
W CIĄGU XIX I XX WIEKU**

**Changes in Land Use in Ojców National Park Area
During the 19th and 20th Centuries**

ABSTRACT. The author deals with the land use changes in the area of the Ojców National Park (OPN) during last two centuries, with the stress to the 1956–1996 period, when the discussed area was under the legal protection. Those changes were analysed by some categories of the land use, those of forest, agricultural lands, waters and the technical uses (buildings, roads, etc.). Trends and periodisation of those changes were defined and the valuation of factors shaping the land use transformation and its scale, too.

KEY WORDS: land use, the Ojców National Park, active protection, national park protection.

SUMMARY

The object of the investigation was the Ojców National Park (OPN) covering 1890 ha and established in 1956. The author analyses changes of the land use within the OPN area during the bicentennial period, values agents of those changes and draws conclusions concerning the further protection of this area. First he presents shortly the nature of the Park, next the land use change factors – natural, political and socio-economic ones.

In this paper various maps, made in the 19th and 20th c., were used, and the iconographic materials from the same period, both showing the scope of particular uses. The most valuable source for the eve of the 19th c. is military cartographic plane of the Western Galicia, made in the 1801–1804 period under the guidance of A. von Heldensfeld, in the 1:28 800 scale. Moreover, using the aerial photographs from 1957, 1982 and 1994, the author analysed the basic land use trends during the 40 years of the OPN existence.

Forest covers actuality 71.4% of the OPN area. In the eve of the 10th c. their share amounted nearly 80%, in the turn of the 19th and 20th c. – over 58%, and during the 1919–39 period – some 54%. Over last 30 years the considerable reduction of the forest with the preponderance of coniferous trees occurred – from some 80% to 58.2%, while the stands of the deciduous ones were doubled. Those data refer only to the area of the State-owned forest of the OPN, but reflect the trend observed in the whole Park.

The forest is the essential land use form of this area. Its share increases both due to the silviculture and the natural succession. To obtain the area of forest from the eve of the past century again, is necessary the afforestation of some 150 ha. Taking into consideration the actual rate of this process in open spaces (1.7 ha yearly in average) and that of the natural succession, the return to the previous level will need some 40–50 years. The forest would cover finally all arable lands, especially on the OPN upland zones and the considerable part of the permanent grasslands, on which the trees enter spontaneously.

Arable lands cover nowadays 175 ha, i.e. 9.3% of the total OPN area. There are mainly in its upland part and – partially – in the bottom of the Prądnik Valley; the tiny plots of those are situated also in the Sąspowska Valley.

The highest share, amounting 19.7% of the OPN total area, covered the arable lands in the pre-war period. Just after the 2nd World War and during the first years of the Park existence, their share fell to 18%. Since the 70s they were reduced in the favour of the forest, and the permanent grasslands.

Permanent grasslands area increased since the mid-19th c. to the pre-war period. In the eve of the investigated period they covered 8% of the total OPN area, and about 1930 – 18%. Beside the fresh meadows situated on the valley bottoms, there also the pastures on the deforested slopes and uplands. In the post-war period their share was reduced due to the afforestation. In 1994 it amounted 11.9 % and was growing, because the arable lands stopped to be farmed.

Waters of streams and springs were taken for consumption and healing purposes in the 19th c. To the 50s of the 20th c. there were 15 mill-streams of the total length of some 6 km. In the post-war period 5 of those disappeared (1.5 km). Of the existing 10, that in the Sąspowska is one of those kept in repair. It supplies with water the trout farm ponds at Ojców. These ponds (11 in total) are also a typical element of the OPN landscape.

Settlement. There is only one village, all situated within the OPN area – that of Ojców, consisted of 64 houses, of which 10 are abandoned. Moreover, there were single houses, being the parts of other villages. The compact settlement is observed only in the centre of Ojców, southward of the ruins of the Ojców Castle to the mouth of the Sąspowska Valley, i.e. along 1 km. Out of this area the settlement is dispersed.

Transport. Before the transit road in the Prądnik Valley bottom was built, there were only the local, soil-surfaced roads. Actually the road network within the OPN area is 49.5 km long, i.e. 0.4 km/km². The hard-surfaced public roads are 25.2 km long, in that the roads with bituminous pavement – 18 km. These are the national, voivodeship and community roads.

In the period of the land use changes with in the OPN area one can distinguish some characteristic subperiods:

- 1800–1864
- 1865–1920
- 1921–55, with two stages, those of 1921–45 and 1946–55
- 1956–96, with two stages, those of 1956–89 and 1989–96.

The 1800–64 period, since the partition of Poland to the January Uprising was that of the extensive use of the discussed area, thus the man's influence on the natural environment was small. In the western sector of the OPN began the cutting of the oak and pine forests. In the eve of the 19th c. the tourist penetration of the analysed area was initiated, according to the all-European trend of growing interest to the nature and history.

The 1865–1920 period, after the changes of the Ojców estate owners, was that of the spoliatory exploitation of the forests. The stands were cut in masses, thus the share of the arable lands in the upland zone and appeared agricultural enclaves within the forests. On the slopes sheep and goats were grazed. In the turn of the 19th and 20th c. the share of forest fell to

58.2%, while that of the arable land increased to 35.8%. In the end of the 19th c. Ojców health resort developed considerably. This was a symptom of ideas concerning the nature protection in this period – the spa protected fully the nature within its area.

The 1921–56 period. In 1924 the concept (not realized) of the reserves in the valleys of Prądnik and Saspowska was elaborated. The hard winter of 1928/29 made considerable harms in the Ojców forests, in the spruce ones especially. In the turn of the 20s and 30s the forests covered 53.7% of the total OPN area, and the agricultural lands (the deforested zones included) – 37.7%. The latter ones were afforested with pine, forming unispecific stands.

After the 2nd World War, over the 1946–55 years, the afforestation was continued. The local farmers used intensively their arable lands and meadows in the valleys, grazed their animals on the deforested slopes.

Due to the change of the socio-political system, number of tourists grew abruptly. The structure and forms of the tourist traffic showed the disadvantageous evolution.

The 1956–96 period. The changes of function of the discussed area were then connected with the creation of the Ojców National Park in 1956. In 1957 the forest covered 61.7% of its area, the agricultural lands: 28.6%, due to the continuous afforestation. The farmer lands were bought and afforested, the succession of trees and shrubs reduced the area of grass and rock biocenoses, which species composition became poorer. The limiting and decline of the traditional farming accelerated expansion of trees and shrubs on the permanent grasslands and on the arable lands.

Began also the negative influence of the industrial plants situated in the vicinity of the OPN. Since the 60s. the considerable losses were noted in the forest stands, especially in those situated on the upland. The decay of the coniferous species was accompanied by the expansion of the deciduous ones, especially the beech stands and *Tilio-Carpinetum* forests.

The development of the settlement in the vicinity of the OPN (mostly in the city of Skała) influenced negatively the quality of the Prądnik water. The zinc and lead mining in the Olkusz region lowered the underground water table, thus the capacity of springs decreased. The political transition of Poland after 1989 was also reflected in the Park. The number of cars arriving to the OPN grew considerably. The Prądnik Valley became crowded, the cars occupy road shoulders and other unallowed places, the air is more polluted by combustion gas.

Summing up his considerations, the author corroborates that:

– the land use changes in the area of the Ojców National Park and their dynamics over the researched period are strongly connected with their natural, political and socio-economic background,

– they were strongly influenced by socio-political phenomena observed in the 1st half of the 19th c., i.e. the protection and the significance of this area for the nation deprived of its State,

– the industrial revolution and changes of the Ojców estate owners during the 2nd half of the past century made the considerable harms in the OPN nature. Response was the counter-action, which could guarantee the protection of the nature and the landscape of the area. Thus, this was the crucial period, after which the natural value of the Prądnik Valley was safe. The landscape variety of this area was then appreciated, and after some decades it began to be protected legally,

– the 1919–39 period was that of the balance, but was also the preparatory one for the next stage of struggle for the Ojców nature protection,

– in the post-war period the considerable disturbed, it was difficult to protect the landscape and the buildings of the historical value – but, on the other hand, the legal protection was introduced, sanctioned by the National Park establishing.

Translated by Z. Górka

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**ZMIANY SKŁADU GATUNKOWEGO I ZASOBNOŚCI
DRZEWOSTANÓW
W OJCOWSKIM PARKU NARODOWYM**

**Changes of Species Structure and Forest Stand Capacity
in the Ojców National Park**

ABSTRACT. The author deals with the regeneration of forest, which before the Ojców National Park establishing was worked out and its species structure changed. During the period of nearly 70 years the share coniferous species fell at 32% at the favour of the deciduous ones, and the total capacity grew at 138%. Over the 30 year period within the strict protection zone the percentage of coniferous trees decreased at 20.6%, and the capacity increased at 102%, while the respective data for the partial protection zone do 14.7% and 90%.

KEY WORDS: The Ojców National Park, species structure of the forest stands, capacity of the forest stands, trends and dynamics of changes.

SUMMARY

The Ojców National Park (OPN) was established in the forest area, which was intensively cut in the past, and then, due to the man-made afforestation, changed the natural species structure of its forest stands. Results of forest inventory, made in order to elaborate forestry plans, let the author to valuate trends in evolution of the species structure and the stand capacity, occurring mostly due to the natural regeneration of the forest.

To define trends and volume of those changes, the author used the data from the first inventory, that from 1923/24, next those from 1962, after the OPN creation – and those from 1992. For the part of the OPN it was possible then to find the dynamics of changes occurred during 70 years, and for the most of its area – to show effects of strict and partial protection, realized over the 30 year period.

In 1923/24 on the area of nearly 530 ha of the former Ojców district, actually all within the OPN limits, dominated the coniferous species, with their average share amounting 92.54%, composed of those of fir (57.08%), pine (18.48), spruce (10.95%) and larch (5.95%). Of the share of the deciduous trees (7.50% only), 6.43% fell to beech, and 1.07% – to admixtures of horn-beam, oak, birch and alder-tree. The forest capacity was estimated at 154.89 m³/ha.

To 1962 the share of the coniferous trees in the discussed area fell at the favour of the deciduous ones at 14.48%, and the total capacity grew at 48%. In the 1962–92 period the further decrease of the coniferous species – at 17.58% – was observed, while the capacity increased at 61.18% (Table 4). Over the whole 1924–92 period the share of the coniferous trees fell at 32%, and the stand capacity grew at over 138%.

In the strict protection zones the share of the coniferous trees amounted in 1962 37.42% and to 1992 was reduced at the favour of the deciduous ones at 16.82% (Table 12). The forest stand capacity grew from 192.08 m³/ha to 387.50 m³/ha – at nearly 102%. Similar, although alightly smaller changes were observed in the 30 year period in the zones of the partial protection (Table 13), in which the forest stand capacity increased at over 90%, to 359.05% m³/ha in 1992.

The described changes of the forest stands in the Ojców National Park are the good example of the regeneration process of the deformed forest biocenoses and the rational effect of the nature protection, realized in the natural reserves.

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**OJCOWSKI PARK NARODOWY I JEGO OTULINA NA MAPACH
OD DRUGIEJ POŁOWY XVIII r. DO 1960 r.***

**The Ojców National Park and its Covering on Maps Since the 2nd Half of
the 18th c. to 1960**

ABSTRACT. The area of the Ojców National Park with its covering has been presented on Polish, Austrian, Russian and Prussian topographic maps since the 2nd half of the 18th c. The considerable historical value is that of maps based on direct military topographic planes, because due to them is possible a valuation of the geographical environment differentiation and its evolution.

KEY WORDS: history of cartography, the Ojców National Park.

SUMMARY

The author shows retrospectively the area of the Ojców National Park (OPN) with its covering on the general and detailed maps, the Polish, Austrian, Russian and Prussian ones.

The paper is consisted of next and the illustrative-graphic part. The text is a description of maps used by the author, chronologically ordered, with their catalogue data and content elements. In the second part there are fragments (or sheets) of reproduced maps in original scales, referring to the OPN area, with explanation of symbols and original (partially) title pages of those maps.

The cartographic image of the discussed area appeared formerly on the "Map of the Cracow Voivodship" by Perthées (1787). After the third partition of Poland and the annexation of the discussed area by Austria, the military plane by A. Heldensfeld and first detailed maps (1:28 800) were made. Political changes in 1815 and establishing of "Polish Kingdom" (controlled by Russia) was the next stage of topographic map development, in which important were "Logistic Map of Armed Forces" (1839), "War-Topographic Map of Russia" and "New Topographic Map of Western Russia", made in the second half of the 19th c. Before the outburst of the 1st World War, Prussia and Austria made also a series of topographic maps of Polish lands, of which the most valuable are "Map of Western Russia" and "Special Map". In Poland after 1919 the Military Geographical Institute made new topographic maps, i.e. "Detailed Map 1:25 000" and "Tactic Map 1:100 000". In the post-war period the OPN area was shown on administrative and tourist maps.

All discussed maps let valuate the changes of the geographical environment of the Ojców National Park area over bicentennial period.

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**OBSZAR ZAPOWIEDNIKA MIODOBORY (UKRAINA)
NA MAPACH OD DRUGIEJ POŁOWY XVIII w.
DO DRUGIEJ WOJNY ŚWIATOWEJ***

**Area of Medobory Nature Reserve (Ukraine)
on Maps Since the 2nd Half of the 18th c. to the 2nd World War**

ABSTRACT. The area of the present Medobory Nature Reserve (Ukraine) was presented on Polish, Austrian and Russian topographic map since the 2nd of the 18th c. For the knowledge on topography of this area the most important are the Austrian military topographic planes from the second half of the 18th c. and those from the 19th c. and those from the 19th c. – and Polish military maps, elaborated in the 30s.

KEY WORDS: history of cartography, the Medobory Nature Reserve (Ukraine).

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SUMMARY

The author presents, from the historical point of view, the cartographic image of the Medobory Nature Reserve on old general and topographic maps, made by Polish, Austrian and Russian cartographers.

The next section of the paper is the chronologic description of maps, with their catalogue data and the content elements. In the second part there are fragments or sheets of black-and-white or coloured maps in original scales, referring to the Medobory Reserve area, with explanation of symbols and some original title pages of those maps.

One of the important maps of the discussed area is "Map od Poland by Zannoni-Jabłonowski" from 1772. After the 1st partition of Poland and the annexation of the discussed area by Austria, in the period between the end of the 18th c. and that of the 19th c. three military topographic planes had been made, which were next used in the elaboration and publication of administrative and topographic maps. These were "General Map" (1:28 800) and "Special Map" (1:75 000). The eastern sector of the Medobory Reserve, belonging then to Russia, was shown on the Russian topographic map (1:120 000).

After the 1st World War this area, lying in Poland, was elaborated by the Military Geographical Institute, Warsaw, on the topographic maps – "Tactic Map" (1:100 000) and "Operational Map" (1:300 000).

The cartographic image of the Medobory Reserve, presented by the author on maps, shows also the geographical environment of this area in several time section, making possible an analysis of its changes.

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**PRZEMIANY WSI I ROLNICTWA
W SĄSIEDZTWIE GÓRSKICH PARKÓW NARODOWYCH
NA PRZYKŁADZIE GMINY NOWOTARSKIEJ**

**Changes of the Country and Agriculture Near Mountain National Parks –
Community of Nowy Targ Example**

ABSTRACT. The author shows the postwar economic transition of Podhale villages, lying close to mountain national parks, due to industrialization, abroad migration and tourism development. The scope of his research contains the community of Nowy Targ. The basic problem is the agricultural land use evolution in the period of changes from the traditional agriculture to the modern one.

KEY WORDS: Land use transformation, agriculture, economic migration, national parks.

SUMMARY

Changes of the country and agriculture are often dealt with geographers. They usually return to this theme during periods of the radical changes of the political system and the related economic one. This is also the matter of the discussions between the generations, led by those, who search their roots in the country and want to know the conditions of the development of the social environment, from which they originate. These problems are also considered by the self – governmental bodies for which the knowledge of the past is necessary in the choice orientation of the further development. The new motivation for these discussion is the turn of centuries (also that of the millennia) – the period of syntheses and valuations. The deep transformation of the country and agriculture is also dealt in Poland in the context of the hoped integration of her with the European Union.

To know the course of the transition process, we must use the credible statistical data and documents, to analyse the publications – and to turn to the witnesses of the past.

The Institute of Geography and Spatial Economy, Jagellonian University, has made for many years the investigations in the Carpathians – these on the geographical – agricultural problems (i.e. the land use evolution) included. Many master theses on those problems were made by the students guided by professors. The most valuable are the theses made by the students in the areas of their origin. Due to the full knowledge of local conditions and the easy contact with the inhabitants the results of those works are very credible.

In the Nowy Targ community such the investigations were made by J. Leśnicki in the village of Gronków (1965) and M. Pranica at Klikuszowa village (1995). The former work concerned the problems of the country and agriculture in the Podhale region in the post – war industrialisation eve, the latter one showed the results of the political and economic transition, realised in Poland in the turn of the 80s and 90s.

The author of this paper made his research more general, considering the economic transition of the whole Podhale region, using as the base land use evolution in the Nowy Targ rural community.

The Podhale Basin, together with the Tatra Mts. and the city of Zakopane (the so – called “winter capital” of Poland) is the famous region of the tourism and recreation. The tourist attractiveness of the discussed region is enhanced by its site close to National Parks, those of Tatra Mts., Gorce Mts., Pieniny Mts., and Mt. Babia Góra. The Nowy Targ community lies near the Gorce National Park – a small part of the Łopuszna village enters into the Park area, and the neighbouring villages, situated on the left bank of the Dunajec River, form its outer, buffer zone.

The denivelations within the Nowy Targ community vary from 525 a.s.l. at Dębno to some 1310 m at Obidowa and Waksmund (Mt. Turbacz in the Gorce Mts.).

The Nowy Targ Basin is separated from Mts. Gorce by the Dunajec River. Many of the villages, created in the present community area in the 14 th. c., under the reign of the last kings of the Piast dynasty (and even earlier) still keep their longitudinal pattern. Establishing their village in the zone between the plain and the mountains, the pioneers wanted to have an access to forests, covering the slopes nearby. The wood was always appreciated in the Podhale region. Formerly the settlement zones were situated in the lower parts of the particular villages, on one side of the Dunajec – or on both its banks. But later, as the deforestation of the southern slopes of the Gorce Mts. was continued, the settlement appeared deeply in the mountains, forming isolated clusters on the glades.

Until the 50s the Podhale agriculture showed many traditional features and was nearly the self – sufficient one. The successive generations of highlanders kept the principles of the work elaborated by their ancestors, who had come from lowlands. In the past the basic sector of agriculture was the farming of the arable lands. Such the principle was very inadequate under the mountain natural conditions.

The domination of the arable orientation in the Podhale agriculture, typical till now, can be shown on the Gronków village example. This village lies on the altitudes 600–700 m, has the vegetational period shorter at over 30 days in comparison with that in the Cracow region, the temperatures are lower, the spring light frosts last longer and the autumn ones begin earlier, thus the period free from those frosts is considerably short. If we add to this the greater quantity of the precipitation, the poor soils exposed to the erosion on the steep slopes – we shall understand, why only some crops can be planted in this region. Nevertheless, according to the statistical data from the mid – 19 th.c., the arable land cover 84 % of the Gronków area, and the total share of the agricultural lands did nearly 95 %. It seems that such the great share is fully possible, as 2/3 of this village cover the flat bottom of the Nowy Targ Basin, where the slopes inclined over 10° are scarce. But another barrier is that of climate and soils. It makes impossible the agriculture similar to that from the environs of Kraków, Miechów or Tarnów, kept by the ancestors of the actual Podhale inhabitants.

Copying of those inadequate patterns in the Podhale region was strange, as in the mountain agriculture the animal production had always priority. According to highlanders’ opinion, the respectable farmer was that who kept animals – cattle, sheep, or (the rich ones) – the horse. To the new-married usually 1–2 cows were given by their parents. It was uneasy to live without animals on the poor mountain soils. The crops could not be sold and all the surpluses had to be transformed into the animal products.

According to the data from 1935, the considerable share of the agricultural lands was observed at Gronków (95,1%) and in the remaining villages of the Nowy Targ community. The share of the arable land amounted at Gronków 87,8 %, while those of meadows and pastures did 5,7 % and 5,6 % respectively. Forests covered some 1 % only, the other uses – 3,9%.

The holdings were still self – sufficient. In Nowy Targ only eggs were sold in order to buy sugar and salt. This was the food bought in the city. The earned money was needed for taxes.

Keeping cows, the farmer family had the necessary quantity of milk, butter and cheese. The part of animal yield was slaughtered, but the basic food was potatoes. When they failed, people hungered before the new harvest. Each holding planted also the leguminous cultures – mostly pea and horse bean – which were resistible for the light frosts. Another important crop was cabbage, eaten usually with pea or bean.

Sheep skins were used for furs, the cattle ones for shoes. Those also were the products of the family holding, like wool and flax, although the use of the latter ones was very labour – consuming. Flax was processed mainly by women, who prepared it since the harvest end to the late autumn, and spinned – in winter. Of the cloth bed and table linen were sewed, also richly decorated table – clothes, napkins – and embroidered regional dresses. Nearly all those products, used by the highlander family and household, were made off flax linen.

In many holding geese were kept – several, sometimes ten or more – in order to get feathers. Such the appreciated product was used in pillows and feather – beds. The feather had the definite commercial value – thus it was an important part of the girl’ s dower and the sell of several years reserve could cover the cost of the new house. Even in the end of the 40s, according to the witnesses opinion, the money obtained for the cow and the feathers covered the cost of the house – it is difficult to tell, if the feathers were so expensive – or the building of the house was cheap.

The above discussed self – sufficiency of the highlander holdings was a result of the poor demand for their products. Therefore it was necessary – in order to maintain the family – the labour – consuming processing of all what was produced in the spot, i.e. by the holding. It is obvious, that similar were the problems of the farmers from the central Poland – but their scale was smaller.

Such the model of the land use was kept in the Podhale region until the mid-50s. Next the economic transformation began. The growing demand for the food caused changes in the land use – the arable land was changed into meadows, in order to fit the production to the needs of the animal one, which had priority in this region. The first who made it were the owners of the greater holdings, then this process was continued by others, encouraged by their neighbours success.

The sod formation is quick in the mountains (Fig. 1 and 2) due to the high precipitations. Even the stubble field in two years since the last harvest has become the meadow. If the manuring is poorer, there will be the considerable share of valuable grass species.

The greatest dynamics of the meadow area growth has been observed since the mid-50s to mid –60s. During this decade many holdings changed dramatically their orientation. The meadows, which formerly covered only the waterlogged, poor parts of the holdings and had given – without fertilizer use – the low quantity of the poor hay – became the basic element of the land use, covering also the better sites. In the villages showing considerable denivelation, the meadows entered formerly the steepest slopes, limiting thus the soil erosion.

Having more meadows, the holdings could produce more hay, thus the animal feeding was better. The valuable hay and the green fodder from the meadows replaced the dry straw. Due to more milk, the economic efficiency of the holdings ameliorated. The greater demand for milk

encouraged the farmers to enlarge cow number. Therefore the milk became one of the basic factor of the post – war transformation of the Podhale villages, possible due to traditional land use structure evolution since the mid –50s.

In the end of 1994 the Nowy Targ community had 20,247 inhabitants – 97 per 1 km². The latter index is spatially differentiated – from 31 person/km² at Obidowa, 41 – at Harkłowa and 47 – at Długopole, to 138 at Waksmund and even 212 at Ludźmierz, the village neighbouring to the city of Nowy Targ. The discussed community, although the mountain one, show the considerable demographical dynamics. During last 50 years, when in many Alpine areas the population number fell, that of the Podhale region grew at 50 %. But in particular villages this increase was unequal, according to the village function and the distance from the city. The villages the closest to Nowy Targ – like Ludźmierz and Waksmund – doubled their population, while in the same period (1950–94) the growth rate was weaker in the peripheral villages and in those having more difficult natural conditions, like Obidowa, Harkłowa, Szlembark – and even that Dębno (Tab. 4, Fig. 7–9).

Among the basic factors of the post – war economic development of the Nowy Targ community one must mention the abroad migration, which tradition is dated back to the mid-19th c. The agrarian overpopulation forced the highlanders to search for the additional income source. The yields were low and uncertain, the food lacked – this was the peculiar form of the “Galician Poverty”.

But it is difficult to tell, whether the emigrants were the people more helpful, courageous and enterprising than the others – or were forced to emigration by the poor economic situation. According numerous specialists, the most enterprising people left their country. They hoped to live better somewhere else.

The results of the 1993 – 95 investigations show that the role of agriculture in the discussed community is reduced considerably. If 20 – 30 years ago the share of agriculture in the total income of the rural population prevailed those of the remaining sectors, actually it is below 1/3, and even less at Waksmund, Ostrowsko, Łopuszna, Klikuszowa and Ludźmierz. In the latter localities prevail the small holdings, thus their output is small and the low level of the income from the agriculture made the population to look for other opportunities to earn money.

According to statistical data, corrected by the results of the author’ s questionnaire research, the greatest holdings are in the Nowy Targ Basin, in the villages of Gronków, Długopole and Nowa Biała. Those villages (especially the first two) are the emigration villages, for which typical are the holdings of 5 – 10 ha size, although there are some over 10 ha, forming the 10 % share of the total number (in the whole community their share amounted several %). It is necessary to explain that the mean size was calculated, dividing the total area of the registered agricultural land by the number of holdings really managed holdings. The emigrants do not cultivate their land – they leased it or lent to family members, or to neighbours. The same solution chose those who are present in the village, but – from various reasons – ceased their agricultural work. Both the cases can be treated as the liquidation of the holding, and the use of the abandoned land by other farmers is the special form of the land concentration (Tab. 7, Fig. 12).

The mechanisation level in the particular villages of the Nowy Targ community is very differentiated. The modern machinery is expensive, thus the purchasing of it is efficient only for the great holding, especially in those, where the man – power lacks. But the use of machines in the mountains (especially the heavy ones) is limited by the relief and the dimensions and quality of the field roads.

Therefore the mechanisation is the most advanced in the villages, where the holdings are great, the natural conditions proper – and the funds sufficient – i.e. at Długopole and Gronków, the traditional migratory villages, which population is backed by the inflow of the US dollars. The similar mechanisation level is observed at Nowa Biała and Krempachy.

In the post-war period the yields grew considerably. If in the 60s those of hay were slightly over 40q/ha (oscillating at 20 – 30 %, according to the soil and weather), actually those yields amount 50 – 80 q/ha. Thus the productivity of land and farmer was doubled.

This productivity should be measured mainly by that of permanent grass lands. The hay yields, estimated at 60 q/ha in average, considerably recompense the poor yields of cereals. It is worth to add, that in the communities neighbouring the city of Cracow the discussed yields scarcely exceed 50 q/ha. The mountain hay is much more valuable as the fodder – if dried properly, it can keep more (even at 1/3) the nutritive components.

Grazing of the sheep on the mountain meadows – so popular in the past – actually lost its economic significance. If backed financially, this form of agriculture can stay in the mountains, as the element of folk culture important for tourist function of the region.

In the Nowy Targ community there are three orientations of the agricultural production – milk, milk – fattening and the mixed ones (Tab. 9, Fig. 14). The basic branch is dairying, as at 12 villages milk gives 65 – 90 % of the total production value. This branch is also crucial for the market production. The cattle milk – fattening orientation is the production in which the values of both the branches are similar. The mixed orientation shows the similar shares of some branches, with small surpluses sold.

The dairying dominates in the eastern part of discussed community (at Gronków, Nowa Biała, Krempachy, Waksmund, Ostrowsko, Łopuszna, Harkłowa, Szlembark and Knurów) and at some villages lying west of Nowy Targ (Morawczyzna, Pyzówka, Ludźmierz and Lasek). The milk – fattening orientation is developed at Rogoźnik, Długopole and Klikuszowa, while the mixed one – at Dursztyn, Dębno and Trute.

The holding specialized in the milk production sell the milk on the spot (in the farmyard) or process it into cheese. The cheese is the typical product of the villages along the Dunajec River. It is produced by the owners of the small holdings, processing the small quantities of milk into the smoked cheese.

In the polyfunctional economic structure of the discussed villages important is also the role of craft. This sector of the Podhale economy is actually in the stage of the deep transformation. The traditional branches (i.e. home work) are falling, replaced by the new ones, needed by the modern economy.

The Nowy Targ community has been known since many years as the tourist area. But the role of the tourism is different in the particular villages – the tourist centres are mainly Łopuszna and Pyzówka, also that of Obidowa.

The Podhale country should keep its polyfunctional character. But the proportion between the basic sources of the rural families income – those of agriculture, craft and tourism – will be, no doubt, different within the Nowy Targ community.

Translated by Z. Górka

Prądnik. Prace Muz. Szafera	15	275–281	2005
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**POCHODZENIE I WIEK LASÓW
OJCOWSKIEGO PARKU NARODOWEGO**

Origin and age of woodlands in the Ojców National Park

ABSTRACT: This paper contain map of woodlands age in the Ojców National Park. It takes into consideration methodology, purpose of preparing this map and a short history of woodlands in Ojców.

KEY WORDS: ancient woodlands, recent woodlands, Ojców National Park.

SUMMARY

At present in landscapes of central and western Europe ancient forests of natural origin occur often on small isolated areas or in complexes with recent woodlands of different origin. An example are woodlands in the Ojców National Park. Results of different investigations show that ancient forests are considerably richer in forest herbs species than recent woodlands. A lot of this those species are indicators of ancient forests. Comparative investigations on the range of colonization of recent woodlands and regeneration of forest communities could be led when ranges of forest parts in different age are exactly known, as well as it is possible to qualify their origin. Map of distribution woods of different origin and age in the Ojców National Park was made for this reason. It is based on the historical maps and data. Age of woodland is regarded as a period of existing of forest community in given place, without its transformations into any form of agricultural use. On the map, woodlands older than 216 years were included to ancient woods category. Large part of those woods are situated in the strict reserve and it is possible to say, that they are remnants of natural woodlands. They represent mainly association: *Dentario glandulose-Fagetum*. Ancient woodlands situated near Pieskowa Skała became strongly transformed in result of forest economy. In spite of changes they are rich in forest herb species and mostly represent associations *Tilio-Carpinetum* and *Pino-Quercetum*. Recent woodlands were divided into seven classes of age.

Translated by the author

Prądnik. Prace Muz. Szafera	15	283–310	2005
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**ZAPISKI DIPTEROLOGICZNE
Z OJCOWSKIEGO PARKU NARODOWEGO**

Dipterological notes from Ojców National Park

Abstract. The paper presents a list of 300 species belonging to 33 families of flies (*Diptera*) from Ojców National Park. This number includes 256 species reported from the Park for the first time and 6 species are new to the fauna of Poland: *Hercostomus brevicornis* (STAEGER, 1842) (*Dolichopodidae*); *Agathomyia collini* VERRALL, 1901 and *A. vernalis* SHATALKIN, 1981 (*Platypezidae*); *Lyciella subpallidiventris* PAPP, 1978 (*Lauxaniidae*); *Cephalops ultimus* (BECKER, 1900) (*Pipunculidae*); *Amaurosoma minutum* BECKER, 1894 (*Scathophagidae*).

Key words: Diptera, Ojców National Park, new records for Poland.

SUMMARY

The flies (*Diptera*) are a poorly known group of insects in Ojców National Park. The majority of families have never been the subject of studies, despite a 150-year-long research tradition, a convenient location in the immediate vicinity of Kraków's research centre and the creation of national park. Data containing remarks on the *Diptera* fauna of Ojców National Park are very fragmentary and dispersed. In large part of them they come from 19th century (Waga 1857, Sznabl 1881) and concern few, gathered accidentally species. Data on many groups are completely lacking. The aim of the present study is to partly reduce this gap. The list of species is compiled on the basis of the collection of flies gathered in the course of the investigation of *Tephritoidea* and stored in the Museum of Ojców National Park.

The paper contains data on 300 species of *Diptera* belonging to 33 families that occur in the Park. Among them there are 256 species reported from the Park for the first time and 6 species new to the fauna of Poland *Hercostomus brevicornis* (STAEGER.); *Agathomyia collini* VERRALL; *A. vernalis* SHAT.; *Lyciella subpallidiventris* PAPP; *Cephalops ultimus* (BECK.); *Amaurosoma minutum* BECK.).

Translated by A. Krukierok

Prądnik. Prace Muz. Szafera	15	311–338	2005
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**ŻĄDLÓWKI Z RODZIN *TIPHIIDAE*, *SAPYRIDAE*, *MUTILLIDAE*,
POMPILIDAE, *EUMENIDAE*, *VESPIDAE* I *SPHECIDAE*
(*HYMENOPTERA: ACULEATA*) OJCOWSKIEGO PARKU
NARODOWEGO. CZ. II. ANALIZA ZGRUPOWAŃ**

***Tiphiidae*, *Sapygidae*, *Mutillidae*, *Pompilidae*, *Eumenidae*, *Vespidae* and *Spheci-
dae* (*Hymenoptera: Aculeata*) of Ojców National Park.**

Part 2. Analysis of aculeate assemblages

ABSTRACT. The paper presents results of investigations on aculeate assemblages in the main plant communities and biotopes of Ojców National Park (southern Poland). The studies were carried out during 1990–2000 and included: boundary strips and fallows, wooden buildings, beech forest (*Dentario glandulosae-Fagetum*), ecotones, meadows (*Arrhenatheretum medioeuropaeum*), pastures (*Lolium-Cynosuretum*), wet meadows (*Cirsietum rivularis*), tall herb communities with *Urtica dioica*, mixed forest (*Pino-Quercetum*), escarpments and abrupt slopes, mixed deciduous forests (*Tilio-Carpinetum*) and xerothermic grasslands (*Origano-Brachypodietum* and *Festucetum pallentis*). During the studies 191 species from the families *Tiphiidae*, *Sapygidae*, *Mutillidae*, *Pompilidae*, *Eumenidae*, *Vespidae* and *Sphecidae* (*Hymenoptera: Aculeata*) were collected in the area (near 50% of species known from Poland).

The most diverse aculeate assemblage was found in ecotones, with as many as 119 species. The second rich one inhabited xerothermic grasslands (106 species), and the third was found on wooden buildings (95 species). Beach forests had the least diverse aculeate community with only 21 species.

The species composition of each aculeate assemblage in the Park is described and the species are grouped into five sets: characteristic exclusive, characteristic, distinguishing, accompanying, and accidental species. The similarities between the assemblages were calculated.

KEY WORDS: *Tiphiidae*, *Sapygidae*, *Mutillidae*, *Pompilidae*, *Eumenidae*, *Vespidae*, *Sphecidae*, insect communities, Ojców National Park, Poland

SUMMARY

Investigations on aculeate communities in the main plant communities and biotopes of Ojców National Park (southern Poland) were carried out during 1990–2000. The studies included: boundary strips and fallows, wooden buildings, beech forest (*Dentario glandulosae-Fagetum*), ecotones, meadows (*Arrhenatheretum medioeuropaeum*), pastures (*Lolium-Cynosuretum*), wet meadows (*Cirsietum rivularis*), tall herb communities with *Urtica dioica*,

mixed forest (*Pino-Quercetum*), escarpments and abrupt slopes, mixed deciduous forests (*Tilio-Carpinetum*) and xerothermic grasslands (*Origano-Brachypodietum* and *Festucetum pallentis*). During the studies 181 species from the families *Tiphiidae*, *Sapygidae*, *Mutillidae*, *Pompilidae*, *Eumenidae*, *Vespidae* and *Sphecidae* (*Hymenoptera: Aculeata*) were collected in the area (near 50% of species known from Poland).

As far as species richness is concerned, the most diverse aculeate community was found in ecotones, with as many as 119 species. The second rich aculeate community inhabited xerothermic grasslands (106 species), and the third was found on wooden buildings (95 species). Beach forests had the least diverse aculeate community with only 21 species.

Two species were collected in all of the studied biotopes: *Vespula vulgaris* (*Vespidae*) and *Trypoxylon minus* (*Sphecidae*). Other ubiquitous species, that were collected in all but one biotopes (both in forest and non-forest ones) were: *Auplopus carbonarius* (*Pompilidae*), *Ancistrocerus gazella*, *A. nigricornis*, *A. trifasciatus*, *Symmorphus debilitatus*, *S. gracilis* (*Eumenidae*), *Dolichovespula saxonica*, *D. sylvestris*, *Vespula rufa* (*Vespidae*), *Passaloecus singularis*, *Stigmus pendulus*, *Crossocerus cetratus*, *C. congener* and *C. quadrimaculatus* (*Sphecidae*). 96 species were collected in non-forest communities exclusively, and 11 out of them were found in all of the non-forest biotopes: *Priocnemis fennica*, *Evagetes crassicornis*, *Anoplius nigerrimus*, *A. viaticus* (*Pompilidae*), *Dolichovespula media*, *Polistes biglumis bimaculatus*, *P. dominulus* (*Vespidae*), *Mimunesa unicolor*, *Oxybelus uniglumis*, *Entomognathus brevis* and *Crabro cribrarius* (*Sphecidae*).

The following species were recorded exclusively in forest communities and on wooden buildings: *Pemphredon lugubris*, *P. montana*, *P. rugifera*, *Passaloecus eremita*, *Spilomena curruca*, *Nitela spinolae*, *Trypoxylon clavicerum*, *Ectemnius lituratus* and *E. ruficornis* (*Sphecidae*).

The highest number of characteristic species was found in xerothermic grasslands. 12 of them were discovered in the Park exclusively in these biotopes, among them many xerothermophilous: *Priocnemis minuta*, *Arachnospila ausa*, *Aporus pollux* (*Pompilidae*), *Spilomena mocsaryi*, *S. punctatissima*, *Ammoplanus marathroicus*, *A. pragensis* and *A. perrisi* (*Sphecidae*). The aculeate community found on wooden buildings was also well developed, with 5 species occurring exclusively in this biotope. The most interesting species there were: *Discoelius zonalis*, *Microdynerus timidus* (*Eumenidae*), *Passaloecus vandeli*, *Polemistus abnormis*, *Trypoxylon kolazyi* and *Rhopalum austriacum* (*Sphecidae*).

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**ŻĄDLÓWKI Z RODZIN TIPHIIDAE, SAPYGIDAE, MUTILLIDAE,
POMPILIDAE, EUMENIDAE, VESPIDAE I SPHECIDAE
(HYMENOPTERA: ACULEATA)
OJCOWSKIEGO PARKU NARODOWEGO.
CZ. III. WALORYZACJA I STAN POZNANIA W POLSCE**

***Tiphiidae, Sapygidae, Mutillidae, Pompilidae, Eumenidae, Vespidae
and Sphecidae (Hymenoptera: Aculeata) of Ojców National Park.
Part 3. Evaluation and state of knowledge in Poland***

ABSTRACT. The paper presents an attempt to elaborate a simple and effective method of three level evaluation for the purposes of nature protection. The first level of evaluation deals with aculeate species from selected families (*Hymenoptera: Tiphiidae, Sapygidae, Mutillidae, Pompilidae, Eumenidae, Vespidae* and *Sphecidae*) recorded in the Ojców National Park during the research carried out in 1990–2002. The second level uses the values of each and every aculeate species to evaluate the plant communities and biotopes in the National Park. The third evaluation, again using the values of the *Aculeata*, points the most valuable localities in the Park. The state of knowledge of the studied aculeate families in Poland is presented. The comparison between the fauna of the Ojców National Park and other areas in Poland is given.

KEY WORDS: Poland, *Hymenoptera, Tiphiidae, Sapygidae, Mutillidae, Pompilidae, Eumenidae, Vespidae, Sphecidae*, Ojców National Park, evaluation, nature protection, state of knowledge

SUMMARY

The paper presents an attempt to elaborate a simple and effective method of quality scoring (evaluation) for the purposes of nature protection. The first evaluation deals with aculeate species from selected families (*Hymenoptera: Tiphiidae, Sapygidae, Mutillidae, Pompilidae, Eumenidae, Vespidae*, and *Sphecidae*) recorded in the Ojców National Park during a research carried out in 1990–2000. The criteria of evaluation of the species are as follows:

- a. number of records from Poland (practically – the number of 10x10km UTM squares: from very common with the scoring ‘1’ to the species known in Poland exclusively from the area of Ojców National Park with the scoring ‘4’),
- b. zoogeographical character (from widely distributed with the scoring ‘0’ to relic species with the scoring ‘3’),

c. environmental requirements (from eurytopic species with the scoring '0' to stenotopic ones with the scoring '2').

Taking into consideration the above criteria the most valuable species of the *Aculeata* are: *Passaloecus vandeli* (with 9 points), *Aporus pollux*, *Microdynerus exilis*, *Pemphredon flavistigma*, *Spilomena mocsaryi*, *Ammoplanus handlirschi*, *A. pragensis*, *A. wesmaeli*, *Trypoxylon kolazyi*, and *Rhopalum ausriacum* — all of them received the score '8'. All the species may be called 'the primary faunistic value'. To the next group, with 7 points belong the following species: *Priocnemis fennica*, *Pseudomicrodynerus parvulus*, *Passaloecus borealis*, *Spilomena punctatissima*, *Crossocerus cinxius*, and *Gorytes fallax*. Together with the species which have got '6' points in the scoring they may be called 'the secondary faunistic value'.

The second level of evaluation deals with plant communities and biotopes in the Ojców National Park, and it is proposed with the use of the results of the first scoring: for each and every plant community and biotope the points of all the species recorded are summarized. The result are as follows: the most valuable are ecotone biotopes (with the highest scoring of 313 points), and xerothermic grasslands (with 300 points).

The third level of evaluation deals with the localities in the Park: for each and every locality the points of all the the species recorded are summarized. The result are as follows: the most valuable locality is Grodzisko — with xerothermic grasslands and the highest number of *Aculeata* species with the highest number of the species which belong to 'the primary faunistic value'.

Comparison of the number of species known from the Park with other regions in Poland shows, that its *Aculeata* is known quite well, what is a result of the recent research. There were almost 50% of the species recorded in the Park out of 389 species representing the families mentioned above in Poland. The species known in Poland exclusively from the Park are: *Pemphredon mortifera*, *Passaloecus vandeli*, *Ammoplanus pagensis*, and *Rhopalum austriacum*.

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**MATERIAŁY DO ZNAJOMOŚCI PAJĄKÓW (*ARANEAE*)
OJCOWSKIEGO PARKU NARODOWEGO**

**A contribution to the knowledge of spiders (*Araneae*)
of the Ojców National Park**

ABSTRACT. Among the 104 species of spiders indicated in this publication — 79 of them were not listed from the Ojców National Park. The presence of very rare xerothermophilous species, such as: *Pardosa bifasciata*, *Cheiracanthium montanum*, *Trachyzelotes pedestris*, *Xysticus robustus* suggests that the xerothermic environments of OPN are well maintained. Based on this information, it is necessary to continue the current environmental action. It is also necessary to start research as quickly as possible in order to complete the knowledge we have of spiders (*Araneae*) which inhabit the Ojców National Park.

KEY WORDS: *Araneae*, Ojców National Park, Poland

SUMMARY

Material used in this research has been collected in the Ojców National Park (Southern Poland). Among the 104 species of spiders found — 79 of them had not been previously listed from the Park area. Rare xerothermophilous species such as: *Pardosa bifasciata*, *Cheiracanthium montanum*, *Zodarion germanicum*, *Trachyzelotes pedestris*, *Xysticus robustus* were found. Finding these species of spiders in the small amount of material available to create this publication suggests that the xerothermic environments of OPN are well maintained. It is also an indication that it is necessary to continue the current environmental action dealing with protecting xerothermic environments. It would be a good idea to do more research as quickly as possible on spiders that inhabit OPN, as the current state of research dealing with this group of invertebrates is not satisfactory.