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## Reaction to playback and density estimations of Syrian Woodpeckers *Dendrocopos syriacus* in agricultural areas of south-eastern Poland

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**Abstract.** The numbers and density of Syrian Woodpeckers were estimated in a synanthropic environment in an area of 238 km<sup>2</sup> in SE Poland during 2003–2005. The combined cartographic method together with voice stimulation (playback) was used during the study. The birds' reaction to the playback was also assessed. It was found that the woodpeckers reacted most strongly to voice stimulation in March and April, which led to a high rate of discovering breeding sites during this period. During the breeding period (May–June) the birds reacted less strongly to playback, which significantly decreased our ability to find their territories. The woodpeckers most often reacted to vocal provocation by drumming and emitting alarm calls, which permitted rapid confirmation of the birds' presence in their territories. During the three years of the study, respectively 29, 41 and 35 Syrian Woodpecker breeding pairs were confirmed, giving a mean density of 1.2–1.7 pairs/10 km<sup>2</sup> for the entire study area, and 13.8–19.5 pairs/10 km<sup>2</sup> calculated for the area of optimal habitat, such as orchards, tree lines and the scattered tree growth associated with human settlements (21 km<sup>2</sup>). The densities noted are among the highest found in both Poland and Europe.

**Key words:** Syrian Woodpecker, *Dendrocopos syriacus*, number of pairs, density, agricultural landscape, playback stimulation

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### INTRODUCTION

The Syrian Woodpecker is an expansive species that inhabited Europe at the end of the 19<sup>th</sup> century (Nowak 1971, Glutz von Blotzheim & Bauer 1980, Cramp 1985). The first observations of this woodpecker in Poland were made in 1978 near Rzeszów (SE Poland), where it was also first confirmed to have bred a year later (Ciosek & Tomiałojć 1982). Since that time, its continual advance in colonising areas to the north and west has been noted (Skakuj & Stawarczyk 1994, Tomiałojć & Stawarczyk 2003). This species prefers synanthropic habitats, settling in orchards, parks, tree lines or treed avenues, avoiding forested areas where it nests only sporadically (Ruge 1969, Winkler 1972, Cramp 1985, Winkler et al. 1995). To date, the distribution of this species in Europe has been presented by providing the locations of confirmed observations (Gorman 1996, Kren 2000,

Tomiałojć & Stawarczyk 2003). Only exceptionally was the status of Syrian Woodpecker population numbers presented for larger areas (Walas & Mielczarek 1992, Hordowski 1998, Luniak et al. 2001). Papers presenting exact numbers based on located nests are sporadically encountered, and relate to only small study areas (Szlivka 1957, 1962).

The difficulty in estimating the number of Syrian Woodpeckers results, among others, from poor understanding of its biology and ecology, compared to other European woodpeckers (Glutz von Blotzheim & Bauer 1980, Cramp 1985). The difficulty in finding its territories and nest holes are related to the lack of knowledge about this species nesting preferences and its secretive behaviour during the breeding season.

Currently, woodpecker numbers are more often estimated using voice stimulation (playback) (Günther 1992, Wesołowski 1995, Noah 2000,

Wesołowski et al. 2005). This practice significantly increases the effectiveness and efficiency of fieldwork, which was clearly confirmed in the case of the Middle Spotted Woodpecker *Dendrocopos medius* (Kosiński & Winiński 2003, Kosiński et al. 2004). High territorial activity of woodpeckers during the pre-breeding season, when the birds are establishing and defending their territories, is useful during searching for them (Cramp 1985, Pasinelli et al. 2001).

The paper presents the reaction of Syrian Woodpeckers to vocal provocation and the density of breeding pairs in an agricultural landscape.

## STUDY AREA

Research was conducted in the townships of Łaszczów and Telatyn (an area of 238 km<sup>2</sup>), 30 km east of Tomaszów Lubelski (50°32'N, 23°48'E, SE Poland). This area is characterised by a fairly diverse geography with hills 195–263 m. above sea level. Due to its very rich soil, the area has a typical agricultural character, with a predominance of cultivated fields and meadows (72.6% and 13.6% of area respectively). The woods, comprising barely 4.9% of the area, have a significant proportion of Hornbeam *Carpinus betulus*, oak *Quercus* sp. and Scots Pine *Pinus sylvestris*. There are also extensive orchards (0.6%) of fairly young stands from 5–20 years of age. They are mostly comprised of dwarf Cultivated Apple *Malus domestica*, but Sour Cherry *Prunus cerasus* and Common Hazel *Corylus avellana* are also encountered. The tree cover in built-up areas (8.2%) mainly consists of orchards dominated by fruit trees 30 to 40, and often 60 years old. In addition to those species just mentioned, Walnut *Juglans regia*, Cherry (*Cerasus*) *Prunus avium* and Pear *Pyrus domestica* as well as plum *Prunus* sp. trees grow here. The study area also has many treed avenues, tree lines and stands of sparsely grouped trees. Many deciduous species are found in such places as, for example, poplar *Populus* sp., willow *Salix* sp., ash *Fraxinus* sp., maple *Acer* sp., lime *Tilia* sp. and Common Hornbeam *Carpinus betulus*. Parks and cemeteries are more rarely encountered, but they have a similar species composition, and the trees here are often over 100 years old. Evergreen trees are found only exceptionally in the study area and are represented by spruce *Picea* sp., larch *Larix* sp. or pine *Pinus* sp.

## METHODS

After an initial survey of the area in 2002, an assessment of the number of Syrian Woodpecker territories and their reaction to playback was made in 2003–2005. Fieldwork was conducted for specific years over 21, 39 and 37 days for 160, 290 and 270 hours respectively. Due to the large size of the study area, observers were able to cover about half of it during one count. A control of the entire study area lasted 3–4 days. Observations were conducted from the beginning of March to the end of June. In 2003, the first control took place on February 28, but in following years the return of winter forced us to begin the studies from mid-March. The search for territories began in the morning hours and was usually conducted for 6–8 h daily. The search took place in habitats considered optimal for the species, that is, in human settlements, orchards, tree lines, treed avenues and loose tree stands (in total, approx. 21 km<sup>2</sup>), located mainly along roads and streets. These were used as transects, allowing us to check the study area precisely and quickly. Stimulation points were established every 200–400 m where a 5 minute sequence of Syrian Woodpecker calls and drumming was played. The stimulation was immediately stopped upon observing a woodpecker or hearing its voice. If the bird was not observed after playback, we listened for about one minute and then moved to the next point where the search was continued. Due to the minimal chance of Syrian Woodpeckers nesting in dense forest complexes (Glutz von Blotzheim & Bauer 1980, Cramp 1985, own observations), strict censuses were not conducted there. Control counts were conducted only in areas where buildings directly abutted forests, in small tree stands located in the middle of cultivated fields and sparse tree stands in forests. Five females and six males from seven territories were colour ringed in 2002–2004, facilitating the count of bird numbers in areas of high population density.

### Identifying territories (density estimations)

The locations of the encountered birds were marked on a 1:25 000 scale topographic map, where all observations were registered. The collected data was elaborated using the combined form of the cartographic method, where territory locations and the types of confirmed birds were precisely marked (Tomiałojć 1980). A breeding territory was defined when the birds were confirmed in an area at least three times. An

additional requirement was the confirmation of a pair of birds at least once or confirmations alternating between the male and female. In addition to simultaneous observations, the ringing of birds as well as finding nests of neighbouring pairs were useful in identifying the actual number of territories in areas of the greatest pair density. Of equal importance were observations of individuals with specific plumage characteristics, for example, hybrid Syrian Woodpeckers x Great Spotted Woodpeckers *Dendrocopos major* (Kroneisl-Ruckner 1957, Skakuj & Stawarczyk 1995, Gorman 1999).

### Reaction to playback

The birds' behaviours were divided into two basic groups: 1) vocal reactions (VR), including mainly alarm calls and drumming, as well as copulation attempts also accompanied by specific vocalisations; 2) quiet reactions (QR) — woodpeckers would fly to the location of the stimulation, perch on electric poles or trees and behaved quietly (they did not react vocally and did not drum). The birds perched mainly high in exposed areas and looked about or preened. On rarer occasions they moved among branches or poles and quietly pecked them.

Only observations obtained after playback were used to analyse the findings and birds' reactions. Findings and natural behaviours of the woodpeckers were not included, which were seldom observed during the study. These were used solely to assess the number of territories. The effectiveness of the playback and the proportion of confirmed observations between pairs and single birds were expressed as a percentage of territories where the birds were observed in relation to the total number of territories visited during a given control. The Kruskal-Wallis ANOVA,  $\chi^2$  test and Student t-test were used in the statistical analysis.

## RESULTS

Respectively 29, 41 and 35 Syrian Woodpecker territories were found in 2003–2005, giving a mean density at a level of 1.2–1.7 pairs/10 km<sup>2</sup> of the area studied. The pair density in the area of optimal habitat (21 km<sup>2</sup>) varied from 13.8 p/10 km<sup>2</sup> to 19.5 p/10 km<sup>2</sup>.

The mean rate of discovering Syrian Woodpecker territories during the controls did not differ among years (mean  $\pm$  SD: 2003 — 62.6  $\pm$

20.1%, 2004 — 57.1  $\pm$  18.1%, 2005 — 60.3  $\pm$  20.9%;  $H = 0.80$ ,  $df = 2$ ,  $p > 0.5$ ). The highest rate of discovery was noted in the pre-breeding season (March–April, Fig. 1). A distinct decrease was noted for May and June, and these differences turned out to be statistically significant ( $H = 28.87$ ,  $df = 3$ ,  $p < 0.001$ ). This situation is the result of a decreased proportion of pairs and individual birds, which were observed with greater frequently before the start of breeding than during the breeding season (Fig. 2). The differences in the findings for both groups were statistically significant (respectively  $H = 22.96$ ,  $df = 3$ ,  $p < 0.001$  and  $H = 11.65$ ,  $df = 3$ ,  $p < 0.01$ ). However, individual birds reacted to playback much more frequently (mean of 37.5,  $SD = 13.59$ ) than pairs (mean of 21.9,  $SD = 14.82$ ), and these differences were also statistically significant ( $t = 5.77$ ,  $df = 108$ ,  $p < 0.001$ ).

No statistically significant differences were found between study seasons for both groups of analysed findings ( $H = 3.26$ ,  $df = 2$ ,  $p > 0.1$  and  $H = 0.63$ ,  $df = 2$ ,  $p > 0.5$ ). Only in June 2004 were reactions to playback noted for entire families and juvenile birds. Such cases were noted only 8 times during the three final controls, and so they comprise only a small proportion of the findings (7.7–14.3%).

Birds responded quite similarly to voice playback in specific months, and vocalisations clearly dominated in the type of their reaction (Fig. 3).

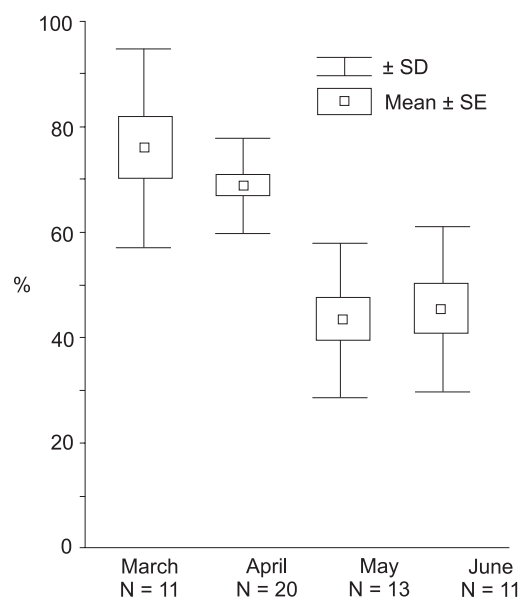


Fig. 1. The rate of discovery of Syrian Woodpecker territories while using playback for specific months (N — number of controls).

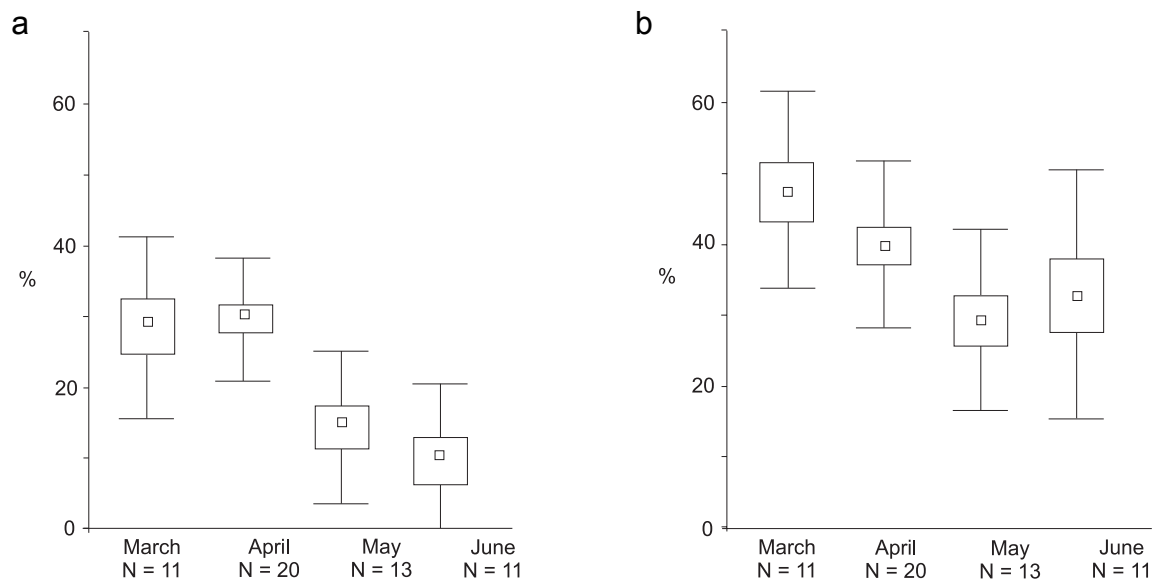


Fig. 2. The proportion of reaction to playback during controls between woodpecker pairs (a) and single birds (b) for specific months. The symbols are the same as in Fig. 1.

There were no statistical differences found here ( $\chi^2 = 0.38$ ,  $df = 3$ ,  $p > 0.95$ ). There were also no differences found in the reactions of woodpeckers among study years ( $\chi^2 = 4.35$ ,  $df = 2$ ,  $p > 0.1$ ), where the proportion of vocal reaction was respectively 71.4%, 81.0% and 75.1%.

## DISCUSSION

The effectiveness of playback searches for Syrian Woodpecker territories is similar to that for other woodpecker species (e.g. Kosiński & Winiecki 2003). It is highest in the pre-breeding season

(March and April) when the birds are establishing and intensively defending their territories (Ruge 1969, Winkler 1972, Glutz von Blotzheim & Bauer 1980, Cramp 1985). This is directly related to the birds' territorial behaviour, when they often drum or emit alarm calls, enabling occupied territories to be quickly located. From May on, the effectiveness of playback decreased, which is connected to the time breeding starts. During that period, woodpeckers exhibit decreased territorial activity (Winkler 1972, Pasinelli et al. 2001) as they are now mainly concentrated on carrying for the brood. A decrease in the discovery rate of territories during breeding season also has been confirmed among other woodpeckers (Wesołowski 1995, Kosiński & Winiecki 2003). The birds' decreased activity during breeding season may also be caused by spontaneous territory abandonment. This can be a significant problem with the Syrian Woodpecker, which is an expansive species and migrates beyond the region of its stable distribution to colonise new areas (Szlivka 1957, Nowak 1971). Most likely, this is the reason why a few territories were noted as devoid of woodpeckers after they had been observed just in early spring, though one also cannot rule out the possibility of their deaths. Another cause of abandoning territories may be the loss of the woodpeckers' brood despite the fact that hole nesters are characterised by high survival rates (Martin & Li 1992, Glue & Boswell 1994, Pasinelli 2001, Mazgajski 2002). However, it

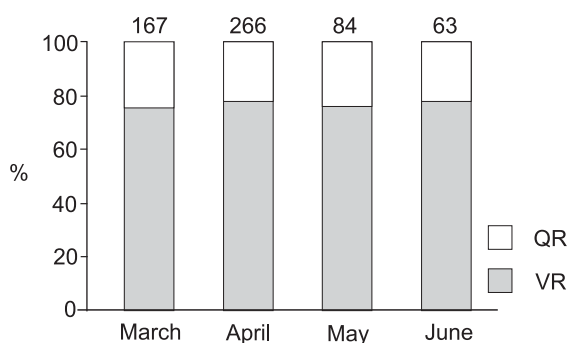


Fig. 3. The proportion of vocal (VR) and quiet reactions (QR) in the behaviour of woodpeckers to playback for specific months. The values over the columns represent the number of noted reactions.

has been confirmed that after losing a brood, some species may not undertake a second nesting attempt and definitely abandon their territory. Such a situation was noted in 2004, when woodpeckers that had lost a clutch in one territory were no longer observed there, and the site continued to be unoccupied in the following season. The clear dominance in the findings of individual birds over pairs in the Syrian Woodpecker may result from the secretive behaviour of this species compared to other woodpeckers (Winkler 1972, Glutz von Blotzheim & Bauer 1980, Cramp 1985). Such behaviour may be conducive to overlooking the second individual of a pair, especially when one of them is watching over the nest hole or brood. It is also possible that the extensive territories of this species (Cramp 1985, Winkler et al. 1995) make it significantly more difficult to observe both individuals of a pair simultaneously, especially if they are able to move very quickly over significant distances (even over 1 km, own observations).

The woodpeckers' most frequent reaction to playback was drumming or alarm calls. Such territorial behaviours of the woodpeckers contribute to the high effectiveness of finding their territories (e.g. Wesołowski 1995, Kosiński et al. 2004). This is the reason such a method was used to lure the birds in assessing their distribution and numbers (Wesołowski 1995, Wesołowski et al. 2005). However, there are many reservations about the precision and interpretation of results obtained using the cartographic method (Tomiałojć 1980, Morozov 1994, Nowakowski 1994). Similar concerns have been formulated about the effectiveness of playback, as it may, for example, lure birds from outside the study area (Johnson et al. 1981). It has been confirmed, however, that playback significantly increases the effectiveness of work conducted using the cartographic method (Kosiński et al. 2004). In comparing both these methods, though, it is worth bearing in mind that in this case, counts were made for only one species, and not for an entire assemblage of birds (Tomiałojć 1980).

By focusing the study on one species and conducting many controls requiring a considerable commitment of time, we can assume that the number of Syrian Woodpeckers found during the study reflects the actual size of the population inhabiting the described area. Differences in the assessment of the breeding population among seasons may be caused by changes in the numbers of this species. This difference can be as great as

two-fold over a period of a few years (Szlivka 1957, 1962). The differences found during the study may also be the result of the increased number of controls, as well as the time spent in the study area during the last two years. Tomiałojć (1980) gave this issue considerable attention, prescribing the significant effect of time commitment that must be made in controlling a study area.

The breeding pair density in the study area is smaller than that found in south-eastern Europe (Winkler et al. 1995, Winkler & Christie 2002). In former Yugoslavia and Austria, the density was found to be 4–10 p/10 km<sup>2</sup> (Szlivka 1957, 1962, Glutz von Blotzheim & Bauer 1980). However, these data were collected from small areas with a significant proportion of optimal habitat for this species, containing little open space such as meadows and cultivated fields. When we re-calculate the findings obtained during the study to our area of optimal habitat (about 21 km<sup>2</sup>), their values increased by even 2–3 times more than the results cited here. It must be stated, though, that these findings were obtained with the support of playback, which is a much more effective method than those used in Yugoslavia and Austria. Similar density values were also noted in the south-eastern regions of Poland, where this species is already commonly encountered (Tomiałojć & Stawarczyk 2003). 2.3–3.4 pairs/10 km<sup>2</sup> (Kunysz & Kurek 1997) were found in Przemyśl and, for example, Hordowski (1998) found 1.6–2.1 pairs/10 km<sup>2</sup> in the Żurawnica township. It is likely that these data are underestimated as they were obtained without using playback.

The breeding territory density results obtained in this study allow us to include the Syrian Woodpecker to fairly numerous bird species (Tomiałojć & Stawarczyk 2003). Based on the census conducted, we also believe that there is considerable underestimation in the assessment of the entire country's population at 300–800 pairs (BirdLife International 2004), as it seems highly unlikely that 5–10% of the national population is found in the two studied townships. It seems even more so, when considering that this bird is commonly encountered in areas neighbouring the study sites, that is, in the Lublin region. These assumptions are also confirmed by the many sightings of Syrian Woodpeckers in other regions of south-eastern Poland or even in Warsaw (Hordowski 1998, Luniak et al. 2001, Tomiałojć & Stawarczyk 2003). We can therefore assume that the state of the Polish population is at a level of 1 000 to 2 000 pairs, and perhaps even higher.

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## STRESZCZENIE

# [Reakcje na stymulację głosową oraz ocena zagęszczenia dzięcioła białoszyjego w krajo-

brazie rolniczym południowo-wschodniej Polski]  
Ekspansja dzięcioła białoszyjego na obszarze środkowo-wschodniej Europy zwiększa potrzebę opracowania efektywnej metody służącej

do oceny jego liczebności. Większość dotychczasowych ocen dokonywano na podstawie szacunków, liczeń atlasowych lub uzyskano metodami kartograficznymi. Wyjątkowo spotykamy prace przedstawiające dokładne dane oparte na wyszukiwaniu gniazd, które jednak wykonywane były na niewielkich powierzchniach. Podjęte badania miały scharakteryzować reakcje ptaków na prowokację głosową zastosowaną podczas oceny zagęszczenia populacji dzięcioła białoszyjego w południowo-wschodniej Polsce. W tym celu podczas liczeń zastosowano kombinowaną odmianę metody kartograficznej połączoną ze stymulacją głosową. Prace prowadzono w latach 2003–2005 na terenie gmin Łaszczów i Telatyn (woj. lubelskie) o łącznej powierzchni 238 km<sup>2</sup>. Występuje tu krajobraz rolniczy z przeważającymi uprawami polowymi oraz łąkami (86.2%), sadami towarowymi (0.6%), osiedlami ludzkimi (8.3%) i niewielkim udziałem lasów (4.9%). Liczenia prowadzono od marca do czerwca.

Największą efektywność stymulacji odnotowano w marcu i kwietniu. Wówczas najłatwiej wykrywano rewiry dzięciołów co związane było z dużą aktywnością terytorialną ptaków. Liczebność populacji lęgowej oceniono w poszczególnych latach na 29, 41 i 35 par. Zagęszczenie wynosiło od 1.2 p/10 km<sup>2</sup> do 1.7 p/10 km<sup>2</sup> całkowitej powierzchni badań oraz od 13.8 p/10 km<sup>2</sup> do 19.5 p/10 km<sup>2</sup> w przeliczeniu na powierzchnię środowisk optymalnych (sądów, szpalerów i luźnych zadrzewień towarzyszących zabudowie mieszkaniowej). Odnotowane zagęszczenia są jedne z najwyższych w Polsce oraz Europie, co pozwala zaliczyć dzięcioła białoszyjego w tym regionie do gatunków średnio licznych a krajową populację ocenić na 1–2 tysiące par lęgowych.

W celu oceny liczebności dzięcioła białoszyjego wyszukiwanie jego stanowisk należy prowadzić w okresie przedlęgowym (marzec–kwiecień), kiedy notuje się najwyższą aktywność terytorialną ptaków.



*T. Cofta*



## **ADAPTATIONS AND CONSTRAINTS OF HOLE USING HOLE-BREEDING PASSERINES CONFERENCE 2007**

(Białowieża, Poland, 7–12 September 2007)

Most of long-term studies of Passerine have been based on birds that breed in tree holes or nest boxes. They offer an almost unparalleled resource in answering important questions about ecology and behavior of the hole-nesters. The forthcoming conference will be held in Białowieża, a famous village located in the heart of the beautiful, primeval forest, NE Poland. A dozen or so hole-breeding Passerines nest there. Some of them have been intensively studied since late 1980s. Now there is an excellent opportunity to meet in this Forest and to discuss major advances of the hole-nesters population and evolutionary ecology.

We shall try to keep costs as low as possible, to make participation easy for ornithologists from all parts of Europe as well as for guests from farther away.

We very much look forward to the meeting and welcoming you in Białowieża!

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More information can be obtained at the Conference web site:

**<http://www.hole-breeding-meeting.ap.siedlce.pl>**