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Loss of Traditional Orchards and Its Impact on the Occurrence of Threatened Tree-Dwelling Bird Species

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Abstract: Horticulture is one of the land use types in agricultural landscapes, which is beneficial for nature if traditional ways of management are implemented. Orchards are affected by three negative transformations: abandonment that leads to afforestation; grubbing as a result of the cessation of fruit plantation; or intensification with the use of chemicals. In this study, changes in orchard management and structure were examined over a decade (2014–2023) in southern Poland (the Carpathians). Additionally, changes in the distribution of Syrian woodpeckers were assessed—a rare species of special concern in the European Union being a major nest hole excavator in orchards. Over a decade, trees in nearly one-fourth of orchards were removed, 15% of orchards were overgrown by forests due to abandonment, and only 40% remained unchanged. The changes were most pronounced in already abandoned orchards and many traditionally used ones. Fruit trees were grubbed in orchards in areas with a high density of people and roads, whereas succession prevailed in orchards in the vicinity of forests. During the same period, around 40% of woodpecker territories vanished, and this phenomenon was associated with tree grubbing or succession by forests. As the Syrian woodpecker requires protection in Europe, it is recommended to preserve traditional horticulture. Moreover, conservative cultivation of traditional varieties of fruit trees and agro-tourism in traditional orchards could be implemented in synergy with nature conservation.

Keywords: fruit trees; horticulture; biodiversity; land abandonment; Syrian woodpecker; *Dendcrocopos syriacus*

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1. Introduction

In the past, traditional horticulture was one of the major types of land use in many areas of the world, and it has a long tradition in Europe [1]. It was particularly widespread in uplands and low mountain areas, where other ways of land use for food production were limited, except for pasturing and meadow farming [2]. Consequently, traditional orchards, meadows, and pastures co-existed, which also proved to be beneficial for the biodiversity of both wood-dwelling and grassland-dwelling organisms [3,4]. This situation has prevailed in many areas of Central-Eastern and Southeastern Europe since the second half of the 20th century [5]. Later, in the 1980s and 1990s, traditional farming ceased in many areas, leading to land abandonment [6,7]. This has had serious consequences for landscapes and biodiversity [8]. Many traditional orchards, not being further cultivated, were left unmanaged and transformed into abandoned woods with many old trees and an increasing amount of deadwood. Such sites became shelters for some wood-dwelling species in the agricultural matrix [4,9]. However, abandonment had a destructive impact on grasslands, which were affected by the natural succession of shrubs, bushes, and trees [8]. In the 21st century, after the incorporation of most Central-East and Southeast European countries into the European Union in 2004 and 2007, this trend was reversed [1]. Land, even in uplands and low mountains, started to be farmed again, although no longer in the traditional way (intensive farming became common). Intensive farming required an increase in fruit production which forced the planting of the area with low-growing trees in high density and the use of pesticides and herbicides which eliminated invertebrates and rich grass and herb cover on the ground (incl. orchard meadows [10,11]). These actions contributed to the loss of biodiversity in the agricultural landscapes of Europe [12]. All of the above is well documented and was the object of numerous studies describing land use changes in horticulture, meadow farming, and pasturing. On the other hand, the impact of changes in horticulture on biodiversity still requires studies. There is research describing differences in the biodiversity of selected groups of animals in orchards of different types of farming or abandoned [3,4]. However, such studies usually examine differences between different types of orchards or associated meadows in the same period. In contrast, temporal changes have not been the topic of appropriate investigations. This could be particularly important for selected species, being rare, threatened, and protected by national or international legislation, among which could be listed Mason bees, *Osmia* spp. (wild bee), Hermit beetles, *Osmoderma* spp. (saproxylic beetle), dormice, Gliridae (arboreal mammal), or woodpeckers, Picidae (birds).

The Syrian woodpecker *Dendrocopos syriacus* (Hemprich & Ehrenberg, 1833) is the only European woodpecker species that is synanthropic—that is, live only in rural and urban areas [13,14]. This bird originates from Iran and spread to Turkey and Israel in the west and the Caucasus in the north. At the end of the XIX c., it spread to the Balkans and later settled in the Pannonian Basin, Transylvania Plateau, and the Pontic region from Romania to southern Russia [15]. Finally, it reached Slovenia, Austria, and Czechia in the west, and Poland and Belarus in the north. In recent years, there have also been occasional observations in Germany (https://ebird.org/, accessed on 15 September 2023). Its trends are stable in most of Europe, except peripheral populations such as in Poland and Czechia but also in Romania (https://www.ebcc.info/, accessed on 15 September 2023). This expansion stopped in Poland at the end of the XX c., and it is now declining rapidly, both in rural and urban landscapes [16,17]. This particular bird species is annexed in the EU Birds Directive (2009/147/WE); therefore, for its protection, special sites have been designated all over Europe within its range. This woodpecker requires old-growth trees for breeding, and it originally bred in a forest-steppe landscape. In Europe, it breeds in parks, cemeteries, tree avenues, or riparian woodlands, but the majority of its population occupies old orchards [18,19]. It does not need dense woodlands, as it can also breed if only scattered older trees are present, and particularly, it prefers fruit trees such as apple (*Malus* spp.) and pear (*Pyrus* spp.), or walnut (*Juglans regia*), willow (*Salix* spp.), and poplar (*Populus* spp.) [18,19]. It is also recognised that this species is associated with a high diversity of other wood-dwelling birds [9], and likely other organisms dwelling in old-growth trees, although this has not been verified so far. Therefore, this species is a good candidate for an indicator species in traditional horticulture. The major threat to its existence is the loss of old trees; therefore, the transformation of traditional horticulture into intensive types is likely to be adverse for this species. In addition, as this species avoids continuous and dense forests, land abandonment could also be detrimental to its breeding sites, if orchards are overgrown by dense woodland.

In this research, data about orchard management and structure collected over a decade in southern Poland was used as well as simultaneous information about the occurrence of Syrian woodpeckers, in order to describe changes that happened in orchards and connect this to the occurrence of the rare bird species. Particularly, it was hypothesised that recent changes in land use in the examined area caused the loss of old-growth types of orchards (abandoned and traditionally farmed). Secondly, the expectation was that changes in orchard management and structure would cause the decline of the Syrian woodpecker.

2. Materials and Methods

2.1. Studied Area

The study was undertaken in the Carpathian Foothills in southern Poland, SE from the city of Krakow. This area has a long horticultural history and is one of the most densely covered fruit tree regions in Poland [20]. The main trees cultivated in the area are apples

(*Malus* spp.), pears (*Pyrus* spp.), plums and cherries (*Prunus* spp.), and walnuts (*Juglans regia*). The distribution of orchards and other agricultural lands is presented in Figure S1 based on Corine Land Cover images for the year 2018 (https://clc.gios.gov.pl/index.php/clc-2018/udostepnianie, accessed on 15 September 2023) (Figure S1).

Data about the distribution and structure of orchards was examined in a previous study by Kajtoch (2016) [9], and the same set of orchards was studied in this research (Supplemantary Materials). Details about orchard selection are available in the preceding publication by Kajtoch [9]. In brief, 66 orchards were selected in three categories: intensively farmed (mostly overgrown by low-growing and thin forms of trees, being fertilized and protected with the use of pesticides and herbicides), traditionally managed (constituted by old and large forms of trees, being cared for by the owners and with frequently moved grasses, but with no use of chemicals), and abandoned (old-growth orchards left after abandonment of settlements, with deadwood not being removed, and with dense grass and herb layers). From all of these types, 22 sites were considered. These orchards were first inspected in 2014, and again in 2023 (Table 1). After a decade, each orchard was characterized by its state in the following manner: (i) unchanged (if the structure and type of management did not change), (ii) grubbed (if trees had been cut, and there is no longer an orchard), (iii) overgrown (if other trees have overgrown the site), (iv) abandoned (if the formerly cultivated orchard is no longer farmed in any way), (v) transformed (when old-growth trees were cut and replaced by low forms of fruit trees), (vi) eldered (if trees grow and intensive farming was ceased, and now the orchard looks like it is traditionally used).

Table 1. Generalized Linear Models built to explain distribution of orchards with removed old trees and abandoned orchards in the examined area based on selected landscape characteristics. Models are ranged according to Akaike Information Criterion (AIC). Only models with ΔAIC < 2 are presented.

Grubbed + Transformed			Abandoned + Overgrown		
all types of orchards					
model	AIC	*p*	model	AIC	*p*
buildings + orchards	80.9	0.021	forests	55.7	0.000
buildings + forests + orchards	81.4	0.027	forests + orchards	56.3	0.000
Intercept	91.5		buildings + forests	57.6	0.000
			Intercept	79.3	

Moreover, for each site we determined the following landscape characteristics using the newest orthophotomaps (https://mapy.geoportal.gov.pl/imap/Imgp_2.html, accessed on 15 September 2023) and QGIS software (https://www.qgis.org/, accessed on 15 September 2023): (i) distance to the nearest larger (asphalt) road (in m), (ii) number of buildings (housing and farming) in a radius of 500 m (N), (iii) proportion of forest cover to agricultural landscape cover in a radius of 500 m (%), (iv) coverage by orchards in a radius of 500 m (ha).

2.2. Woodpecker Inventory

Syrian woodpeckers were searched for using standard methods [21]—playback of drumming and calling during the peak of their territorial and nesting activity during two periods: the 10th and 20th of April and the 20th and 30th of May. All counts were taken in good weather conditions, in the morning hours when the activity of birds is highest, and with the same survey methods; thus, bird detectability should not cause any substantial biases in the collected data. Bird occurrence was mapped using a GPS receiver. Individuals were determined to the species based on their plumage, and hybrids were also considered as it is known that Syrian woodpeckers could interbreed with the great-spotted woodpeckers, D. major; this phenomenon is particularly common in Poland [22]. Woodpecker inventories were carried out in the same years as inventories of orchards (2014 and 2023).

2.3. Statistical Analyses

Differences between orchards based on changes in their management (described above) were assessed with the use of analysis of variance (ANOVA). For determination of the characteristics explaining the grubbing of old trees in orchards or the afforestation of orchards, generalized linear models (GLM) were built with a binomial distribution, and then assessed with the use of the Akaike Information Criterion (AIC) [23]. Two sets of GLMs were used; first, grubbed and transformed orchards were considered together as dependent variables (as both required the grubbing of old-growth trees). In the second GLM, all abandoned (unchanged and newly abandoned) orchards were grouped as dependent variables (as all of them represent orchards with many older trees). Both sets of GLMs considered the distance to roads, the number of buildings, the proportion of forests to agriculture, and the total area of orchards as explanatory variables. Models were built for all data (all orchards) as well as separately for each type of former management (in 2014): abandoned, traditionally, and intensively farmed.

Additionally, the share of particular types of changes in orchards (listed above) in the territories of Syrian woodpeckers determined in two periods (2014 and 2023) was compared using Chi-square tests. The current distribution of Syrian woodpecker territories was also explained by the same set of variables (roads, buildings, forests, and orchards) with the use of canonical analysis (CA).

Certain limitations of the collected data (relatively low number of orchards, particularly when assigned to types and changes, low number of detected territories of woodpeckers due to the overall rarity of Syrian woodpeckers), prevented the implementation of some types of analyses that could help in better elaboration of data and understanding of results (e.g., use of multinomial models to test the probability of each orchard changing its state, or estimating extinction and colonization parameters for woodpeckers).

Statistics were obtained with the use of Statistica v.13 (https://www.statsoft.pl/statistica_13/, accessed on 15 September 2023), except for CA, which was calculated in the PAST v.4 (https://www.nhm.uio.no/english/research/resources/past/, accessed on 15 September 2023).

3. Results

3.1. Orchards

In total, 66 orchards were investigated (Table S1). General changes in the landscape of the examined area are presented in Figure S2. There are also photomaps showing examples of traditional orchards being grubbed, and abandoned orchards being overgrown by forest trees. Among orchards, 16 (24%) were affected by the grubbing of trees between 2014 and 2023, and this concerned mostly abandoned orchards (7; 32%), traditionally managed (7; 32%), and only two intensively managed (9%) (Figure 1). 10 orchards (15%) transformed into forest-like woods due to a succession of trees. This happened only in abandoned orchards (10; 45%) (Figure 1). Three traditionally used orchards in 2014 are now abandoned (5% of all and 14% of formerly traditionally used) (Figure 1). Five of the intensively farmed orchards from 2014 changed into traditionally used due to the growth of trees and the cessation of branch cutting (8% of all, and 23% of formerly intensively farmed orchards) (Figure 1). The reverse situation was determined for the other five orchards—trees formerly traditionally used were grubbed and new fruit trees were planted leading to intensively managed orchards (8% of all, and 23% of formerly traditionally farmed orchards) (Figure 1). Finally, 27 orchards (41%) did not change their farming type. This concerned 5 abandoned (23%), 7 traditionally managed (32%), and 15 intensively farmed (68%) (Table 1) (Figure 1).

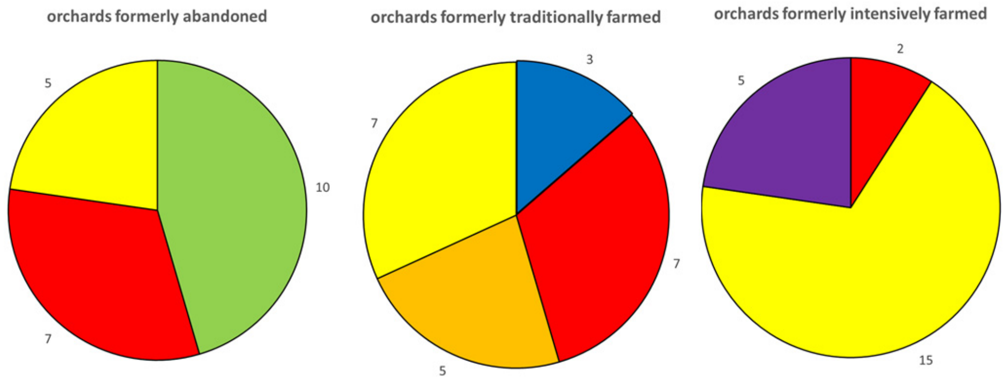

Figure 1. Pie charts presenting changes in orchards between 2014 and 2023 in three categories of orchards being formerly abandoned, traditionally and intensively used. Blue—abandoned, green—overgrown, red—grubbed, orange—transformed, yellow—unchanged, violet—eldered.

Distance to the road (Table S1, Figure 2) was the highest for orchards overgrown by forest (on average 640 m), and orchards having been abandoned in the last decade (430 m). Other orchards were situated closer to roads: grubbed (290 m), eldered (200 m), transformed (120 m), and unchanged (210 m). These differences were significant (F = 14.62, df = 5, p = 0.012). Pairwise comparison pointed to significant differences only between unchanged and overgrown (p = 0.02), whereas differences for transformed and overgrown and transformed and overgrown were not significant. The surroundings of grubbed orchards were most densely built (Table S1, Figure 2) (on average 14 buildings), unchanged (13), transformed (13), and eldered (9). The lowest number of buildings were found in the surrounding of overgrown orchards (4) and newly abandoned (6). These differences were significant (F = 11.52, df = 5, p = 0.042). Pairwise comparison pointed to the significant differences only between unchanged and overgrown (p = 0.02) and grubbed and overgrown (p = 0.02), whereas differences for transformed and overgrown were insignificant. Forests prevailed over agricultural landscapes in the surrounding of over-grown orchards (Table S1, Figure 2) (proportion of forest to agricultural land—72), and newly abandoned (39). In the remaining orchards this value was lower: grubbed (32), unchanged (22), transformed (18), and eldered (6). These differences were significant (F = 17.39, df = 5, p = 0.004). Pairwise comparison pointed to the significant differences only between unchanged and overgrown (p = 0.02), and eldered and overgrown (p = 0.01). Horticulture prevailed in the surrounding of orchards being eldered (Table S1, Figure 2) (on average 42 ha), unchanged (39 ha), and transformed (35 ha), whereas in the vicinity of grubbed (32 ha), newly abandoned (21 ha), and overgrown (9 ha) orchards, the total area of orchards was lower. These differences were insignificant (F = 10.56, df = 5, p = 0.063). Pairwise comparison pointed to the insignificant differences between all pairs of compared types of orchards.

Removal of old-growth trees in orchards was determined mostly by the higher level of human settlements and areas being intensively used for horticulture (Table 1) (full model: Wald = 8.31 p = 0.004). GLMs also pointed to the contribution of the high share of forests to the grubbing of old trees in abandoned orchards. Orchards being formerly abandoned lost their old trees mostly in densely built-up sites, but other explanatory variables contributed to the tree loss in these orchards, although the full model turned out to be insignificant (Wald = 2.77, p = 0.96) (Table 2). Tree removal in traditionally farmed orchards was explained by distance to roads, built-up areas, and forest and orchard cover, although again, the full model was not significant (Wald = 0.18, p = 0.670) (Table 2). Intensively farmed orchards lose trees in sites being highly covered by these orchards, and in this case, the full model was significant (Wald = 9.64, p = 0.002) (Table 2).

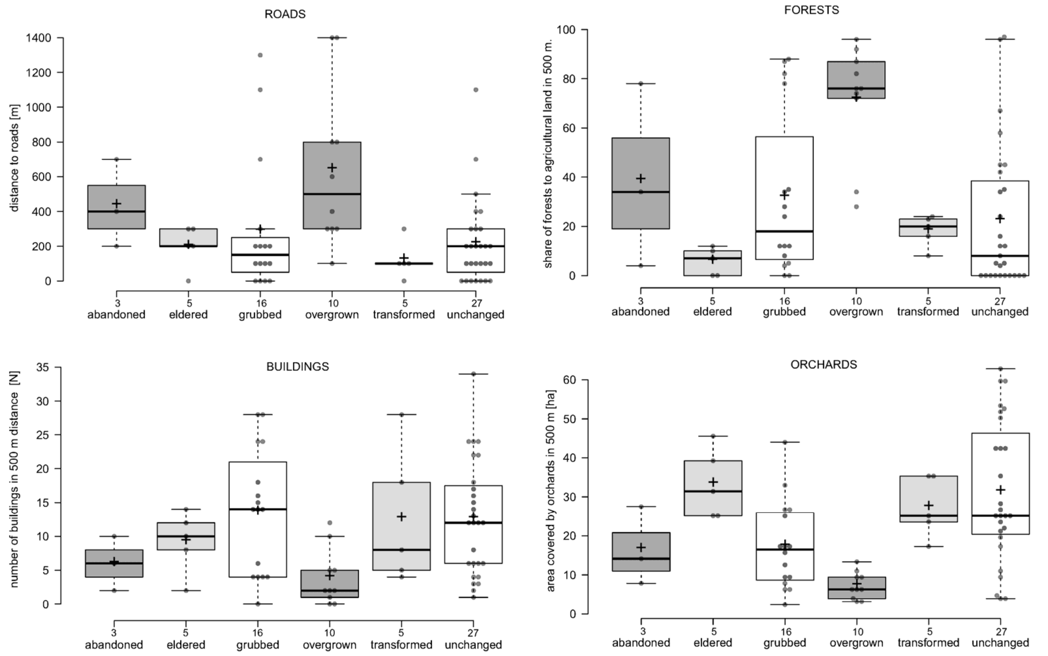

Figure 2. Differences of orchards (grouped according to changes observed in the last decade) in four selected landscape characteristics.

Table 2. Generalized Linear Models built to explain distribution of orchards with removed old trees and abandoned orchards in the examined area based on selected landscape characteristics. Models prepared separately for three types of orchard management in the past (abandoned, traditionally and intensively farmed). Models are ranged according to Akaike Information Criterion (AIC). Only models with ΔAIC < 2 are presented.

Grubbed + Transformed			**Abandoned + Overgrown**		
formerly abandoned					
model	AIC		model	AIC	
buildings	30.6	0.340	buildings	30.6	0.340
forests	31.0	0.464	forests	31.0	0.464
orchards	31.4	0.714	orchards	31.4	0.714
roads	31.5	0.880	roads	31.5	0.880
buildings + orchards	32.3	0.540	buildings + orchards	32.3	0.540
roads + buildings	32.4	0.566	roads + buildings	32.4	0.566
Intercept	29.5		Intercept	29.5	
formerly traditionally farmed					
model	AIC	*p*	model	AIC	*p*
roads	24.5	0.002	roads + forests + orchards	8.0	0.001
roads + buildings	26.0	0.006	roads + buildings + forests + orchards	10.0	0.002
roads + forests	26.1	0.006	Intercept	19.5	
roads + orchards	26.4	0.007			
Intercept	32.3				
formerly intensively farmed					
model	AIC	*p*			
orchards	15.6	0.185			
roads	16.3	0.294			
roads + orchards	16.9	0.282			
forests	17.2	0.665			
buildings	17.2	0.667			
buildings + orchards	17.6	0.397			
Intercept	15.4				

Orchard conversion into woodlands was determined by a higher share of forests in the surrounding landscape, and also by the lower area of orchards in the surroundings (Table 1) (full model: Wald = 20.61, $p < 0.001$). Abandonment and overgrowing by trees in orchards formerly abandoned was best explained by the lower cover of build-up areas and higher cover of forests in surroundings, although the full model proved to be insignificant (Wald = 2.77, $p = 0.096$) (Table 2). Abandonment in traditionally farmed orchards was explained by higher distance to roads, lower cover by built-up areas, but higher cover by forests in the surroundings, and the full model was significant (Wald = 8.83, $p = 0.03$) (Table 2). It was not possible to assess abandonment for intensively farmed orchards as no such orchards were left without management.

3.2. Woodpeckers

Syrian woodpeckers were found in 12 orchards in 2014 (1 abandoned, 5 traditionally used, and 6 intensively farmed) (Table S1); overall, 78.8% of orchards were not occupied by this species at all. After a decade, only seven occupied sites remained (two in abandoned orchards, two in traditionally managed, and three in intensively managed orchards) (Table S1). The distribution of territories changed significantly over this period (Chi2 = 21.53, $p < 0.01$). Consequently, the number of sites with woodpecker presence declined by 42%. Moreover, in at least one site, a hybrid female was found breeding with a male great-spotted woodpecker. Five territories of Syrian woodpeckers did not change over 10 years (one in abandoned, one in traditionally managed, and three in intensively managed), so 42% of orchards occupied in 2014 hosted these woodpeckers in 2023 (corresponding to 7.6% of orchards with constant occupancy by Syrian woodpeckers). Four in traditionally managed orchards and three in intensively managed orchards disappeared. Three of them were grubbed and two (formerly traditionally managed) were transformed into intensively managed orchards, meaning that territories vanished in 10.6% of all orchards. At the same time, new territories were settled in only two orchards (3% of all orchards): one abandoned and traditionally managed (both unchanged). In summary, in formerly abandoned orchards, only a single territory remained, and one new territory appeared. The greatest changes happened in formerly traditionally used territories as only one remained, four disappeared, and one orchard was colonized. In formerly intensively used orchards, three territories remained and three disappeared, whereas there were no new territories colonized.

Current woodpecker distribution, according to CA (Figure 3), is determined by the average 0.8-times lower density of buildings but being closer to roads (1.4-times), and 1.2-fold higher area of horticulture (so, with lower forest area in the surroundings). 1-axis: eigenvalue = 0.355, 78.0% of total variance ($p = 0.001$), 2-axis: eigenvalue = 0.065, 14.3% of total variance ($p = 0.039$).

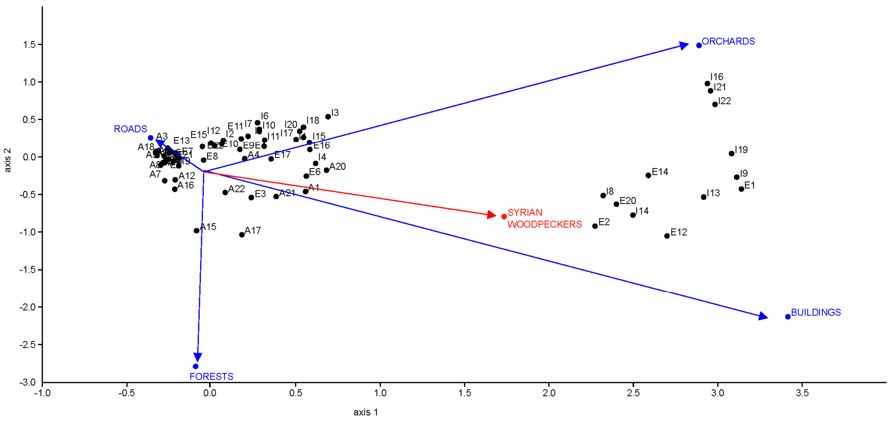

Figure 3. Plot showing the relationship between the occurrence of Syrian woodpecker territories with landscape characteristics in the examined area of southern Poland. Dots represent examined orchards assigned to three categories according to their type of management in 2014 (A—abandoned, E—traditionally managed, I—intensively farmed).

4. Discussion

Old-growth orchards were characteristic elements of agricultural landscapes in Central-East and Southeastern Europe, and this remained until the end of the XX century, when intensive fruit tree plantation started replacing traditional horticulture [1,5]. In Poland, traditionally managed orchards still prevail in many areas, especially in the uplands and low mountains of the southeastern part of the country [20]. Some of these orchards had been abandoned in the second half of the XX century as a result of the cessation of farming, and the movement of people to the cities. In this study, we proved that nearly one-third of former old-growth orchards, both abandoned and traditionally managed, had been destroyed. Trees in these orchards were grubbed, and fruit trees were either no longer cultivated there or new forms of trees (low and thin) were planted for intensive farming. This resulted in a great loss in habitat diversity of agricultural landscapes and must have had a serious impact on biodiversity. It particularly depauperates favourable microhabitats for wood-dwelling organisms such as insects, birds, mammals, fungi, and lichens [3,4,24,25]. All these organisms are dependent on older trees with cavities or rough bark, some on deadwood. In agricultural landscapes, there is a high deficiency of such kinds of microhabitats, and a loss of traditional orchards is a great problem.

Simultaneously there is an opposite trend, which does not need to be beneficial for biodiversity. Land abandonment also affects orchards, which are left without cultivation when old owners die and descendants do not want to continue horticulture [6,7]. This is a particular problem in areas being poorly communicated and surrounded by forests. There, orchards are overgrown by pioneer tree species and after some time they start to resemble forests. Such sites are no longer favourable for taxa associated with open woodlands [9]. Moreover, old fruit trees often collapse after heavy winds or ice accumulation on longer branches.

This study showed that changes in horticulture are highly diverse and there is no single trend. It is particularly visible in areas with very complex ownership and high parcellation of plots. This is characteristic of some regions of central-east and southeastern Europe, especially in lands formerly under the Austro-Hungarian Empire in the 19th and 20th centuries. In this area, numerous small farms exist, formerly being traditionally managed, including orchards. Many owners abandoned their lands (died or moved to urbanized areas), which could be beneficial for biodiversity, but only for some time until natural succession "re-naturalizes" such lands into woodlands. On the other hand, recent economic trends force the merging of plots into large agricultural fields. Even if some of these fields are intended for horticulture, the way of their management, focused on the increase in fruit production, is also an adversary for biodiversity.

In total, 39% of orchards disappeared in the examined area (grubbed or overgrown by forests). This is a great loss in only one decade and comprised mostly be abandoned orchards (nearly 77%) and traditionally managed orchards (32%). This has caused a substantial change in land use in many agricultural landscapes. At first glance, there are two opposite trends, and their simultaneous acting should lead to some balance as orchards lost due to abandonment could be replaced by new ones. However, it does not work like this for traditional horticulture. Both the abandonment and transformation of traditional into intensive orchards lead to the loss of old-growth trees in traditionally farmed orchards. All these changes are a great threat for sustaining traditional horticulture. Economically, horticulture likely benefits from these transformations, as intensive farming increases fruit production. This increase has some consequences, as it requires the use of chemicals for plant growth and protection against pests. This has also impacted biodiversity, which is affected by both the loss of old-growth trees, which are crucial for many wood-dwelling animals, and chemistry, which reduces the food base for many animals [3,4].

The Syrian woodpecker is known to be an important element of wood-dwelling assemblages in rural woodlands [13]. It is the only woodpecker species that is synanthropic and responsible for digging tree holes, which are subsequently utilized by numerous other animals such as wild bees, saproxylic beetles, bats, rodents, or other birds. Other woodpeckers also breed in orchards although none of them are common except for the

Eurasian wryneck Jynx torquilla, but this species does not make its own nest holes [13]. In the last decade, great-spotted woodpeckers have become more common in rural woodlands; however, its expansion is a widespread phenomenon in Poland [26] and could be associated with hybridization with Syrian woodpeckers (Kajtoch Ł., unpublished). The latter species is also particularly important as it is a species of special concern in the EU (listed in the EU Birds Directive). In the EU, there are designated sites for the protection of this species (https://eunis.eea.europa.eu/species/Dendrocopos%20syriacu, accessed on 15 September 2023), and the majority of them are localized in rural landscapes, mostly covered by orchards. The results of this study prove that the Syrian woodpecker is in steep decline in the orchards of southeast Poland. An approximate loss of 40% of its territories over a decade means that its population should be treated as vulnerable (VU) according to The International Union for Conservation of Nature (IUCN) criteria. This trend is in accordance with other information about the loss of local rural and urban populations in Poland [16,17]. The results of this study show that the problem is not only due to the grubbing of trees in orchards but also the succession of wild (pioneer) trees in abandoned orchards. The first problem simply leads to the loss of elder fruit trees, suitable for this species (it particularly prefers to breed in plum and cherry trees but is also attracted by walnut trees for foraging). It needs to be highlighted that the Syrian woodpecker is also seen in intensively farmed orchards but there are some older trees in the surrounding areas [27], mostly willows (*Salix* spp.) planted along field boundaries. This was the case for most of the Syrian woodpecker territories in intensively farmed orchards in 2014; however, by 2023, such orchards, even if unchanged, were without surrounding old willows, which made such sites unfavourable for this species. Most likely the reason for this was the granting in 2017 of permission for the removal of any tree in Poland (so-called "Lex Szyszko" after the name of the former Minister of Environment, who allowed for uncontrolled tree grubbing on private lands) [28]. The same situation was observed in the urban population in the adjacent city of Krakow [29]. Loss of area and fragmentation have already proved to be harmful to biodiversity in orchards [30,31]. Additionally, methods of farming in horticulture were found to be crucial for the preservation of biological diversity [4,32].

5. Conclusions

The farming of fruit trees is mainly a business concern; therefore, it focuses on the economy, not ecology or conservation. However, farming should be sustainable and balanced between economic gains caused by the selling of products (in this case—fruits), and ecological importance [33]. Overall, biodiversity, or even a single rare species, should not be neglected in farming. This is particularly important as the current policy is to ecologise production in agriculture; therefore, orchard management should not be destructive to wildlife [34]. The solution is rather simple, but could be hard to implement for some orchard owners. If Syrian woodpeckers (and the general biodiversity of taxa associated with older fruit trees) are to be protected, the most important action is to preserve traditional horticulture, and dense forms of fruit trees, which enable the development of cavities, both woodpecker-made and natural [35]. Additionally, intensively farmed orchards could be valuable for wood-dwelling organisms if some older trees are left (if not fruit trees, this can be old willow hedges) [12]. On the other hand, abandoned orchards need to be cultivated occasionally, including removing long branches causing the collapse of trees and mowing grasses to stop the natural succession of bushes and trees. The latter recommendation is not possible to implement if the owner of an abandoned orchard is unknown or does not want to undertake such actions. This is particularly problematic in the case of many regions in Central-East and Southeastern Europe, where parcels are numerous, small, and with a complicated history of ownership [36]. There are funds available for ecological farming in the European Union, including for ecological horticulture, although it does not include sustaining old trees in abandoned orchards. Such sites need to be considered as important shelters for local biodiversity associated with trees in agricultural landscapes. These orchards also have a cultural and aesthetic value [37] as they resemble ancient agriculture. This could be connected to the use of traditional orchards in agro-tourism, which is a fast-growing branch in Europe, especially in areas less affected by intensive farming [38]. Additionally, sustaining traditional horticulture helps in the preservation of traditional varieties of fruit trees, which are threatened by replacement by new varieties or are lost due to abandonment of orchards [39]. In this way, genetic variants characteristic of traditional varieties of fruit trees will not be lost. Preservation of these traditional varieties of fruit trees could also be beneficial for the development of new ones thanks to hybrid formation [40]. All the above methods of orchard management and use are not harmful to biodiversity and should be implemented in synergy with nature conservation.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/agriculture13122267/s1, Supplementary File. Localization of examined orchards (kmz file). Figure S1. Picture of land use in the examined area. Orchards and other land types that include orchards along with other types of agricultural lands are marked in the legend. The image downloaded from https://clc.gios.gov.pl/index.php/clc-2018/udostepnianie (accessed on 15 September 2023). The Corine Land Cover 2018 project in Poland was implemented by the Institute of Geodesy and Cartography and financed by the European Union. The project results were obtained from the website of the Chief Inspectorate of Environmental Protection clc.gios.gov.pl. Figure S2. Satellite images of landscapes of the examined area in 2014 (A) and 2023 (B). Examples of orchards with old-growth trees being grubbed (C), or abandoned orchards being overgrown by forest between (D) the two periods of study. Images are from https://www.google.pl/intl/pl/earth/ (accessed on 15 September 2023). Table S1. Characteristics of examined orchards and distribution of Syrian woodpecker territories in two periods.

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Institutional Review Board Statement: This study does not require any permissions as the orchards are not protected and, during the field survey, all data were collected without entrance to private areas. The inventory of Syrian woodpeckers also did not require permission as the methods in use were noninvasive.

Data Availability Statement: All data collected for this study are available in tables.

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