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The Impact on Aviation Operations at Polish Civil Airfields Caused by Mammals

Wpływ ssaków na operacje lotnicze realizowane na cywilnych lotniskach Polski

Воздействие млекопитающих на воздушные операции, реализуемые в гражданских аэропортах в Польше

ABSTRACT

Aim: The purpose of this study was to investigate the impact on aviation operations caused by four free-living species of mammals, which dwell on Polish civil airports property.
Method: Raw data from official records of the State Commission for Aircraft Accident Investigations was used to identify the influence of animals on flight operations at 7 Polish civil airports. An analysis was performed on 117 flight disruption incidents involving: deer, hares, foxes and boars during the years 2006-2009. The evaluation focused on the time of day and season.
Results: Roe deer and hares were the species, which disrupted aviation operations with the highest frequency. Most incidents occurred during landings and the largest number of incidents took place during winter (34.2%), especially in the month of January. The lowest number of incidents were recorded during autumn (12.5%). Roe deer and foxes disrupted flight operations most frequently during winter and in case of hares, disruptions took place mostly during spring, especially in April. Disruption by roe deer herds was most frequent during the autumn-winter period compared with spring-summer. Roe deer and hares were also the species, which most often collided with aircraft. The greatest number of collisions with aircraft occurred during spring (March-May). However, the highest frequency of serious collisions between deer and aircraft occurred during winter. The majority (66.7%) of analysed collisions with animals took place during landings. Apart from the risks, some benefits were identified with the presence of red foxes at airports, linked to their potential interaction with birds. Animal carcases, which are not removed from runways, attract carrion eaters and can escalate the level of disruption caused at airports. Therefore, it is important to remove carcases from runways in accordance with FOD procedures.
Conclusions: The study revealed that, in contrast with birds, mammals pose the biggest threat at airports during winter. Mammals disrupted landings more frequently than take-offs. This study identifies misconceptions and difficulties encountered during attempts to reduce the impact of animals on airport flight operations.

Keywords: flight safety, wildlife strikes, airfields, risk management
Type of article: case study – analysis of actual events

ABSTRAKT

Cel: Celem badań było poznanie środowiskowych aspektów wpływu 4 gatunków wolnożyjących ssaków na operacje lotnicze realizowane na polskich lotniskach cywilnych.
Metoda: Nieprzetworzone dane z protokołów Państwowej Komisji Badania Wypadków Lotniczych wykorzystano do określenia wpływu ssaków na operacje lotnicze na 7 cywilnych lotniskach w Polsce. Analizowano 117 przypadków zakłócenia operacji lotniczych przez: sarny, jelenie, zające szaraki, lisy oraz dziki na lotniskach cywilnych w latach 2006-2009. Analiz dokonywano w kontekście dobowym oraz w kontekście miesięcznym.
Wyniki: Sarny i zające były gatunkami które z największą frekwencją zakłócały operacje lotnicze. Pośród analizowanych operacji, zwierzęta zakłócały najczęściej lądowania. Najwięcej operacji lotniczych zostało zakłóconych zimą (34,2%), szczególnie w styczniu. Najmniej takich przypadków zanotowano jesienią (12,5%). Sarny i lisy zakłócały operacje lotnicze najczęściej zimą, gdy w przypadku zajęcy miało to miejsce najczęściej wiosną, szczególnie w kwietniu. Zakłócenia ze strony stad saren były częstsze w okresie jesienno-zimowym w porównaniu z okresem wiosenno-letnim. Gatunkami najczęściej zderzającymi się z samolotami były: sarny i zające. Do największej liczby kolizji ze zwierzętami doszło wiosną w okresie (marzec-maj). Jednakże zimą dochodziło najczęściej do najbardziej niebezpiecznych dla samolotów kolizji z sarnami. Większość (66,7%) analizowanych kolizji ze zwierzętami miała miejsce podczas lądowań.
Poza zagrożeniami zidentyfikowano także korzyści z obecności lisów na lotniskach, z uwagi na ich interakcje z ptakami. Przyczyną wzrostu zagrożenia dla operacji realizowanych na lotniskach stanowią także nieusunięte ciała ssaków na drogach startowych, ponieważ zwabiają zwierzęta zjadające padlinę. W tym kontekście duże znaczenie ma usuwanie padliny z dróg startowych w ramach procedury FOD.

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Wnioski: Badania wykazały, że w przeciwieństwie do ptaków, największe zagrożenie ze strony ssaków odnotowywane jest w okresie zimowym. Ssaki zakłócały częściej operacje lądowania w porównaniu z operacjami startu. Praca wskazuje na błędy oraz trudności, jakie napotkano podczas prób ograniczania odziaływania ssaków na operacje wykonywane w portach lotniczych.

Typ artykułu: studium przypadku – analiza zdarzeń rzeczywistych
Słowa kluczowe: bezpieczeństwo lotów, kolizja z udziałem zwierząt, lotnisko, zarządzanie ryzykiem

АННОТАЦИЯ

Цель: Целью исследования было изучение экологических аспектов воздействия 4 видов свободноживущих млекопитающих на воздушные операции, проводимые в польских гражданских аэропортах.
Метод: В целях исследования использовались исходные данные из протоколов Государственной комиссии по расследованию авиационных происшествий. С их помощью определено воздействие млекопитающих на воздушные операции в 7 гражданских аэропортах в Польше. Проанализированы 117 случаи нарушения полетов европейскими косулями, благородными оленями, зайцами-русаками, лисами и кабанами в гражданских аэропортах в период 2006-2009 гг. Исследовались суточные и месячные зависимости.
Результаты: Видами животных, которые нарушали воздушные операции, чаще всех были (европейские) косули и зайцы. Среди проанализированных операций, чаще всего происшествия с животными происходили во время посадки. Воздушные операции подвергались воздействию чаще всего зимой (34,2%), особенно в январе, а реже всего осенью (12,5%). Косули и лисы воздействовали на воздушные операции чаще всего в зимний период, а зайцы - весной, особенно в апреле. Происшествия, вызванные стадами косулей, случались чаще в осенне-зимний период, чем весеннее-летний. Косули и зайцы чаще всех сталкивались с самолётами. Наибольшее число столкновений с животными имело место в весенний период (март-май). Зимой, как правило, происходили самые опасные столкновения с косулями. Большинство (66,7%) проанализированных столкновений с животными имели место во время посадки.
Кроме указания угроз, автор также указал пользу от присутствия лисов в аэропортах, которые воздействуют на птиц. Подчеркнул также факт, что присутствие трупов животных на взлетно-посадочных полосах, может способствовать увеличению риска для операций проводимых в аэропортах, так как трупы могут привлечь животных, питающихся падалью. В таком случае важно удалить падаль согласно процедуре Foreign Object Derbis (повреждение посторонним предметом).
Выводы: Исследование показало, что в отличие от птиц, самая большая угроза со стороны млекопитающих возникает зимой. Млекопитающие в большей степени являются угрозой во время посадок, чем во время взлетов. Работа указывает на ошибки и трудности, с которыми обычно сталкиваются при попытках снижения воздействия рассматриваемых животных на воздушные операции, проводимые в аэропортах.

Вид статьи: тематическое исследование – анализ реальных случаев
Ключевые слова: безопасность полетов, столкновение с животными, аэропорт, управление рисками

1. Introduction

Compared to bird presence, the issues regarding the presence of terrestrial wildlife at airfields and the threats it creates to air traffic occupy decidedly less space in literature [1-5]. This probably stems from the number of collisions and other forms disturbance of avition operations involving terrestrial animals being incomparably smaller than the corresponding figure for birds. Cumulative data from many countries shows this [3], [6-8]. The leaders of threat rankings, causing much greater problems at airfields than birds do, are Cervidae deer.This is because a very high percentage of aircrafts sustain damage [1], [5], [9] when they hit this animal. Terrestrial wildlife occurs at European airfields as well, seriously impeding landings and take-offs [7-8], [10]. In the context of strikes, it is worth pointing out that collisions generated other disturbances of aviation operations because they made it necessary to remove the carrion from runways. The aim of this study is to present the ecological aspects of the effects terrestrial wildlife has on flights at civil aircrafts in Poland. Four species of mammals – roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*), european hare (*Lepus europaeus*), red fox (*Vulpes vulpes*), and wild boar (*Sus scrofa*) are considered because they are know as species which disturb aviation operation on airfields

2. Materials and Methods

Raw data from protocols obtained from the State Commission for Aircraft Accident Investigations (2006-2009) were used to quantify the effects of terrestrial animals on aircraft operations at 7 Polish airfields. They were identifed by the International Civil Aviation Organization (ICAO) codes: Warsaw-Okęcie (EPWA), Kraków-Balice (EPKK), Wrocław -Strachowice (EPWR), Bydgoszcz-Szwederowo (EPBY) Katowice-Pyrzowice (EPKT), Mielec (EPML) and Goleniów (EPSC). Protocols of the Commission were obtained from the websites (www.mi.gov.pl) as reports in the form of PDF files, as well as from the portal called PortaldlaPilota (www.dlapilota.pl). The author standardized statistics involving ans imal-aircraft interaction by the number of seasonal and diel aircraft movements at each airport. The seasons were defined in the following manner: winter (December-February), spring (March-May), summer (June-August), and autumn (September-November). Further, day and night were divided into 4 time intervals: 1: 9:00-15:00, 2: 15:00-21:00, 3: 21:00-3:00, and 4: 3:00-9:00. Relative to associated sample sizes, the author used the chi-square test, Fisher‘s exact test and G-test [11] to test the hypotheses.

3. Results

A total of 117 cases of the effects on aviation operations were analysed, including 31 collisions with the discussed animals (table 1, table 2). Landings predominated among the aviation operations effected by the discussed animals: 72 (61.5%). Effects on flights were reported in the case of only 45 take-offs (38.5%). This difference in frequency turned out to be significant ($\chi^2 = 6.23$, df = 1, p = 0.013). Among aviation operations effected by deer, 31 (64.6%) were landings and 17 (35.4%) were take-offs of aircraft. Hares also interfered mostly with landings: 29 cases (63.0%), interfering with only 17 take-offs (37.0%). The differences in the frequency of the effected operations significantly diverged from equal predictions only in the case of roe deer: ($\chi^2 = 4.08$, df = 1, p = 0.043). No such regularities were found for hares: ($\chi^2 = 3.13$, df = 1, p = 0.08). In regard to foxes and wild boars, the number of disrupted take-offs was the same as that of disrupted landings: 9 and 2, respectively. A red deer disrupted one landing. A comparison of the frequencies of disrupted landings demonstrated that there was a statistically significant difference in the frequency

of disrupted landings between roe deer, hares and foxes (G =29.3, df = 2, P < 0.01). A similar difference was found for take-offs (G = 22.0, df = 2, P < 0.01).

The period of high threat from terrestrial mammals at Polish airfields was observed in the winter, when as many as 40 disruptions of aviation operations were reported (34.2% of total), whereas in spring, summer and autumn the following number of disruptions took place, respectively: 36 (30.8%), 26 strikes (22.2%) and 15 strikes (12.8%). Differences between seasons in the frequency of disturbances caused by terrestrial wildlife were statistically significant (χ^2 = 12.8, df = 3, p = 0.0051). In the case of roe deer the greatest number of disruptions of aviation operations was reported in the winter: (24.5%), including 13 (37.1%) in January, and not a single case of aviation operation effected by roe deer was reported in July (fig. 1). There were no differences between seasons in the frequency of disturbances caused by roe deer: χ^2 = 16.5, df = 3, p = 0.0009. Foxes most frequently disrupted aviation operations in the winter, when 6 such cases were reported (33%), with 4 cases occurring in December. Worth noting is the fact that no disturbances from foxes were reported in March, April, June and September (fig. 1). Unlike in the case of roe deer and red foxes, the largest number of disruptions of aviation operations caused by hares was reported in the spring: 21 (45.7%), including 10 (21.7%) in April (fig. 1). The periods of particularly high frequency of disruptions were spring and summer, when as many as 67% of the reported cases took place (fig. 1), contributing to differences among seasons (χ^2 = 11.9, df = 3, p = 0.008).

Looking at all of the reported disturbances of aviation operation in the circadian cycle, we can see that they were th most numerous in the first and second time interval, when a total of 81 cases (69.2%) took place. During the four periods of night and day, the frequency of disturbances of operations differed from equal predictions (χ^2 = 25.5, df =3, p < 0.0001). In the evening time interval (15:00-21:00), the highest percentage of disturbances was observed for as many as 4 species: roe deer (43.8%), hare (34.8%), fox (61.1%) and wild boar (75.0%) (fig. 2).

In the circadian rhythm, no disturbances were reported for hers of roe deer in the 21:00-3:00 time interval, while in the remaining three time intervals the frequency of disturbances caused by herds of roe deer was evenly distributed, and did not diverge from the equal predictions: χ^2 = 0.363, df = 2, p = 0.834 (fig. 2). Disturbances caused by herds of hares took place mainly (75.0%) in the morning time interval 3:00-9:00 (fig. 2). In the context of the observed disturbances, sociability appears to be significant for the two species: roe deer and hare. Disturbances caused by herds of roe deer (N=22) and hares (N = 4) were reported, respectively. Analyses showed that disturbances from the herds of roe deer were more frequent in the autumn-winter period compared to the spring-summer period: 16 (53.3%) vs. 6 (33.3%), but the differences turned out to be insignificant: Fisher's test (one-tailed) p = 0.147. No interference of the herds of hare with aviation operations was observed in the autumn-winter period. They were observed in the spring-summer period, when 4 such cases were reported, constituting 8.7% of disturbances from hares. Majority (n=21) of collisions (67.7%) took place during landings and only 10 (32.3%) during take-offs (table 2).

A majority of these collisions – 10 (55.5%) – took place during landing. In regard to deer, a total of 8 collisions with aircraft were reported (table 2), which constituted 16.3% of the analysed disturbances involving these ungulates. However, only one collision occurred during the take-off and only one involved a red deer; all the others were caused by roe deer. Five collisions with foxes were reported, which constituted 27.8% of all disturbances involving these predatory mammals. Just like in the case of deer, only one collision with a hare took place during take-off. Aircraft strikes were not reported only in the case of wild boars. As indicated above, the greatest number of collisions with terrestrial wildlife was observed in spring, but as many as 72.7% of all collisions that occurred at that time involved European hares. As many as

Table 1. Context of animal effects on aviation operation conducted at civil airfields in Poland

Species	Take-offs		Landings		Total	
	N	%	N	%	N	%
Roe deer	17	37.8	31	43.0	48	41.0
Red deer	-	-	1	1.4	1	0.9
European hare	17	37.8	29	40.3	46	39.3
Red fox	9	20.0	9	12.5	18	15.4
Wild boar	2	4.4	2	2.8	4	3.4
Total	45	100	72	100	117	100

Source: Own elaboration.

Table 2. Context of terrestrial wildlife strikes at civil airfields in Poland

Species	Take-offs		Landings		Total	
	N	%	N	%	N	%
Roe deer	1	10.0	6	28.6	7	22.6
Red deer	-	-	1	4.8	1	3.2
European hare	8	80.0	10	47.6	18	58.1
Red fox	1	10.0	4	19.0	5	16.1
Wild boar	-	-	-	-	-	-
Total	10	100	21	100	31	100

Source: Own elaboration.

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55% of the collisions involving these animals took place from spring to summer (fig. 3).

However, the performed analyses show that it is winter that was a particularly dangerous period. Although only 26.7% of the collisions with all the animals discussed here took place in that season, they included as many as 50% of roe deer strikes that were the most dangerous for the passengers and the crew (fig. 3). There was a significant difference in the frequency of disturbances caused between the three species posing the greatest threat at airfields (roe deer, hare, and the fox): ($G = 9.24$, $df = 2$, $P < 0.05$). The greatest numbers of collisions were reported in the second and third time interval: 18 (58.1%) and 8 (25.8%), respectively. Only 3 (9.7%) and 2 (6.5%) strikes occurred in the first and the fourth time interval. A significant difference in the frequency of collisions with the studied animals (roe deer, hares, foxes) existed between time intervals: ($G = 19.7$, $df = 3$, $P < 0.01$). Sixteen collisions with hares (34.8%) also required removal of hare carrion from the runway. Only 2 (4.2%) cases of disturbance caused by the removal of roe deer carrion from the runway was reported.

The difference in the frequency of aviation operations disrupted by the removal of hare carrion and the corresponding figure for the removal of roe deer carrion was significant: Fisher's test (one tailed): $p = 0.0001$. In the case of other analysed animals no disturbances of this kind were reported. The above data mean that as many as 15.4% of disturbances of aviation operations was connected with carrion removal. During one case of disturbance of aviation operations (late January 2008) at EPWA airport a fox was observed appearing on the runway at a hare carrion. In late December 2007 at EPKK airport a case was observed of a fox and a herd of roe deer appearing simultaneously on the runway.

4. Discussion

A relatively large number of disruptions of aviation operations caused by Cervidae deer, mainly by roe deer, at airfields in Poland can be interpreted as resulting from a clear and uncontrolled increase in the population size of these ungulates in Poland, leading to overabundance [12]. Europe, including Poland, has also witnessed a dynamic increase in the population size of foxes, which can be directly connected to the not entirely well thought-out campaign of supressing rabies, where rabies has been infecting the limited population of foxes for years [12- 15].

Unlike the mentioned mammals, the European brown hare in particular has experienced a dramatic decline in many European countries [16-17]. Still, European brown hares appear at airfields in Poland due to the presence of large grassy areas and preferred forage plants, such as clovers (*Triforium*) spp. and others, constituting the food basis for them [10], [18-20]. Panek and Kamieniarz [21] found that the density of the European brown hare in different landscapes of Poland (1981-1995) ranged from 0.07 to 5.18 individuals/km^2 (based on hunter take). However, airfields are areas where hares are not subject to hunting pressure, nor active lethal control by airport staff. For example, counts at one military airfield revealed densities of 2.7-3.4 individuals/km^2, estimates higher than in other areas in Poland and despite pressure from foxes [10]. Still, due to the lack of hunting management in the area of airfields, hare individuals most probably led a sedentary life there, while results of field work show that harvesting may intensify migration tendencies in these mammals [22].

The factor undoubtedly conducive to the presence of roe deer at Polish airfields are grass surfaces used as pastures is the presence of tree-covered and bush-covered areas [10], [23], ensuring the possibility of undisturbed rutting and calving [23-25]. Unfortunately, also against standard recommendations concerning animal strike prevention [26], there are water bodies and watercourses functioning there satisfying the needs of mammals and birds residing there [10], [20], [23].

What is additionally conducive to the presence of terrestrial mammals discussed in the article at airfields in Poland is many years of very serious neglect connected with the lack of fences at Polish airfields [10]. Analyses of data from Poland showed that in the winter (December, January and February) as many as 50% of disturbances of aviation operations from roe deer and as many as 60% of all collisions with roe deer took place. In the USA between 1990-2009, 879 collisions took place of civil aircrafts with white-tailed deer. There appeared to be some seasonal patterning in incident frequency, with deer incidents increasing overall from January to November and peaking in October and November (30.7%) [3].

It should also be emphasized that Polish results of phenological analyses of road collisions with roe deer show some resemblance to the results from airfields: two peaks of collisions were found there in the year cycle: April-May (33%)

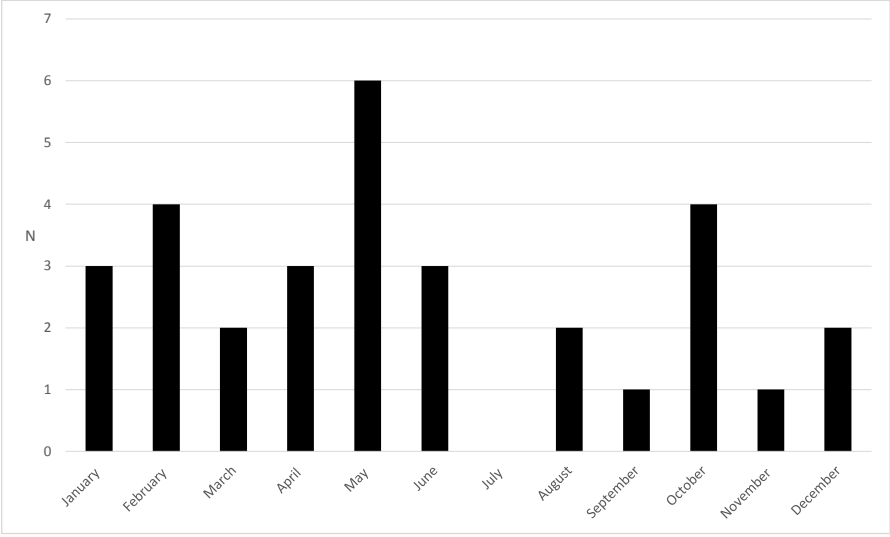

Fig. 1. Annual distribution animal effects on aviation operation at civil airfields in Poland
Source: Own elaboration.

and December-January (23%). However, a majority of fatal strikes of roe deer on roads occurred in May, which coincides with the period during which individuals, are active in marking and defending their territory [27]. Similar tendencies were found in Slovenia, where a majority of crashes occurred in April and May [28]. In Denmark road accidents when roe deer are killed were at its highest in June-July and September-October period [29]. Not without importance for collisions at airfields is the fact, that in winter in open landscape roe deer form larger herds compared to roe deer associated with forest complexes [30], which strongly corresponds with the obtained results showing that disturbances from roe deer herds were more frequent in the autumn-winter period than in the spring-summer period. The hare is a crepuscular species [31], which well explains the high number of disturbances caused by this species between 15:00 and 21:00. The period of particular intensity of disturbances caused by hares is the March-August period, when a majority of collisions took place. The above can be strongly related to the intensity of hare reproduction, since it is precisely then that litters occur which are significant to the population size [18], [32]. High frequency of collisions with hares has also been found in autumn, which is a phenomenon related to high mobility of individuals resulting from very intensive foraging, especially females in the period of rebuilding fat stores after the breeding period [33]. Probably an important role in the processes described in this article is played by the experience of individual hares in avoiding aircrafts. Concluding the analyses of the collected material with reference to the phenology of disturbances, including collisions, we find that winter, which is regarded as the period with a lower incidence of bird strikes at the airfields of Poland and Europe [34] is a period with a high incidence of terrestrial animal strikes.

Collisions of aircrafts with terrestrial animals generate the emergence of carrion resources. Its portions are an attractive food source for carrion eaters, which, in the conditions of Central Europe, are carnivore (*Carnivora*) as well as birds: raptors, corvids (*Corvidae*) and gulls (*Laridae*) [7], [35-36]. The above animals penetrate airfields and may be lured by the carrion sources lying on runways, constituting a very serious threat to the performed aviation operations. For many airfields in Europe, avian facultative carrion eaters are causes of collisions [6], [8], [34]. In this context, it is worth noting that even a very small portion of mammalian

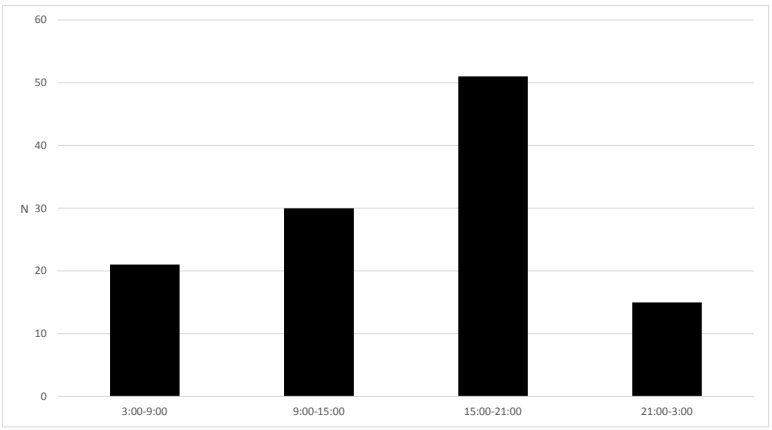

Fig. 2. Twenty-four hour distribution of animal effects on aviation operation at civil airfields in Poland
Source: Own elaboration.

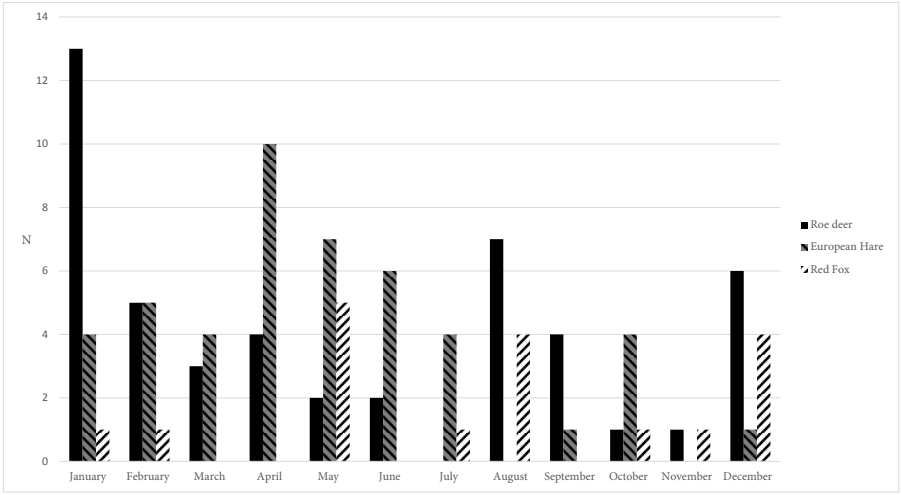

Fig. 3. Annual distribution of collisions with terrestrial wildlife at civil airfields in Poland
Source: Own elaboration.

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carrion, attracting carrion eaters, can be the cause of very serious collisions [7].

There are airports in Europe where collisions with foxes constitute a noticeable percentage of animal strikes [8], [37]. Therefore, it is worth discussing more broadly the determinants of fox presence at the airfields in Central Europe. In the light of the analyses presented here as well as other studies conducted so far [10], this presence is higher in winter. These mammals, specialized in catching voles *Microtus* sp., encounter problems connected with the decrease in the availability of those rodents, which has its source in the seasonal reduction of their density and in the thick snow cover. In response to these processes, they expand their home range and change their diet, exploiting carrion and vegetable food [35-36]. In situations of food shortage, foxes may anticipate hare or roe deer collisions with aircrafts and penetrate the vicinity of runways in search of carrion, thus creating a threat, which found confirmation in this study. Such penetration, aimed at the exploitation and removal of carrion sources from roads by foxes, is noted in numerous sources [38-40]. Analysis of the phenology of disturbances caused by foxes shows that the largest number of disturbances occurred in December and May. There is a possibility that it is adult male foxes that generate the largest number of landing and take-off disturbances because it is them that are present in open areas and clearly prefer such habitats for foraging [41-42]. In regard to the high number of disturbances, including collisions, in May – it stems from that being the period of transition to independence of the fox cubs. It may also be related to the high mobility of the inexperienced cubs born in April [43-44]. During discussions concerning fox presence at airfields, certain benefits should also be considered. The results of field studies indicate a negative impact of fox presence on the breeding of the bird community in open areas [45]. It must be noted that, in European conditions, due to the similarity of food niches (with preferences for voles) [35], [46-48] foxes are on the one hand competitors to birds frequent at airfields – common buzzards (*Buteo buteo*), rough-legged buzzards (*Buteo lagopus*), and kestrels (*Falco tinnunculus*) – by depleting food resources. On the other hand, they can modify the net of foraging activities of these species by scaring them away from low perches usually located near runways (such as navigation lamps, main runway curb signs (Kitowski I. – personal unpublished data). Detailed studies carried out in Poland also demonstrate that the fox's food contains other birds as well, including heavy ones, frequently observed at airfields [35]. It is also worth stressing that foxes are much more active at night, particularly in urbanized areas [49-50] where air traffic is considerably lighter.

The presence of the discussed mammals on the Polish airfields inspired actions aimed at minimizing their stay there. As mentioned above, they consisted mostly in fencing the airfields. Still, the fencing did not begin until the beginning of the present century. Moreover, typical for many airfields are holes and tunnels under the fences enclosing them [10]. On the other hand, many mistakes have been made in the process of fencing, such as enclosing an airfield together with the ungulates residing there and catching them afterwards [10], [23]. The removal of the carrion of all the animals discussed here is also implemented as part of FOD (Foreign Object Derbis) procedures. Additionally, regular operations of catching hares, deer and badgers (*Meles meles*) are carried out in the area of airfields where this problem exists [23].

5. Conclusions

In conclusions it should be pointed out that:

1. Roe deer have the biggest influence on flight safety at Polish airports.
2. As opposed to birds, the biggest threat generated by mammals took place during winter.
3. Mammmals disturbed landings more frequenly than take offs
4. Wildlife strikes were the most frequent in May, but the most dangerous for passengers and the crew hits with roe deer were related to winter.
5. Studies of wildlife strikes at Polish civil airports should be continued.

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