

Monika SPOREK¹

MONITORING OF 24-HOURS ACTIVITY IN A POPULATION OF WILD BOAR (*Sus scrofa*)

MONITORING AKTYWNOŚCI DOBOWEJ POPULACJI DZIKA (*Sus scrofa*)

Abstract: The aim of the study was to determine 24-hour activity of the Wild Boar at the baiting site established in a forest ecosystem next to large scale plantations, mostly of maize. The study was based on 24-hours monitoring by camera traps. This pilot study was conducted during a year (from May 2015 to June 2016) in western Poland. Recording the exact time and date of each observation made it possible to determine the 24-hour rhythm of the studied species. Moreover, we obtained information on the seasonal change of the structure and size of the packs, and on the frequency of their occurrence at the baiting site. Changes in the size of packs over the year matched directly the animals' breeding cycle. The highest activity of Wild Boars was recorded between 10:00 p.m. and 02:00 a.m. In each month the time of their coming and leaving the baiting site matched sunrise and sunset. Wild Boars were also active during the day. This refers mostly to small groups of a few unexperienced squeakers and piglets without the leading females.

Keywords: monitoring, camera traps, Wild Boar, 24-hour activity

Introduction

Increased availability of monitoring devices, such as camera traps, and improvement of their parameters made them gradually more frequently used to study animal populations [1–5]. The advantage of camera traps is they collect large datasets, because the devices are constantly active. Data from camera traps provide information about the population size, the use of space, and the 24-hour activity of animals, because the exact time and date of each observation are recorded. The use of such devices makes it possible in a short time to collect the amount of data, which in the past were obtained after many years of laborious and time-consuming observation. Moreover, these devices provide reliable numeric data. However, this is a new field of study in ecology, which still requires testing, especially in conditions of a confined forest habitat. Using new

¹ Ecology and Nature Protection Unit, Independent Chair of Biotechnology and Molecular Biology, University of Opole, kard. B. Kominka 6A, 45-035 Opole, Poland, phone: +48 77 401 60 60, email: mebis@uni.opole.pl

methods, even imperfect but with the existing background of methodology of data collection and analysis, is still more justified than conclusions based on subjective estimates. However, the use of this method requires from the observer the ability to interpret images and to distinguish groups of wild boars, which can be difficult in the recorded material. Developing possibly the most accurate methods of surveying animals' activity in forest ecosystem is purposeful, for applications in both management of game species and research. But this is also a challenge because of problems with observation of studied population caused by e.g. the features of the habitat, secretive life of the animals, their movements at different time, variation in distribution of individuals depending on the time of a year.

The aim of the study was to determine 24-hours activity of Wild Boars in the forest complex located next to large arable land, based on images from a camera trap. The additional aim was to determine the reaction of Wild Boars to bait located on border strips, in relation to availability of a abundant food on farmland next to the forest complex. Luring Wild Boars away from farmland to baiting sits has important practical applications. Firstly, baiting reduces damage to plantations caused by Wild Boars. Secondly, it helps the hunters to fulfil the yearly hunting plans for the overcrowded population of Wild Boars, which otherwise stay for a few months in extensive farmland, finding there food and shelter.

Material and methods

The study was conducted during 13 months (from May 2015 to June 2016) in the forest division Proszkow, forest district Przyciecz, section 183d. The monitored fragment of the forest section was located in the habitat of the fresh mixed forest, where



Photo 1. Study post (photographed by the author)



Photo 2. Feeding of Wild Boars at the baiting sit

the first layer is 140 years old stand of Scots Pine (*Pinus sylvestris* L.), and the second layer is 85 years old spruce and oak stand (*Picea abies* Karst., *Quercus petraea* Liebl.) The for material for assessment of 24-hours activity of Wild Boars' population was collected with a camera trap Suntek HT-002LI, based on the passive detector of movement PIR, with inbuilt infra-red LED lights, which make it possible to take photos also at night. The camera was located on a tree trunk, at 1 m above the ground, near covered hide, which enabled the observed to confront the direct observations with the images from the camera trap. The camera trap was fitted with the external memory card, which was exchanged every seven days on an average. The research stand was supplemented with seven measured metal poles fixed in the ground (Photo 1), and located within the view field of the cameras. While ageing and sexing the Wild Boars, the build and colouration of individuals, and their shoulder height, were read from measuring devices (Photo 2). To increase the success, the baiting sites were successively refilled with maize grain, maize ensilage, mixed oats and barley, fodder beetroots, carrots and apples.

Results and discussion

The material from camera traps was analysed to determine the 24-hours activity rhythm of the studied population, considering the timing of the animals' arrival at and departure from the baiting sit. The highest activity during the year occurred between 9:00 p.m. and 06:00 a.m., during feeding, and 5% of these activities was recorded between 10:00 p.m. and 02:00 a.m. (Fig. 1). The mean daily activity was 9 hours in total, which corresponds with studies of other authors (8–11 hours) [6]. The time of animals' movement differed between seasons and matched the timing of sunrise and

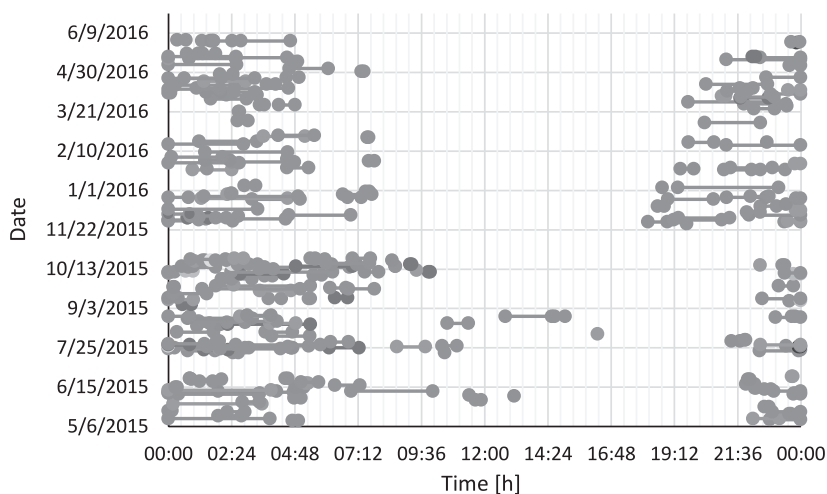


Fig. 1. 24-hours activity of the Wild Boar population

sunset. In spring, Wild Boars were most often observed between 8:30 p.m. and 5:00 a.m. In summer and autumn they were present between 9:30 p.m. and 6:30 a.m., and in June and July the packs stayed at the baiting sit even up to three hours after the sunrise. In winter the animals stayed the longest, from 7:30 p.m. to 7:00 a.m., but the start of feeding was delayed in relation to sunset by two hours, on an average.

Young Wild Boars were more active than old ones. Solitaires, which mostly leave alone, and join packs only for mating, occurred the rarest at the baiting sit. Sows appeared usually in the company of young animals (squeakers, piglets and subadults), in different numbers and configurations, depending on the season. The greatest activity of sows, accompanied mostly by squeakers, was observed between mid-May and the end of July. This might be an effect of the increased demand for food the females with youngs, which have to restore the body mass lost during the pregnancy, and provide offsprings with milk.

Analysing the images from the camera trap allowed to determine the social hierarchy of the population. If the males occurred at the baiting sit, they clearly dominated the females, the subadults were subordinated to sows, and the piglets, especially those that were not looked after by the mothers, were at the bottom of the hierarchy.

Wild Boars were also active during the day. This refers mostly to small groups of a few unexperienced squeakers and piglets without the leading females (Photo 3). A lack of the leader and guardian of the pack was probably the reason they occurred in places visited by people.

The results of other authors show that 24-hours activity rhythm of Wild Boars is an individual feature, and a population feature, and may be affected by many factors. The factors most often described by different authors are individual condition, climate, and human pressure at places these animals inhabit. The results of monitoring of Wild Boars in Canada and in China show clearly that these populations were mostly active during



Photo 3. Feeding of a squeakers at the baiting sit

the day. In China, where the study was conducted in a nature reserve, the highest activity was observed between 8:00 a.m. and 8:00 p.m., with a peak between 8:00 a.m. and 10:00 a.m. [7]. In Canada, where monitoring was conducted in areas of mixed farmland and forest, no effect of man activity of the studied population was noted. However, the study area was not heavily penetrated by man. The numbers of detections overlapped between day and night, and were 49% and 51% of all recorded events, respectively [8].

Human pressure on the environment, direct and indirect, is considered the main reason for large differences in the 24-hours rhythm in the study species. Direct pressure include individual and group hunting. Indirect effects on game animals include farming, managing activities in forests ecosystems, development of infrastructure, penetration by tourists etc. The greater that human pressure is the largest variation it causes in the 24-hours activity. Some authors [9, 10] describe the linear relation between the timing of man and wild boars' activity. In regions where animals were hunted during the day wild boars were most often recorded at night [10]. When frequency of individual hunting was intensive in the evenings, a reversed pattern was observed [9]. A similar pattern of the 24-hours activity of Wild Boars occurred near houses, which reduced the occurrence of animals in their vicinity during the day [9, 10].

Differences in the timing of Wild Boars' arriving and departing from the baiting sit observed during spring and summer, and their staying at the baiting sit despite sunrise, might be an effect of increased food demand of females that gave birth to offsprings, which have to invest energy to restore lost body mass and feed the youngs. Extended hours when packs occurred within the baiting sites in winter, was on the one side connected with prolonged night time, and on the other side it might have been caused by reduced access of Wild Boars to natural food resources due to snow cover or low temperatures [9].

Conclusions

1. Analysis of the 24-hours rhythms of recorded individuals showed that the timing of wild boars' activity depend mostly on the level of human pressure in places they inhabit, which was reflected by more frequent detection of animals at night than at day.

2. Identifying 24-hours activity of Wild Boars at the baiting sit may improve efficiency of implementation of hunting plans by hunters, and reduce damage to crop on farmland and to forest plantations.

3. Observations of lonely groups of squeakers and piglets during the day indicate that the leading female in the pack was shot.

References

- [1] Hebeisen C, Fattebert J, Baubet E, Fischer C. Estimating wild boar (*Sus scrofa*) abundance and density using capture-resights in Canton of Geneva, Switzerland. *Eur J Wildl Res.* 2008;54(3):391-401. DOI: 10.1007/s10344-007-0156-5.
- [2] Aditya V, Ganesh T. Camera trap records of Rusty-spotted Cat *Prionailurus rubiginosus* and Leopard Cat *Prionailurus bengalensis* (Mammalia: Carnivora: Felidae) from Papikonda National Park, northern Eastern Ghats, India. *J Threat Taxa.* 2016;8(5): 8818-8819. DOI: 10.11609/jott.2401.8.5.8818-8819.
- [3] Gomes de Rocha D, Sollmann R, Ramalho E.E, Ilha R, Tan CKW. Ocelot (*Leopardus pardalis*) Density in Central Amazonia. *PLoS ONE.* 2016;11(5):e0154624. DOI: 10.1371/journal.pone.0154624.
- [4] Petrov PR, Popova EP, Zlatanov DP. Niche Partitioning among the Red Fox *Vulpes vulpes* (L.), Stone Marten *Martes foina* (Erxleben) and Pine Marten *Martes martes* (L.) in Two Mountains in Bulgaria. *Acta Zool Bulg.* 2016;68(3):375-390. <http://www.acta-zoologica-bulgarica.eu/downloads/acta-zoologica-bulgarica/2016/68-3-cover.pdf>.
- [5] Šver L, Bielen A, Krizan J, Gužvica G. Camera Traps on Wildlife Crossing Structures as a Tool in Gray Wolf (*Canis lupus*) Management – Five-Years Monitoring of Wolf Abundance Trends in Croatia. *PLoS ONE.* 2016;11(6):e0156748. <https://doi.org/10.1371/journal.pone.0156748>.
- [6] Briedermann L. Zur Reproduktion des Schwarzwildes in der Deuchen Demokratischen Republik. *Beitr Jagd Wildforsch.* 1971;7:169-189.
- [7] Liu X, Wu P, Songer M, Cai Q, He X, Zhu Y, et al. Monitoring wildlife abundance and diversity with infra-red camera traps in Guanyinshan Nature Reserve of Shaanxi Province, China. *Ecol Indic.* 2013;33:121–128. DOI: 10.1016/j.ecolind.2012.09.022.
- [8] Stolle KM, van Beest F, Vander Wal E, Brook RK. Diurnal and nocturnal activity patterns of invasive Wild Boar (*Sus scrofa*) in Saskatchewan, Canada. *Canadian Field-Naturalist.* 2015;129(1):76-79.
- [9] Keuling O, Stier N, Roth M. How does hunting influence activity and spatial usage in wild boar *Sus scrofa* L. *Eur J Wildl Res.* 2008;54:729-737. DOI: 10.1007/s10344-008-0204-9.
- [10] Ohashi H, Saito M, Horie R, Tsunoda H, Noba H, Ishii H, Kuwabara T, et al. Differences in the activity pattern of the wild boar *Sus scrofa* related to human disturbance. *Eur J Wildl Res.* 2013;59:167-177. DOI: 10.1007/s10344-012-0661-z.

MONITORING AKTYWNOŚCI DOBOWEJ POPULACJI DZIKA (*Sus scrofa*)

Pracownia Ekologii i Ochrony Przyrody, Samodzielna Katedra Biotechnologii i Biologii Molekularnej Uniwersytet Opolski, Opole

Abstrakt: Celem badań było określenie aktywności dobowej dzików na łące założonym w ekosystemie leśnym graniczącym z wielkoobszarowymi uprawami głównie kukurydzy. Do badań wykorzystano całodobowy monitoring z foteopułapek. Pilotażowe badania prowadzono przez okres jednego roku (od maja 2015 do czerwca 2016), w zachodniej części Polski.

Rejestracja dokładnego czasu oraz dat każdej detekcji umożliwiła poznanie rytmu dobowego badanego gatunku. Ponadto uzyskano informację o sezonowej zmianie struktury oraz wielkości watah a także o częstotliwości ich bytowania w obrębie miejsca dokarmiania. Zmiany liczebności watah w ciągu roku pokrywały się bezpośrednio z przebiegiem cyklu rozrodczego. Najwyższą aktywność w ciągu doby zarejestrowano między godziną 22.00 a 02.00. W poszczególnych miesiącach czas pojawiania się, jak i schodzenia zwierzyny z nęciska pokrywał się ze wschodem i zachodem słońca. Odnotowano także aktywność dzików w ciągu dnia. Taka sytuacja dotyczyła głównie małych grup składających się z kilku młodych niedoświadczonych pasiaków lub warchlaków, bez lochy przewodzącej w stadzie.

Słowa kluczowe: monitoring, fotorułka, dzik, aktywność dobową