

An ecological monitoring of the plateau pika and its impact on grassland – An experiment in the Yushu District, Qinghai Province of China

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Keywords: Plateau pika, scouting camera, ecological monitoring, Qinghai-Tibetan Plateau.

Introduction

The plateau pika (*Ochotona curzoniae*; see Fig.1 for photo) is a small mammal that lives in the alpine grasslands of the Tibetan Plateau. There are several uncertainties existing in the ecological behavior of the plateau pika and its impact on the alpine grasslands, and this impact has long been a subject under discussion. The mammal will have created both positive and negative impacts to the plateau environment and the alpine ecology. In China the plateau pika is regarded as a pest and has been a target of control or extermination because it is a competitor with livestock for food. It also putatively destroys fragile high-altitude grasslands and accelerates the spread of deserts. On the other hand, some scientists have believed that the plateau pika is important for alpine grasslands and the ecology, by tilling the soil and also by functioning as a keystone species for biodiversity of the plateau. This paper summarizes a part of the pika's behavior identified through the experiment conducted during the summer of 2012 in the Qinghai-Tibetan Plateau, China.

Methods

In this study, the behavior of the pika was observed in the Yushu District, Qinghai Province of China, primarily using a scouting camera by LTL ACORN (Model LTL-5210A). The observation period was from August 12th to the 21st, 2012. As pikas entered the camera's field of view, the camera automatically started recording videos during the daytime in color, and at nighttime in near-infrared grayscale using near-infrared flash. The time of one recording was set as 40 seconds. The camera's field of view was 52°. Because pikas are very small (about 15cm tall), activities of individuals appeared to be more than 10 m away from the camera so it was difficult to confirm the details. For this reason, the target area of analysis was limited to up to 10 m from the camera. The target area included one entrance of the burrow and two pits pikas used as a place of excretion. To correct the supplemental information, some physical conditions of burrows were also investigated.

Results and Discussions

During the observation period, 705 activities were recorded



Figure 1. Plateau pika.

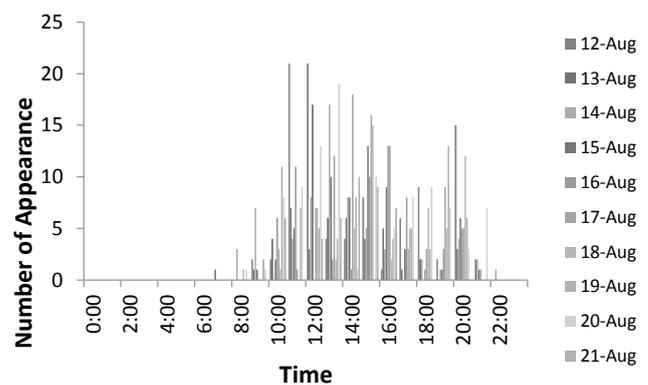


Figure 2. Number of Appearance by date and time.

(50-90 samples per day in 1σ). Figure 2 shows the number of the pika's appearance by time. The primary time of appearance was from 8:00 to 21:00, and no pikas appeared after 22:00. Pikas are said to be most active in the morning and in the evening (Kawamichi, 1994), and this study's observation of the plateau pika somewhat agreed with the general activity pattern of pikas.

The recorded activities of pika were categorized into four primary patterns: "eating," "social interaction," "stop and watch," and "others." "Social interaction" included courtship behavior and all other activities involved two or

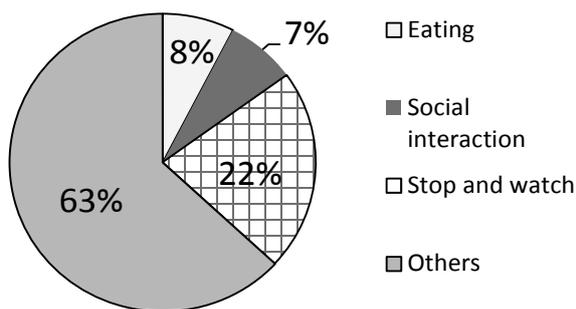


Figure 3. Breakdown of the recorded activities.



Figure 4. Weasel entering the pika's burrow

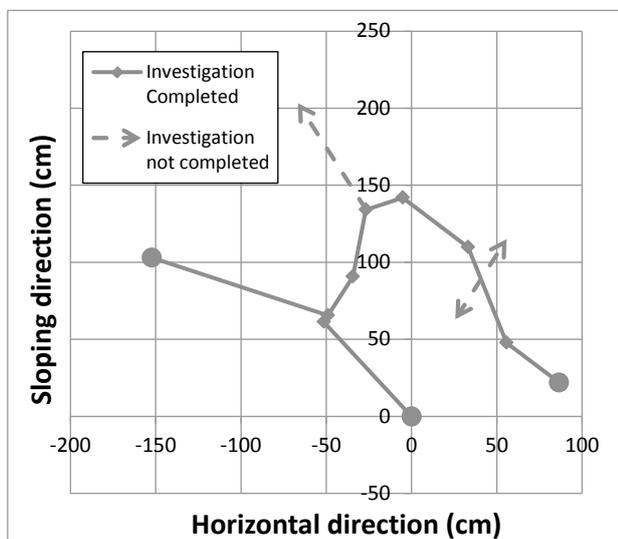


Figure 5. Structure of a burrow

more individuals. "Others" included moving and running. Figure 3 shows the breakdown of the recorded activities. A large portion (22%) of the recorded activity was "stop and watch," suggesting that pikas are watchful of predators

living on the plateau. The presence of raptorial birds, foxes and weasels was confirmed in the same area during the observation. The scouting camera recorded weasels entering the pikas' burrow (Fig. 4). The results of this analysis describe only a part of the pikas' behavior because both the observation time period and the area were limited. However, the monitoring successfully illustrated a part of the behavior of the pika, and the surrounding ecosystem.

Figure 5 shows the structure of a relatively new pikas' burrow. The burrow extended in total more than 6 m, with at least three entrances. The diameter of the burrow ranged from 7 cm to 15 cm, and the total volume of the bored soil was estimated to be about 43,000 cm³, which was more than 130 times the volume of a plateau pika. Multiple entrances are necessary for the pikas' burrow primarily to keep an emergency exit for when an enemy enters, and probably also to smoothly sweep the bored soil out to the surface upon constructing the burrow. The tilling process and the availability of the burrow definitely impact the physical property of soil in the plateau. According to Guo et al. (2012), it can have both a positive and negative impact depending on the density of burrows. The large amount of excavated soil changes the vegetation condition around the entrance of the burrow, which might also have a positive and negative impact on the grassland environment.

Conclusion

Throughout the study, a part of the plateau pika's behavior was identified or confirmed. Monitoring by the scouting camera recorded the pikas' behavior and indicated that the pikas' activity was strongly affected by the availability of other predators. The structure of a burrow investigated during the study indicated both positive and negative impacts of burrowing on the grassland environment. This study described only a limited portion of the pikas' behavior and the impact on the grassland since the study period and target area were limited. More information will be corrected in the future to quantify the complicated impacts of the plateau pika on the plateau environment and ecosystem.

Acknowledgements

We would like to thank Ms. Kimika Sano, University of Miyazaki, for continuous assistance of data analysis. This research was supported by Grand-in-Aids for Scientific Research (A) No. 23255015 from Japan Society for Promotion of Science.

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