

Expanded abstract

Aspects of golden takin ecology in the Qinling Mountains, China

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The takin (*Budorcas taxicolor*) is believed to be the closest living relative of the muskox (*Ovibos moschatus*). Both species are large-bodied and gregarious, but while the muskox inhabits the open treeless tundra of the arctic, the takin lives most of the time in steep, dense mountain habitats at temperate latitudes largely within the People's Republic of China. Two of the four subspecies have ranges that extend into Bhutan, Burma and India. The present study of some aspects of the ecology of the golden takin subspecies (*B. t. bedfordi*) is part of a larger project investigating relationships between takins and muskoxen through comparisons of their ecology and mitochondrial DNA. Despite their different habitats, some aspects of the social structure of muskoxen and takins, in particular group size, appear to be similar.

Objectives

This field study was designed to increase knowledge of golden takin ecology by observing takins as often as possible within a limited area during summer and autumn. The objective was to collect data on four broad aspects of takin ecology: *social structure*, including group size and age and sex of group members, *habitat use*, *feeding behaviour*, and *activity patterns*.

Study area

The study was conducted in the Qinling Mountains, 150 km south of Xian, Shaanxi Province at 33° N. latitude. Base camps were established at 1720 m in 1988 and at 2380 m in 1990. An area of 35 km² was monitored on foot for takin activity. Elevations within the study area ranged from 1600 m to 2512 m. Vegetation was a dense, mixed coniferous and broadleaf forest with stands of bamboo.

Methods

Data were collected during two field seasons, July–November 1988 and October–November 1990. Daily surveys (weather permitting) were conducted on foot within the study area to look for takins and takin activity. Recent takin tracks were followed to evaluate habitat use and feeding preferences and to estimate group size. If takins were sighted, group size and composition were recorded and feeding behaviour and activity patterns were observed by scanning the entire group at regular time intervals.

In 1990, 90 random transects were sampled to obtain data on habitat use. Transects were divided by terrain characteristics into 3 strata: alpine (along ridgelines, elevation 2300–2500 m), slope (below ridges, above valleys, elevation

1800–2400 m) and valley (along water, elevation 1650–2100 m). In addition to general vegetation and habitat data, plant species at 1 m intervals and presence of takin feeding were noted for each 30 m transect. Vegetation density was defined by 4 classes as follows: 1 = < 1 stem/m², 2 = 1 – 5 stems/m², 3 = 6–10 stems/m², 4 = >10 stems/m².

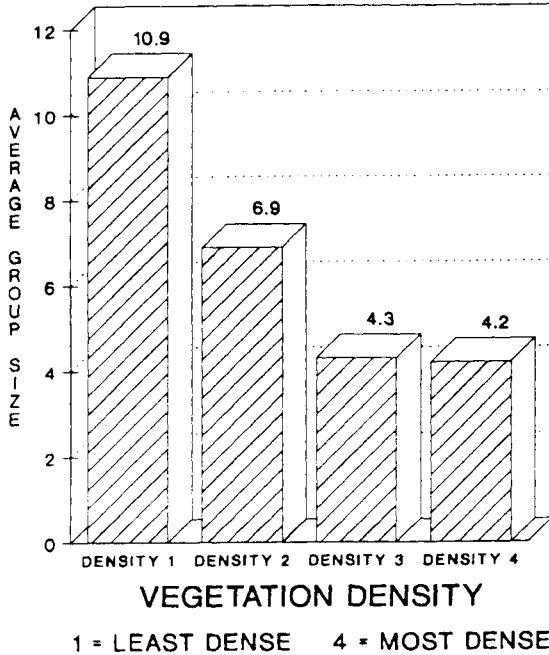


Fig. 1. Average takin group size in relation to vegetation density.

Results

Takins were observed in all vegetation densities. Small groups, 10 individuals, tended to be more common in dense vegetation and larger groups in more open vegetation.

Larger takin groups tended to be at higher elevations. Small groups were observed over almost the entire elevation range of the study area. Large groups were observed only above 2100 m. The largest group, of 40 individuals, was observed just below the highest point in the area. In 1990 group size was generally smaller, the largest group sighted contained only five takins.

The density of alpine transects where takin feeding was observed was significantly higher than the density for alpine transects with no feeding ($p < 0.05$). Takins fed in all terrain strata and 64 % of all transects had evidence of fee-

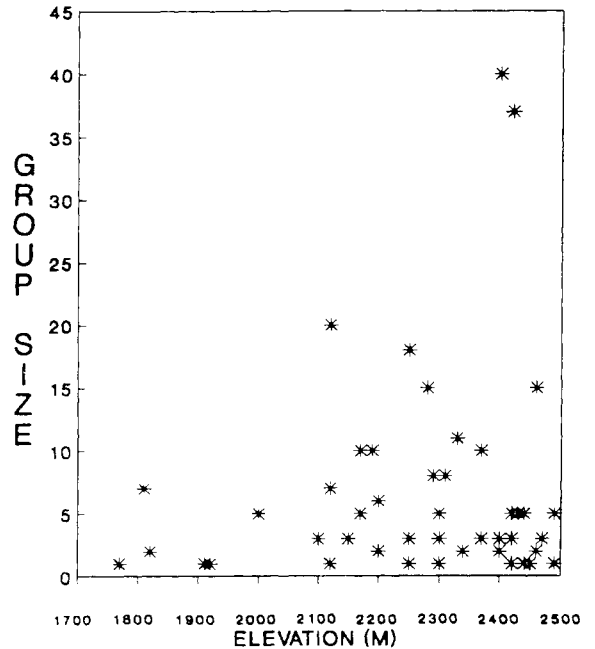


Fig. 2. Takin group size in relation to elevation.

ding, indicating extensive use of the study area. Takins consumed at least 84 of the 120 plant species identified over the 90 transects. Parts of plants eaten included leaves, current annual growth, seeds, bark and twigs. Shrub stems up to 8 cm in diameter were often broken over to enable browsing of upper branches.

Discussion

The dense vegetation and rugged terrain made direct observations of takins difficult. Takins were mobile, moving throughout the study area. All terrain strata and vegetation densities were utilized for feeding, with many plant species consumed. However, within the alpine strata, takins fed in denser vegetation. Larger groups of takins tended to utilize areas with less dense vegetation and also appeared to be unstable. Because larger groups tended to be in less dense vegetation and at higher elevations, but feeding in alpine areas was in denser vegetation, takins may form large groups for reasons not related to feeding. The interannual difference in group size might be seasonal, but could also be related to habitat destruction and increased human activity and poaching within the study area.

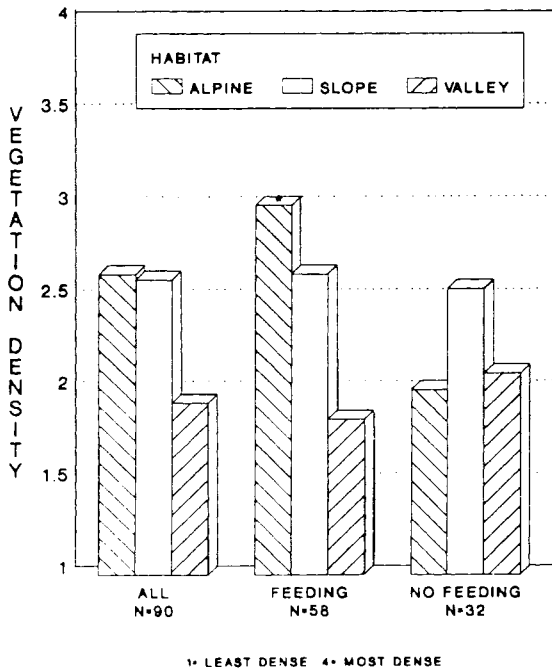


Fig. 3. Average vegetation density of transects by habitat and takin feeding. Average density of alpine transects with feeding significantly greater than all alpine transects and alpine no feeding transects ($p < 0.05$).

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