

Life on the steppes

Fact file - The importance of Pikas as a keystone species on the Tibetan plateau



Photo by Don Pirot

A keystone species is one that, if lost, will lead to a cascading effect of reduced biodiversity and interfere with the proper functioning of an ecosystem. The Plateau Pika is a Keystone Species because it:

1. Makes burrows that are the primary homes to a wide variety of small birds and lizards.
2. Creates microhabitat disturbance that results in an increase in plant species diversity.
3. Serves as the main prey for most of the predators on the Plateau.
4. Contributes positively to ecosystem-level dynamics by recycling soil.
5. Enhances above-ground and below-ground (root) biomass.

Extermination

In spite of these contributions to the Tibetan Plateau ecosystem, Plateau Pikas have been targeted in China for control. This is because they are believed to cause negative effects on rangeland habitat and to compete with livestock for food. In addition, the many burrows are hazards to individuals who ride horses across the grasslands.

Pikas and diversity

Nesting sites

The Tibetan Plateau is largely a treeless environment, and the open meadows offer little in the way of protection for nesting animals. The burrows of the Plateau Pika offer breeding habitat for many species including birds like the jay and snowfinch and lizards.

Plant diversity

On the Mongolian steppe, local floral diversity is enhanced due to the burrowing of pikas (some shrub plants only grow on pika burrows). Certain plants (*Euphorbia altaica*, *Artemisia* spp., and some crucifers) grow only on the burrows of Pallas's Pika.

Food

Most of the predators on the Tibetan Plateau rely heavily on pikas in their diet. Pikas are the most abundant source of food for predators during the summer, and as pikas do not hibernate, they become almost the sole source of food during winter. When pikas are exterminated, this important source of food disappears and the effect is to starve these species resulting in a loss of local biodiversity. In areas where pikas have been poisoned, birds of prey are seldom seen.

Wolves, snow leopards and brown bears can prey on animals as small as the Plateau Pika. Snow leopards largely specialize on big game and pikas act only as a buffer species. However pikas comprise over 50% of the diet of wolves in some areas, and brown bears appear particularly reliant on pikas for food.

Ecosystem functioning

The Plateau Pikas increase local primary plant productivity, aid in the formation, aeration and mixing of soil, and enhance infiltration of water into soil. Burrowing mammals, such as pikas, do not increase levels of erosion. Rather erosion in most cases is caused by overgrazing of vegetation by domestic livestock. Foraging of small and moderate populations of Plateau Pikas is selective and may play an important role in the stabilization of the alpine meadow community. Their digging activity loosens and improves the soil, and the accumulation of their excrement and leftover stores in the burrow system yields high levels of organic materials. Soil temperatures and humidity are higher, and concentrations of nitrogen, calcium, and phosphorus are greater near burrow systems than in nearby areas without pika burrows. The overall biomass of plants when growing over the burrow system of Daurian Pikas is almost five times greater than in the surrounding steppe. In spring the plants growing over burrow systems are 10 to 15 days in advance of plants growing on nearby steppe without pikas.

This information has been abridged from:

Andrew T. Smith and J. Marc Foggin. 1996. The Plateau Pika Is A Keystone Species For Biodiversity On The Tibetan Plateau. in: Conserving China's Biodiversity (II) (PETER Johan Schei, WANG Sung and XIE Yan eds.). China Environmental Science Press. Beijing. 211-221p.