Ecology and Social Behavior of the Yellow-Bellied Marmot (Marmota flaventris)

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Social Behavior

A colony of marmots was located inside the south entrance of Yellowstone on the east side of the Snake River just south of the junction of the Lewis and Snake Rivers. The colony lies in a north-south direction on an old terrace of the Snake River at an elevation of about 6680 feet. The burrows are along the old river bank and in the alluvial flat bordering the present stream bottom. The vegetation is primarily clover and timothy. A hot stream flows along the base of the bank, but does not serve as a barrier as young marmots crossed it frequently. All of the colony was not studied; that part along the bank and north of the phone line was omitted.

First observations were made on June 17. On that day young were observed at a number of the burrows. An observation tower was built and the colony mapped prior to the beginning of regular observations. Trapping was started July 5 and continued irregularly until August 15. Seven adult females, two adult males, and thirty-six young were trapped, ear tagged, and color marked. Adults were tagged in the left ear and young in the right ear. The pattern of trapping is indicated in Table 1. Twelve were retrapped once, one was retrapped twice, four, three times; one, four times; and two, five times. One adult and 25 young were retrapped. Trap success was considerably lower than hoped for. Of 350 set traps, only 95 resulted in captures including recaptures, or about 27%. A number of baits were tried, peanut butter, raisins, apples, carrots, honey, and oats. The latter seems to offer the best promise of success. Part of the lack of success is probably a result of the rich food supply available.

Since all animals were not trapped, an accurate census of the population is not possible. However, a close count can be achieved by counting adults under different situations, such as appearance at a burrow in the morning, number of adults appearing at various burrows during an alarm, etc. The adults in the study area numbered 17-20 and the young numbered 45-50. Of the adults, nine were identified as females and three as males. It seems that the sex ratio will show many more females than males unless it should develop that females are more susceptible to being trapped than males.

Activity of the animals was studied at various periods during the day. This was correlated with weather conditions. The peak of activity was from 7-10 A.M. with a possible second peak after 4 P.M. until the animals entered the burrows for the night. However this latter peak seems to occur only early in the summer when temperatures are cooler.

Activity drops by about 40% when the temperature is above 21°C. The drop is really greater than this indicates for many of the animals are at the burrows during the high temperatures whereas they were out feeding or playing during the cooler hours. All of the animals enter their burrows when a rain ensues, but a few may remain at the burrow entrance during a drizzle. By a half hour after sunset, all the animals have entered their burrows.

The detailed behavior of an individual animal was followed to determine the percentage of time spent in various activities. Feeding utilized more time (34.4%) than any other observed activity. Feeding was primarily on clover. During the period of blooming of the yellow monkey flower the young were observed feeding on the flowers. Some grasses were eaten and late in the summer young were seen eating the timothy heads.

The play activity of both young and adults was noted. Nearly all play occurred before 10 A. M., but some play might take place anytime during the day.

Each animal had a home burrow and most had auxilliary burrows in addition. The burrow systems seem to be so laid out that an animal is rarely ever more than 20-30 feet from a burrow. The auxilliary burrows function primarily as a refuge in case of danger.

The home range of a number of adults was noted. This varies considerably for different individuals. One old adult rarely went over 20 or 30 feet while others ranged up to 480 feet. Each animal tended to go to the same area for feeding. Whenever a marmot traveled from one part of the colony to another part, it used the trail system. The dependence upon trails can be well illustrated by the reaction to an alarm. On alarm marmots will use the most direct trail system to the home burrow if possible. Only when the trail to the home burrow is blocked will the marmot use a trail to an auxilliary burrow.

There was no evidence that any marmot acted as a sentinel. There always were some marmots lying near their burrows or feeding. The marmot that first detected an intruder gave the alarm whistle. This whistle alerted other marmots nearby who in turn might start whistling. Never was the entire colony seen to react to an intruder, but only that part of the colony nearest the intruder. On some occasions marmots distant from the scene of intrusion might stand up and look around for a few seconds, then go on with their activity. The alarm reaction was typified by a running to the burrow, entering, or sitting at the burrow and watching the intruder and often whistling. Alarm reactions were given to moose, deer, horses, coyotes, and people.

The alarm whistle was shrill and sharp. There were at least four other sounds in addition. One which was similar to the alarm whistle I have labelled the "curiosity" whistle. This call was given in situations similar to the alarm call, but did not precipitate the alarm reaction.

There were sounds given by the young at play, shrieks emitted by an animal being molested by another, and growls which could be heard in the burrows.

Since only about half the adults could be recognized as individuals, it was not possible to gather much material about interactions between individuals. One series of observations revealed that two females and a male made up a harem or part of a harem. The male was dominant and had free range over the harem burrow system. The females were probably dominant only at their own burrow and only to the other female.

By the first week of August, many of the animals had their full winter coat. By the second week of August the adults were disappearing and on August 20th only two adults could be found. Nineteen young were counted the same day. The adults definitely go into hibernation before there is a marked change in environmental conditions and while there is still an ample supply of food. Hibernation is evidently brought about by internal changes, such as amount of fat, type of fat, or some other internal factor. This is further substantiated by the fact that the young go into hibernation later than the adults, and marmots go into hibernation later at higher elevations.

Habitat Selection

Nine marmot colonies were located during the course of the summer. Although marmots are found under a variety of conditions, the optimal habitat is a grassy meadow with the trees and shrubs at a considerable distance from the burrows. Something to burrow under seems to be a necessity. A colony at the south end of Jenny Lake in Teton National Park shows signs of dying out. Trees and shrubs are growing over the area and old burrows, now grown over with vegetation, can be found. Mr. Jepson, Park Naturalist, reports that population has dropped since 1945. The reasons why a colony dies out when the area is invaded by trees and shrubs is not fully understood. Since the animals seem to rely strongly on sight to detect intruders, it may be that predators are able to operate more successfully.

Melanism

It was not possible to determine the incidence of black marmots. Activity was limited to gathering reports from others who claimed to have seen these animals. The authenticity of the reports will have to be checked at a future time. Nine locations were reported ranging from the Bechler country to the Snake River Canyon south of Hoback, Wyoming. The colony at the south end of Jenny Lake referred to above was one of these. An adult and young were found there and the young was photographed.

Not included here, but contained in the original report are a detailed map of the study area and tables on trapping and play activity.

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