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Steller's Jays Steal Gray Jay Caches: Field and Laboratory Observations

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Steller's Jays (*Cyanocitta stelleri*) are nest robbers and have been observed to steal the food stores of other birds. Bent (1946) referred to them as "notorious nest robbers," and he suspected them of stealing the stores of the California Woodpecker (Acorn Woodpecker, *Melanerpes formicivorus*). Bailey (in Bent 1946) called them "robbers of the first order" and stated that they would "steal anything edible about camp." Steller's Jays have been observed to rob the seed caches of Clark's Nutcracker (*Nucifraga columbiana*, Tomback 1978). Although nutcrackers are vigilant for other nutcrackers and Steller's Jays before caching in seed storage areas, Tomback (1978) watched jays empty newly made caches just after nutcrackers left the cache sites. These observations suggest that food-cache pirating may be a frequent foraging behavior on the part of Steller's Jays.

We report here field observations of Steller's Jays pursuing Gray Jays (*Perisoreus canadensis*) and attempting to steal their caches. Gray Jays form boli of saliva-permeated food and store these in various places on conifers, such as on branch crotches, in bark crevices, and in foliage (Rutter 1969). The Gray Jays we observed, in turn, exhibited evasive behavior and in some cases avoided loss of caches. Because

these observations were made under relatively heavy snow conditions, these pirating behaviors could have been brought out by food scarcity. To test the effect of Steller's Jay presence on Gray Jay caching behavior, we conducted a short laboratory experiment. The results of these studies suggest that Gray Jay caching in the wild is regularly inhibited by the presence of Steller's Jays.

Field observations were made at Bear Lake (elevation 2,900 m), Rocky Mountain National Park, Colorado from mid-February to mid-March 1984. The forest in the vicinity of the lake consists primarily of subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*). We usually observed birds between 1000 and 1400, and attracted them to us by offering pieces of bread. Generally, Gray Jays, Steller's Jays, Clark's Nutcrackers, and Mountain Chickadees (*Parus gambeli*) came to feed. Most often, we fed only Gray Jays in order to collect data on their food-caching behavior. Gray Jays arrived in groups of 2-7, Steller's Jays in groups of 2-14, nutcrackers usually a short while later in groups of 2-6, and chickadees intermittently in groups of 3-7. The weather conditions were variable, with most days cloudy and cool (ca. 5°C). The snowpack for the months of February and March averaged 114.3 cm, which was about 42% higher than at the same time the previous year

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(weather data from U.S. Soil Conservation Service). However, snowpack at this time of year averaged 110.5 cm over the last 7 yr, suggesting that the February and March 1984 snowpack was not unusual.

We summarize our observations as follows. On eight occasions (17 February, 2 and 12 March) a Steller's Jay attempted to steal a newly made Gray Jay cache. The behavior sequence began when a Gray Jay took bread, flew into the woods, and cached the bread. Caches were most often made at the end of a branch and always in foliage. One or two Steller's Jays would follow the Gray Jay into the woods, and as soon as the Gray Jay cached, a Steller's Jay would fly in and attempt to take the bolus. On six occasions the Gray Jay displaced the Steller's Jay, removed the cache, and flew deeper into the woods, leaving the Steller's Jay behind. In two instances, the Steller's Jays were successful in stealing the Gray Jay cache. In the first of these, a Gray Jay flew to a tree to cache and was followed by 2 Steller's Jays. After it had cached, Steller's Jay "A" flew in to steal the cache. The Gray Jay displaced jay "A," but in the interim Steller's Jay "B" flew in and removed the cache. A short while later, another Gray Jay stored a cache and then remained nearby. After 3-4 min, it flew off. Immediately after, a Steller's Jay flew to the cache. The Gray Jay returned and tried to displace the Steller's Jay, but the Steller's Jay had already taken the cache.

To determine if Steller's Jays would affect Gray Jay caching behavior in a laboratory setting, we trapped 2 Steller's Jays and 2 Gray Jays (red and yellow banded) on 13 April 1984 at Bear Lake. A Clark's Nutcracker was already in the lab. The experimental aviary was similar to that described by Bunch and Tomback (1986). An artificial tree was placed in the center of the aviary. The tree consisted of a center "trunk" with 13 randomly placed "branches." Each "branch" had four equally spaced pinyon pine (*Pinus edulis*) cones attached as cache sites. A 25.4 × 35.4 × 36.6-cm Glenhaven trap was suspended in the aviary such that a watching bird sitting on a perch in the trap had a full, unobstructed view of the caching bird and the tree. The watching bird perched quietly, facing the tree. A tray bearing 5 balls of processed cheese was placed next to the tree. During the 2 weeks before the beginning of this study, each Gray Jay was trained to cache and to recover its caches in this setup (Bunch and Tomback 1986). The experiments reported here were completed between 29 May and 22 June. The jays usually began caching immediately after entering the aviary. Each caching trial lasted 30-60 min. A trial was considered over after 30 min when a jay cached all food provided or began rearranging its caches. When no caches were made, trials ended after 45-60 min. To maintain their motivation for caching, Gray Jays were allowed to recover their caches in separate sessions either later the same day or 24 h later. For our experiments, we rotated in sequence a Gray Jay, Steller's Jay, and Clark's Nutcracker as the

watching bird. These sequences were repeated twice for each Gray Jay, alternating Gray Jays. Observations of Gray Jay behavior were made through a one-way glass window.

The results were consistent for both birds throughout the experiments. On all occasions when a Gray Jay was watching another Gray Jay, the cacher was unaffected by the watcher's presence. When the red-banded Gray Jay was the cacher and the yellow-banded Gray Jay was the watcher, the red-banded bird made 7 caches on the first trial and 1 cache on the second trial. The reverse situation resulted in 3 caches by the yellow-banded bird on both the first and second trials. When a nutcracker was the watcher, the Gray Jays also cached normally. The yellow-banded bird made 7 and 4 caches, and the red-banded bird made 3 and 4 caches. When the Steller's Jay was the watcher, it elicited a totally different response from the Gray Jays. Neither Gray Jay would cache in the presence of a Steller's Jay, although we allowed the Gray Jays ample time for this activity. When the Steller's Jay was removed from the aviary, the Gray Jays were given more time to cache, which they did immediately. The yellow-banded bird made 4 and 8 caches after the Steller's Jay was removed, and the red-banded bird made 3 and 4 caches.

Thus, it appears that Steller's Jays will steal the caches of Gray Jays, and consequently, Gray Jays either have learned to be or are instinctively cautious when caching in the presence of Steller's Jays. These behaviors may, in part, be exaggerated by winter conditions and a deep snowpack. However, summer observations of Steller's Jays stealing caches of Clark's Nutcrackers (Tomback 1978) suggest this is an occasional foraging strategy of Steller's Jays. In addition, Rutter (1972) has described the efforts of Blue Jays (*Cyanocitta cristata*) to steal Gray Jay caches in Algonquin Park. Pirating of food caches may then be a typical foraging behavior of the two *Cyanocitta* species.

Nutcrackers may not pose a common threat to Gray Jays because they are transient through Gray Jay habitat, ranging over a much larger area (Burnell and Tomback pers. obs.). The Steller's Jays, in contrast, may occupy territories near to and possibly overlapping with Gray Jay territories. Apparently, the Gray Jays were not a threat to one another because Gray Jays either do not habitually steal caches from each other or do not steal from mates or close relatives. We suspect that our Gray Jays were either related or a mated pair, as they traveled together and cached in the same general area.

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