

Attempted Predation of a Diurnally Active Spotted Bat (*Euderma maculatum*) by a Belted Kingfisher (*Megaceryle alcyon*)

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Jung, Thomas S. 2013. Attempted predation of a diurnally active Spotted Bat (*Euderma maculatum*) by a Belted Kingfisher (*Megaceryle alcyon*). *Canadian Field-Naturalist* 127(4): 346–347.

Most species of bats (Chiroptera) are nocturnal, and diurnal activity is only occasionally reported. I observed a Spotted Bat (*Euderma maculatum*) flying along a lakeshore in the Okanagan Valley of southcentral British Columbia, Canada, in mid-afternoon. The Spotted Bat flew along the shoreline and drank from the lake. During the course of its flight, the Spotted Bat was attacked by a Belted Kingfisher (*Megaceryle alcyon*), but it escaped. This is the first reported observation of a Spotted Bat active during the daytime. It is also the first reported observation of attempted predation of a bat by a Belted Kingfisher. It is not known how prevalent daytime activity is in Spotted Bats, but this observation supports the hypothesis that predation risk may be high for bats that are active during the day.

Key Words: Belted Kingfisher; *Megaceryle alcyon*; Spotted Bat; *Euderma maculatum*; diurnal activity; predation; British Columbia

It is believed that most species of bats (Chiroptera) are nocturnal as an evolutionary means to avoid competition with, and possible predation by, diurnal birds (Speakman 1991; Jones and Rydell 1994; Rydell and Speakman 1995; Russo *et al.* 2011). Nocturnality is therefore entrained in most (if not all) species of Microchiropteran bats. For instance, even in high latitudes, where the period of darkness is short or altogether absent during certain times of the year, bats are active at the relatively darkest time of the day (i.e., near midnight; Speakman *et al.* 2000; Talerico 2008). Occasionally, however, observations of diurnal activity by bats are reported in the literature (e.g., Speakman 1990; Ciechanowski and Anikowska 2007; Hendricks and Hendricks 2010; Russo *et al.* 2011). Reasons for diurnal activity by bats are not clear, but may include the need to drink or forage (Speakman 1990, 1991). Regardless, diurnal activity by bats could come at the cost of increased risk of predation by birds (Speakman 1991; Speakman *et al.* 1994; Fenton *et al.* 1994; Lima and O'Keefe 2013). Though, obtaining evidence for this hypothesis is challenging, given the irregularity of daytime activity in otherwise nocturnal bats (Lima and O'Keefe 2013). Here, I report an observation of attempted predation of a diurnally active Spotted Bat (*Euderma maculatum*) by a Belted Kingfisher (*Megaceryle alcyon*).

On 27 August 2013, at approximately 14:35 Pacific Daylight Time (PDT), an unidentified bat was observed flying about 5 m above a campground road at Vaseux Lake Provincial Park (49.298, -119.530), about 6 km south of Okanagan Falls, British Columbia, Canada. The bat flew among an open canopy stand of mature Ponderosa Pine (*Pinus ponderosa*) and arced toward nearby Vaseux Lake (M. M. Clyde, personal communication). At 14:39 (PDT) while wading about 10 m off the eastern shore of Vaseux Lake, I observed a Spotted Bat. The Spotted Bat was about 0.3 m above the surface of the water and flew within 3 m of me. Given the prox-

imity, I was able to positively identify it as a Spotted Bat, based on the large pink ears and the distinctive black dorsal pelage with large white spots (Nagorsen and Brigham 1993). The Spotted Bat remained within 20 m of the lakeshore, and I observed it drinking from the lake four times during a flight that undulated up-and-down between 0.3 and 3.0 m above the lake.

When the Spotted Bat was about 80 m away from me, a Belted Kingfisher perched on a tree along the shoreline dove at the Spotted Bat but missed it. The Belted Kingfisher quickly gained altitude to about 7 m above the surface of the lake and dove at the Spotted Bat again. The Spotted Bat easily avoided the Belted Kingfisher and continued down the lakeshore for another 80–100 m until it was out of sight. The Belted Kingfisher did not pursue the Spotted Bat further. The attack by the Belted Kingfisher lasted ≤ 30 seconds. It was a sunny day and the temperature was about 29°C.

This observation is of interest from several perspectives. To the best of my knowledge, this is the first record of diurnal activity by a Spotted Bat. Why the Spotted Bat was active during the day is unknown. Spotted Bats in the southern Okanagan Valley generally emerge to forage later in the day than sympatric species of bats (Wai-Ping and Fenton 1989) and they mostly forage over terrestrial habitats (Woodsworth *et al.* 1981; Leonard and Fenton 1983), so flying in daylight over a lake is unusual. It was not an overly hot day; however, diurnal roosts of Spotted Bats in the southern Okanagan Valley tend to be on tall, south-facing cliffs that may experience increasingly high temperatures throughout the day (Woodsworth *et al.* 1981; Leonard and Fenton 1983; Wai-Ping and Fenton 1989). The most plausible explanation was that the Spotted Bat needed a drink to reduce dehydration. Hendricks and Hendricks (2010) similarly observed unidentified species of myotis (*Myotis* spp.) drinking during daylight. It is not known how prevalent diurnal activity is in Spotted Bats, particularly related to drinking. This

observation is also the first known record of a Belted Kingfisher attempting to prey on a bat. Belted Kingfishers are primarily piscivores, but they will occasionally prey upon riparian small mammals (Kelly *et al.* 2009). For example, Cairns (1998) reported an American Water Shrew (*Sorex palustris*) in the diet of a Belted Kingfisher from Nova Scotia. However, the main scientific value of this observation is that, in conjunction with similar reports (e.g., Miller 1962; Fenton *et al.* 1994; Lefevre 2005), it lends further support to the hypothesis that diurnal activity by bats may incur an increased risk of predation by diurnal birds (*sensu* Speakman 1991; Fenton *et al.* 1994; Speakman *et al.* 1994; Lima and O'Keefe 2013).

Acknowledgements

I thank M. M. Clyde for ably assisting with this observation. H. M. Huynh, D. F. McAlpine, and an anonymous reviewer kindly provided helpful comments on an earlier draft of this note.

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Received 11 September 2013

Accepted 16 November 2013