Use of the bait-marking method to estimate the territory size of scavenging birds: a case study on ravens *Corvus corax*

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We tested the applicability of the bait-marking method in ravens *Corvus corax* to estimate their territory size during the breeding season in Białowieża Forest, eastern Poland. We marked 57 carrion baits and six additional carcasses with a distinctive type of plastic marker. The baits were experimentally placed around seven raven nests at different distances. A total of 1,018 pellets and 1,193 droppings from seven target raven nests, six neighbouring raven nests and from the communal roost were checked for markers. Ravens used 89% of baits and carcasses. In total, 705 markers, corresponding to 40 different baits and carcasses, were recovered. As confirmed by marker-type recoveries, ravens fed on 63% of experimental baits and 76% of those exposed inside the estimated territory. The proportion of baits utilised by a raven pair, as well as the total number of recovered markers declined with increasing distance of the bait from the nest. The probability of ravens feeding on a bait significantly decreased with greater distance from the nest. Distance from the nest correctly explained 84.5% of variation in the use of carrion by ravens. A threshold of 2,040 m indicated a raven territory size of 13.1 km². Raven pairs utilised baits and carrion further away than 2,040 m only exceptionally. Habitat characteristics and snow cover did not affect bait use and marker recoveries. Bait-marking was revealed as an efficient, accurate and economic method to estimate the territory size of scavenging birds, as well as to collect information on their movements.

**Key words:** bait-marking, Białowieża Forest, carrion, common raven, *Corvus corax*, scavengers, territory size

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