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Polygamy in Tengmalm's Owl *Aegolius funereus*

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Although difficult to ascertain, polygamy has been reported in many European owl species, e.g. the Barn Owl *Tyto alba* (Baudvin 1975, Shönfeld & Girbig 1975), Scops Owl *Otus scops* (Psenner 1969, Koenig 1973), Snowy Owl *Nyctea scandiaca* (Watson 1957, Hagen 1960, Poley & Poley 1972), Tawny Owl *Strix aluco* (Scherzinger 1968) and Ural Owl *Strix uralensis* (Minnemann & Busse 1978). In Tengmalm's Owls *Aegolius funereus*, polygamy has been observed many times in Europe. Biandry was found by Haase & Schelper (1972), Ritter et al. (1978) and Heidrich & Ritter (1979) in Germany, and by Kellomäki et al. (1977) in Finland, and a brief report on bigyny was published by Kondrazki & Altmüller (1976) in West Germany. There are no precise data on polygyny in this species in Finland, however, though it is the most numerous owl in this country (Merikallio 1958). The following case may thus be of some interest.

Adults of Tengmalm's owl were caught on nests in the Kauhava region (63°N, 23°E), western Finland: 166 females in the years 1969—82 and 53 males in 1979—82 (for study area and methods, see Korpimäki 1981a). During this time bigyny was observed once, but biandry not at all.

A nest with six newly laid eggs was found on 17 April 1982 in Kauhava in the village of Orava. On 4 May there were five nestlings and five days later there were six. The female was ringed on this visit (C-259.293). The male was ringed on 22 May (C-264.395). The six young owls fledged in early June.

Another nest was found 3 km from the first one. A female was seen there on 28 March and on 3 April the nest contained two eggs. Two weeks later there were two cold eggs and the nest seemed to be deserted. Surprisingly, on 23 April there was a female with three eggs in the same nest. I suspected that this was not the same owl as on the previous visit, because its behaviour was different. On 9 May there were seven eggs in the box and the female was ringed (C-259.290). On 30 May five nestlings had hatched and we caught the male. It was the same as in the previous nest. Thus this male had two breeding females as far apart as 3 km. All five nestlings were dead one week later, the reason for this being unknown.

There are two major types of polygyny, simultaneous or harem polygyny and successive polygyny (sometimes called restricted monogamy, see v. Haartman 1969). These types cannot always be clearly distinguished. In the present case the interval between the first and second clutches was about 20 days, so that this may be successive polygyny, as in the two cases of bigyny in Germany (Kondrazki & Altmüller 1976).

v. Haartman (1969) pointed out that relatively few polygynous species are clearly polyterritorial, and the question arises whether the present male had his females in different territories. During a good vole year in Swedish Lapland, a Tengmalm's Owl hunted within a radius of one kilometre from the nest (Norberg 1970). In another case a male could be tempted with an atrap to a distance of 700—900 m from the nest (Kuhk 1950). Since the present nests were at a distance of 3 km from each other, polyterritorial polygyny may be involved.

Kondrazki & Altmüller (1976) suggested that bigyny occurs in Tengmalm's Owl when food is abundant. My observations partly support their conclusion, because the second clutch was located near abandoned fields, where trappings made in late May — early June 1982 indicated a density of about 120 *Microtus* voles (*M. agrestis* and *M. arvalis*) per hectare. This very high value suggests that the *Microtus* vole populations were in the peak phase.

In 1982 there were 34 nests of Tengmalm's Owls in 410 holes or boxes in the Kauhava region and the breeding percentage of the nest-sites was 8.3 %. According to my earlier studies (Korpimäki 1981a, b, 1982), the owl population was in the increasing phase in the whole study area. Thus polygyny seems to occur in other phases of the population cycle besides the peak years.

In addition, 18 song territories of owl males were located in the study area. These males were very active vocally, but remained unpaired (e.g. Lundin 1961, Lundberg 1978, Korpimäki 1981a), possibly because they had occupied poorer territories (Lundberg 1979). If territories differ in quality, for example in terms of food abundance, females may reproduce more successfully with an already mated male in a good habitat than with an unmated male in a poorer environment (Verner 1964, Orians 1969, Wittenberger 1976). This would explain why part of owl population may fail to mate, while a few males have two females.

v. Haartman (1969) points out that hole-nesting passerines are polygynous more often than other birds and that scarcity of nest-sites may favour the evolution of polygyny among species nesting in holes. He suggests three reasons for this. (1) The assistance of the male in driving of enemies may be of less importance if the nest is safe. Unlike the other Finnish owls, the male of Tengmalm's Owl never guards his nest, but the female is well adapted to avoiding enemies (e.g. the Pine marten *Martes martes*, see Korpimäki 1981a). (2) The safety of the nest allows slower growth in the nestlings; further, the good insulation reduces the energy needed for maintenance of body temperature in the nestlings. The nestling period of Tengmalm's Owl is usually 30—33 days (Korpimäki 1981a), the longest time in relation to body size among all the European owl species, except the Barn and Pygmy Owl. The young of Tengmalm's Owl and the Pygmy Owl (Bergmann & Ganso 1965) are able to fly when they leave the nest-hole, unlike those of other European owls. (3) The restricted number of nest sites may contribute to the evolution of polygyny among hole-nesters. The natural nest sites of Tengmalm's Owl (holes of the Black Woodpecker *Dryocopus martius*) were often concentrated in groups on the terrain and polygyny would permit more effective utilization of the nest-holes than monogamy.

The slow growth and small maintenance energy costs of the nestlings reduce the food requirements. Tengmalm's Owl stores prey in the nest during egg-laying, incubation and hatching and also at the beginning of the nestling period. This makes it possible for the

male to feed both females and both sets of small nestlings.

The female takes little part in feeding, and 79 % of the prey was brought to the nest by the male (Korpimäki 1981a). This explains, why the productivity of the second clutch is very low in polygyny.

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Selostus: **Polygamiaa helmipöllöllä**

Kauhavalla Etelä-Pohjanmaalla todettiin helmipöllöllä yksi bigyniatapaus keväällä 1982. Sama koiras saatiin pyydystettyä kahdelta eri pesältä, joiden etäisyys oli peräti kolme kilometriä. Jälkimmäinen naaras oli aloittanut muninnan n. 20 vuorokautta myöhemmin kuin ensimmäisen pesän emo.

Polygamian syyksi esitettiin runsasta ravintotilannetta myöhäisemmän pesän vieressä olleella pakettipellolla (n. 120 pelto- ja kenttämyyrää hehtaarilla). Kolopesintä suosii polygamiaa helmipöllöllä, sillä turvallisen pesäpaikan vuoksi koiraan ei tarvitse vartioida koloa ja poikasten hidas kasvu on mahdollinen, mikä vähentää päivittäistä ravinnontarvetta. Lajin luonnolliset pesäpaikat (palokärjen kolot) ovat keskittyneet ryhmiin ja polygamia tehostaa harvojen pesäpaikkojen hyväksikäyttöä.

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