

Tiedonantoja - Meddelanden - Notes

The reaction of a regular Cuckoo host to foreign eggs

LARS VON HAARTMAN

The relationship between host and Cuckoo (*Cuculus canorus*) is in many respects analogous to that between hostile nations producing armaments. The stronger the armour of the battle-ships, the larger the guns made to repel them, and vice versa. The more frequently the Cuckoo parasitizes a certain species, the stronger will be the defence mechanisms evolved by the species. The commonest defence mechanism is the ability of the host to discriminate between its own eggs and those of the parasite, which will lead to either removal of the strange egg or desertion of the parasitized clutch. Other defence mechanisms, perhaps not evolved *ad hoc* but functioning just as well, will be early laying, breeding in sites inaccessible to the parasite (e.g. tree-holes with a narrow entrance), and egg polymorphism combined with the ability to discriminate between the morphs (Chaffinch?, cf. BRAESTRUP). Species which, from the standpoint of evolution, have become Cuckoo hosts very recently, may, however, fail to show any defence mechanisms (cf. BRAESTRUP).

In a classic investigation, RENSCH (1924, 1925) found that regular Cuckoo hosts learn to recognize their own eggs as soon as they are laid. According to him, non-parasitized species lack this ability. This seems plausible, though the number of species studied was small.

As the Cuckoo host evolves a capa-

city to discriminate against foreign eggs, the parasite will be forced to evolve eggs mimicking those of the host in an ever more refined way. The fact that of all the birds the Cuckoo is the one with the smallest eggs in relation to its size, is the most important general trait serving to fulfil this demand. As Cuckoo hosts have eggs varying strongly with respect to colour and markings (this interspecific diversity being as such a defence against the parasite), evolution seems to have produced different strains of Cuckoos with different egg colours. In the Cuckoo literature the strains are usually called *gentes*, though ecological subspecies or ecotypes would be more apposite terms, as the strains are sympatric, obviously genetically isolated from each other, and adapted in that they lay eggs similar to those of the host species. It is possible that the isolation of the strains is maintained by imprinting of the Cuckoo young upon the foster parents.

In Finland the Pied Flycatcher (*Ficedula hypoleuca*) is practically never parasitized by the Cuckoo. Of more than 1500 clutches seen by me, none contained a Cuckoo egg. In the great majority of cases, the entrance of the nest-holes of the flycatcher is too narrow for the Cuckoo.

In accordance with this lack of parasitism, the female Pied Flycatcher is apt to incubate nearly every strange subject placed in the nest, excepting those with a broken surface and, perhaps, a red colour. The size is so unimportant that a female Pied Flycatcher tried to incubate the egg of an Eider Duck (*Somateria mollissima*), her difficulties

in balancing on top of it being comparable to those of the fabled princess upon the glass mountain (v. HAARTMAN 1952).

In contrast to the Pied Flycatcher, the Redstart (*Phoenicurus phoenicurus*) is a regular Cuckoo host in Finland, nearly a third of all the Cuckoo eggs found being laid in Redstart nests (v. HAARTMAN, HILDÉN, LINKOLA, SUOMALAINEN, TENOVUO). In the Baltic parts of the USSR the Redstart is, as a Cuckoo host, second only to the White Wagtail, *Motacilla alba* (MALCHEVSKY 1960). As a rule, the Redstart nests in tree-holes with much larger entrances than those of the Pied Flycatcher (MEIDELL 1960, and others). When using a nest-box, the Redstart definitely prefers one whose entrance has been enlarged by the Great Spotted Woodpecker, *Dendrocopos major*. It also frequently nests in the ground (SIIVONEN 1935, 1937, LAMPIO 1941, RAITASUO 1941). Together with Cuckoos parasitizing White Wagtails and Bramblings (*Fringilla montifringilla*), the Redstart-Cuckoos are probably the most easily discernible of our Cuckoo "gentes". (WASENIUS 1936.)

As Redstart-Cuckoos lay blue, unspotted eggs, which are almost perfect imitations of those of the host, it seemed likely that the latter is discriminating with respect to egg colour and spotting. This assumption was tested in experiments carried out in 1974—1976. Unfortunately, few Redstarts nest in my study area (Lemsjöhölm in SW Finland), the population having decreased since the 1930s, and the number of experiments was, therefore, small.

Redstart pair (1). Twelve days after the completion of laying (8 Redstart eggs), a Chaffinch (*Fringilla coelebs*) egg of the greyish type was added to the clutch. On the following day the nest contained 1 R-egg, 7 newly hatched R-young and the Chaffinch egg.

Pair (2). Experiment (a). Eleven days

after the completion of the Redstart clutch (7 eggs), a Chaffinch egg of the greyish type was added. On the following day, the nest contained 2 R-eggs, 5 R-young, and the Chaffinch egg.

Experiment (b). The Chaffinch egg was now removed, and, instead, an egg of the Red-winged Thrush (*Turdus iliacus*) was introduced. The next day there were 7 R-young and the egg of the thrush.

Pair (3) Thirteen days after the completion of the clutch, a Redstart's nest contained 3 eggs and 4 newly hatched young. A Great Tit's (*Parus major*) egg was now added. After 4 days the nest contained 6 R-young and the tit's egg.

Pair (4). Experiment (a). A Redstart's clutch contained 6 eggs. When the 4th egg was laid, an egg of the Wryneck (*Jynx torquilla*) was added to the clutch. Six days later (4 days after the completion of the R-clutch) the nest contained 6 R-eggs and the Wryneck's egg.

Experiment (b). The Wryneck's egg was now removed and replaced with a Great Tit's egg. On the following day, the Redstart female incubated the clutch, including the Great Tit's egg.

Summarizing these experiments, we may note that foreign eggs were offered, which diverged from Redstart eggs with respect to colour, spotting and size. The foreign eggs were unspotted and white in 1 case, white with brownish spots in 2 cases, greyish green or greyish with darker spots in 3 cases. The size of the foreign eggs agreed well with that of the Redstart's eggs in 4 cases, but was larger in 1 case, and much larger in another. One of the larger introduced eggs also deviated with respect to colour and spotting.

In all the experiments the foreign egg was accepted and incubated, or, if the Redstart had young, allowed to remain in the nest.

The foreign eggs were usually introduced when the Redstart's eggs were close to hatch or some of them had hatched. This allowed the host maximal time to learn to recognize its own eggs. In one case, the foreign egg was introduced when the Redstart was still laying. Irrespectively of the time of introduction, the foreign egg was accepted.

Though the experiments were few,

the result is convincing. The Redstarts accepted eggs deviating more from their own eggs than do any Cuckoo eggs.

This is an unexpected finding, which cannot, at the present time, be fully understood. A theoretically possible explanation, though not one which I consider likely, is that the Redstart is too rare in SW Finland to enable the Cuckoo to parasitize successfully. The experiments should, therefore, be repeated in E and N Finland, where the Redstart is much more frequent.

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Yhteenveto: Erään käen isäntälinnun reaktio vieraisiin muniin

RENSCHin mukaan säännölliset käen isäntälinnut pystyvät jo munimisvaiheessa oppimaan omien muniensa ulkonäön, mihin loisinnan kohteeksi harvoin joutuvat lajit eivät pysty.

Jo aikaisemmin kokeiltiin kirjosisiepponaaraan reaktiota atrappimuniin. Laji on harvoin käen isäntänä. Kirjosisiepponaaras hyväksyykin mitä moninaisimpia vieraita esineitä "munina" ja hautonee.

Uudessa koesarjassa todettiin että leppälintu hyväksyi vieraita muniä pesässään, vaikka onkin maamme yleisin käen isäntälintu. Nämä munat poikkesivat sen omista värin, läikkyyden ja koon suhteen; jopa kaikissa näissä suhteissa poikkeavan punakylkirastaan munan leppälintu hyväksyi.

Tekijä ei pysty tulkitsemaan tuloksia. Leppälintu on kuitenkin nykyään harvalukuinen Lounais-Suomessa, jossa kokeet suoritettiin. Siitä saattaa johtua, että laji tällä alueella välttyy käen loisinnalta. Kokeita leppälinnun reaktiosta vieraisiin muniin pitäisi tämän johdosta suorittaa myös siellä, missä leppälintu on yleisempi.