

during the third year 19%. The Common Gulls usually start breeding when three years old (Table 1). Only about 9% of each cohort of eggs reach this age.

The mortality of breeding birds (estimated from checks of colour-ringed birds) averages 13%, varying yearly between 9 and 17%.

The mortality of the different age-classes has been estimated from observations of colour-ringed birds. The mortality for first-time breeders is rather high, and mortality then levels off, to rise again as the birds become older (Fig. 1). The oldest individual found so far has been 24 years old. The breeding career lasts, on the average, 5 years. Only 25% of the birds breed for more than 8 seasons.

In Fig. 2 we give the age-structure of the population, and the production of offspring in each reproducing age-class. Young breeders contribute proportionally less to coming breeding generations than do experienced breeders. Breeders that have bred five or more times contribute about two-thirds of each new breeding generation.

Common Gulls prefer mates of the same age. The pair bond is usually permanent. Mating of birds of the same age is promoted by the different arrival times of birds of different ages; older birds arrive

Table 1. The age at first breeding of Common Gulls ringed as chicks (sample size in parenthesis).

	Age		
	2 years	3 years	4 years
Males (175)	8.6%	59.4%	32.0%
Females (56)	7.1%	42.9%	50.0%

earlier than young birds. Pairs with less breeding experience (1–4 yrs) are more likely to break the pair bond after one year (19%) than birds with longer breeding experience (10%). In the latter case, the divorce seems to be related to breeding success.

Site fidelity is strong. Only 5% of the pairs change their breeding islands between two breedings, and these are usually young pairs. Of the males 41% breed in their natal colony, while only 4% of the females do so.

The most productive territories are near the edges of the colony. These are occupied by experienced breeders, while central territories are occupied by inexperienced breeders.

Population ecology of the Great Tit *Parus major* and the Pied Flycatcher *Ficedula hypoleuca* in Estonia

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A detailed study of the population ecology of the Great Tit and the Pied Flycatcher was started near the Nigula Nature Reserve in Estonia in 1971. Within a radius of 25 km there are more than 15 000 nest-boxes, of which about 10 000 are checked regularly each year.

The numbers of *P. major* increased from the early 1960s until 1973, after which this species steadily decreased. In recent years no decrease has occurred, but the numbers have remained low. The total study population of *P. major* was divided into three parts: 1) urban population, 2) agricultural population and 3) natural forest population. In urban areas the pair bond is fairly permanent, only about 10% of the pairs changing mates annually, and the territories are also permanent. In contrast, in forest areas the territories are less permanent, and, therefore, mate fidelity is low. The egg-laying of urban tits starts a couple of days earlier than that of forest tits, but in urban areas the clutch size is smaller. The earliest first clutches

contain the fewest eggs. The proportion of females incubating in empty nests seems to have increased recently (in urban areas 2.9% in 1984).

F. hypoleuca is the most numerous box-nesting bird in Estonia. After about 1975 the species decreased in numbers, and a new rise did not occur until 1986. Over 3000 individuals have been checked during the project. In SW Estonia over 30% of the breeding males are faithful to their previous breeding place (maximum observed shift between two breeding places over 30 km). About 50% of the females and 90% of the males in new breeding places are 1-year-old birds. In *F. hypoleuca* breeding density affects clutch size and breeding success only slightly. The productivity of the flycatchers is better in deciduous than in coniferous forests. The number of birds recorded on autumn migration correlates clearly with breeding success, but not with population size in spring.