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SUMMER BEHAVIOUR OF *CYGNUS CYGNUS CYGNUS* IN ICELAND

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A comparative study was made of breeding and non-breeding *Cygnus cygnus cygnus* in the Myvatn area of northeast Iceland.

Birds arrive in north Iceland, possibly via staging posts on the south coast. Breeders probably migrate paired, or may pair at staging posts, then move into the vicinity of breeding sites to commence nesting when waters become ice-free. Non-breeders first move to areas of spring grazing, then change to aquatic habitats.

Successful breeders moult at the breeding site. However, the remaining moulters can be found in two distinct flocks. Aspects of pairing and of quasi-territorial behaviour, and the time of build-up of the flocks suggest that the first flock, feeding on blanket weed *Cladophora*, is comprised of non-breeders. The second flock, feeding on pondweeds *Potamogeton spp*, is comprised of failed breeders and birds which have occupied breeding sites but have not produced eggs or young.

Detailed aspects of time-budgeting, feeding and reproductive behaviour of breeding and non-breeding birds were also investigated.

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THE BEHAVIOURAL ECOLOGY OF *CYGNUS CYGNUS CYGNUS* IN CENTRAL SCOTLAND

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Observation areas

Area 1 (see Fig 1), to the east, lies between the A91 road to the north and the A905 road to the south and extends to Monument Hill in the west and to Alva and Alloa in the east. Area 2, to the west, lies between the A84 and the A811 as far west as the B8075 and extending to Stirling in the east. All observations were made from a vehicle, mostly at a range of 100 m or more.

The distribution and size of flocks

During the period from 31 October 1977 to 7 May 1979, 142 flocks were recorded from the study areas, the term 'flock' being used for all numbers including singletons. Each flock is given an identification number. This number is retained if the flock remains the same size during consecutive observations, although it may move to a different locality.

During the same period, birds were present for a total of 5123 bird-days, 40.5% (2075 bird-days) in winter 1977/78 and 59.5% (3048 bird-days) in 1978/79. Of a total of 26 localities used, only nine contributed more than 200 bird-days each, only four of which received similar usage over two winters. The remainder each contributed fewer than 100 bird-days (see Table 1 and Fig 1).

Flocks ranged in size from 1 to 134, the mean being 26.9 (24.8 winter 1, 27.3 winter 2). However, if localities contributing more than 200 bird-days are considered separately, the mean flock size is 40 ($n = 119$: 40.8 winter 1, 39.5 winter 2) while for the remaining localities it is 18.2 (18.6 winter 1, 17.6 winter 2). Over two thirds (70.4%) of all flocks are of fewer than 50 birds (Fig 2). Large