Distribution and habitat use by Sheldgeese populations wintering in Buenos Aires province, Argentina

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Introduction

The southern part of Buenos Aires province in Argentina (Fig. 1) is one of the main wintering areas for three species of sheldgeese (Tadornini), the Lesser Magellan or Upland Goose *Chloëphaga picta,* the Ashy-headed Goose *C. poliocephala* and the Ruddy-headed Goose *C. rubidiceps.* Most of the birds arrive in April and depart in August (Humphrey *et al.* 1970; *Niello* 1966). Here the geese feed on the leaves of autumn sown cereal and grass pastures, a situation that causes concern amongst farmers. As well as killing the geese, one of the main methods to deal with this problem is to scare them with aircraft. Collectively the farmers hire an aircraft to round up and drive the flocks elsewhere (Pergolani da Costa 1958). Sometimes the flocks are driven out to sea in an attempt to drown them. However, as the geese are used to over-sea migration (Plotnick 1961) it is likely that they regain land. Thus this solution is only temporarily effective and only serves to transfer the problem elsewhere.

No work has been carried out to establish the amount of damage the geese are doing or the best method to deal with the problem. Therefore, as a first step in trying to understand and quantify the problem, a comprehensive survey was carried out in Buenos Aires province in winter to describe the distribution and numbers of the geese and their habitat use.

One of the species, the Ruddy-headed Goose, has become very rare in Argentina (Rumboll 1975) and winters only in this area. Thus there is a need to determine its present status and distribution so that the species can be protected and to ensure that goose control measures are not directed against it.

Study area

The study area is composed of low-lying land divided into large farms where cereal crops are grown, as well as maize *Zea mays,* sorghum *Sorghum graniferum,* and sunflower *Helianthus annuus.* Wheat *Triticum aestivum* is the most important cereal crop in the area, although a few fields of oats *Avena sativa,* barley *Hordeum vulgare* and rye *Secale cereale* are also found.

Managed pastures make up a considerable proportion of the area. These, as well as natural grassland and crop stubbles are used for grazing cattle and sheep.

The following field types were recognised in the study area:

1) Ploughed fields.
2) Wheat stubble with a good coverage of annual rye-grass and reseeded wheat. These fields are often grazed by cattle.
3) Wheat stubble lightly ploughed in January or February to allow for better growth of annual rye-grass and re-seeded wheat and used for winter grazing.
4) Wheat fields with plants which have had up to 25 days of growth (two or three leaves).
5) Wheat fields with plants which have had more than 25 days of growth (already tillered).
6) Young pastures, usually of white clover *Trifolium repens,* alfalfa *Medicago sativa* and fescue *Festuca arundinacea* sown between March and May and first grazed lightly in September.
7) Established pastures of more than one year old and grazed annually. They are ploughed and re-established approximately every eight years.
8) Winter oats, sown in March and grazed between May and August.
9) Natural grassland with indigenous vegetation composed mainly of *Stipa* sp. which has not been used for any other purpose other than for grazing. They often occur in low lying salty soils where *Disticlis* sp. is also abundant.
10) Paddocks of natural vegetation which are lightly ploughed annually or every two years to favour good reseeding of natural grasses, usually used for sheep grazing, and cleared of bushes and shrubs.
11) Maize, sunflower and sorghum stubble.

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Methods

The survey was carried out between 17 and 26 July 1983, and 21 and 31 July 1984. Road transects totalling 3787 km (1983) and 3615 km (1984) were surveyed throughout the main wintering area during 10 consecutive days. The length of each transect varied between 200 and 500 km. The following information was collected along the transect

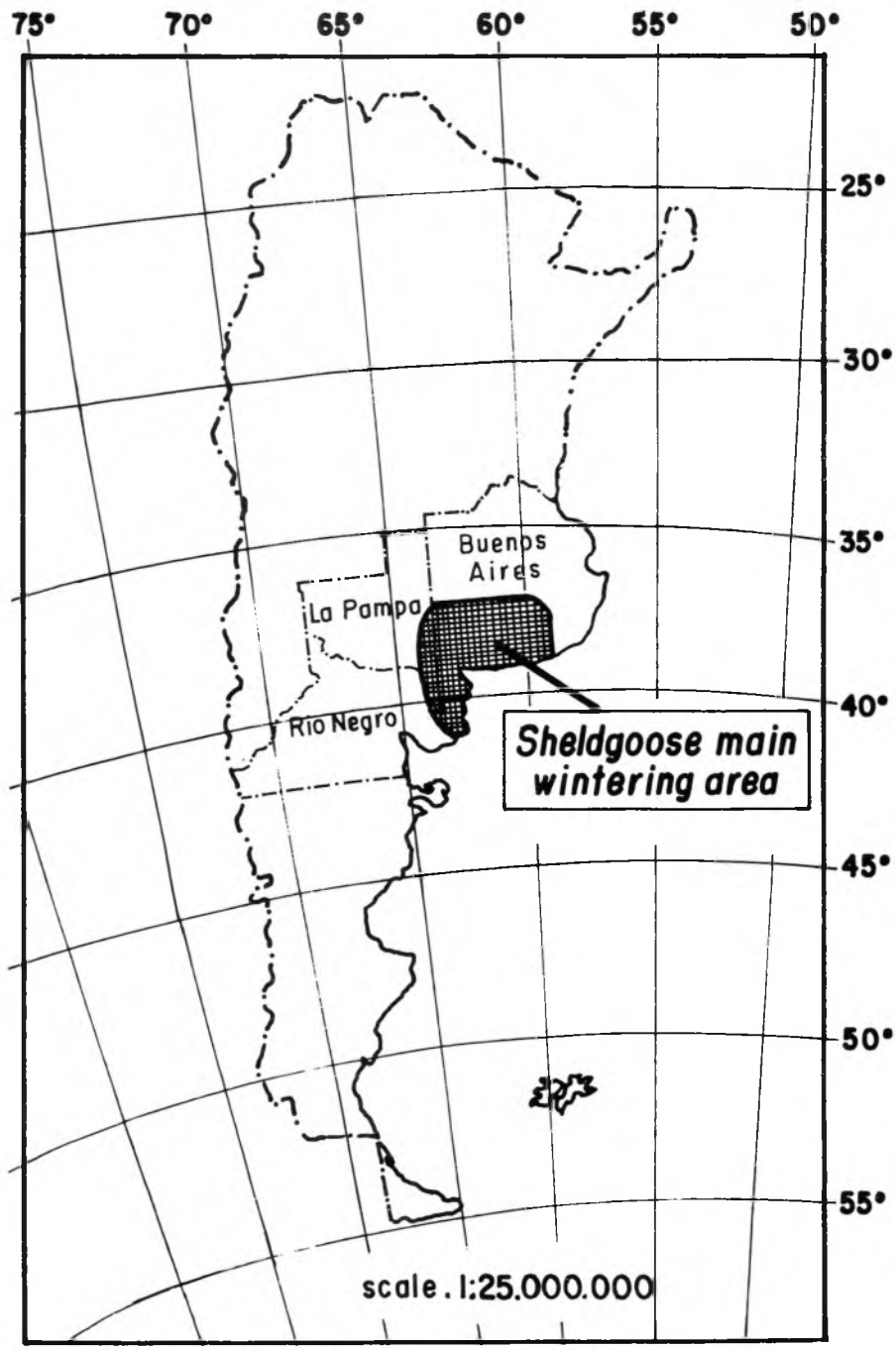

Figure 1. Sheldgoose main wintering area in Buenos Aires, province, Argentina.

to a distance of 500 m on either side of the vehicle: numbers of each species of goose, their location on the transect and the type of field on which they occurred. Also, the two colour morphs of the male Upland Geese, barred and white-breasted were recorded. The proportion of each field type present along the transect was determined from sample sections totalling 606 km in 1983 (16% of the total surveyed length) and 2089 km in 1984 (58%). Plots were similar in size and independent of the use assigned to them.

Indices of habitat selection were determined by dividing the proportion of birds found on a particular field type by the proportion of that field type available in the area. Values over 1 indicate positive selection and values less than 1 indicate negative selection (Newton & Campbell 1973).

Results

Numbers and distribution

The total numbers of geese counted were

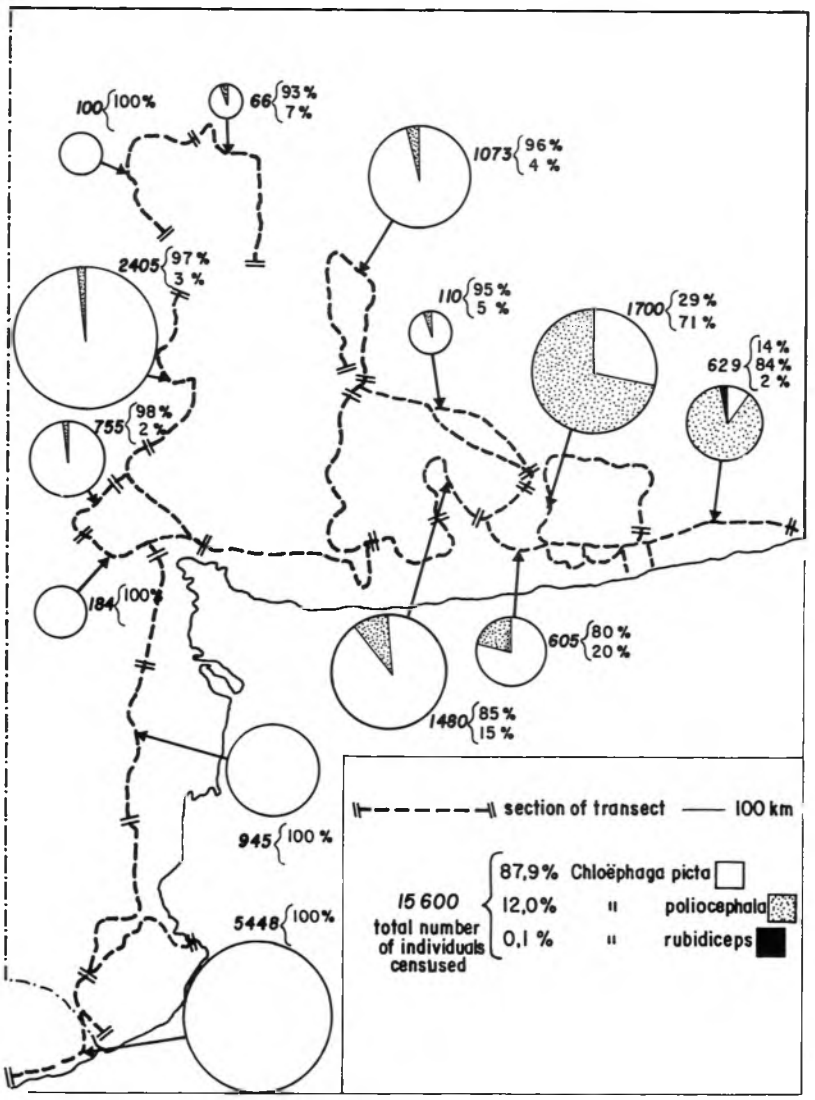

Figure 2. Number and relative abundance of sheldgeese (Buenos Aires, 1983).

15,600 in 1983 (4.1 geese/km of transect) and 16,560 in 1984 (4.5 geese/km of transect). Only 12 Ruddy-headed Geese were sighted in 1983 and 44 in 1984, most of which occurred south of Tres Arroyos. The rest were Upland Geese (88.0% in 1983 and 93.8% in 1984) and Ashy-headed Geese (12% in 1983 and 6.2% in 1984). The relative proportion of Upland and Ashy-headed Geese in the 1984 survey was calculated for 12,200 of the 16,560 individuals censused since the distance to some groups did not permit their correct identification.

The distribution of the three types varied; Ashy-headed and Ruddy-headed Geese were more abundant in the east of the study area compared with the west (Fig. 2 and 3). Circles in Figures 2 and 3 represent geese found within approximately 100 km sections in each transect. Geese were not observed in all of these sections for both years.

The population sizes of the two colour morphs of the Upland Goose were different and they had a different distribution; 62.2% and 60.9% of the males were barred, and 37.8% and 39.1% white-breasted in 1983

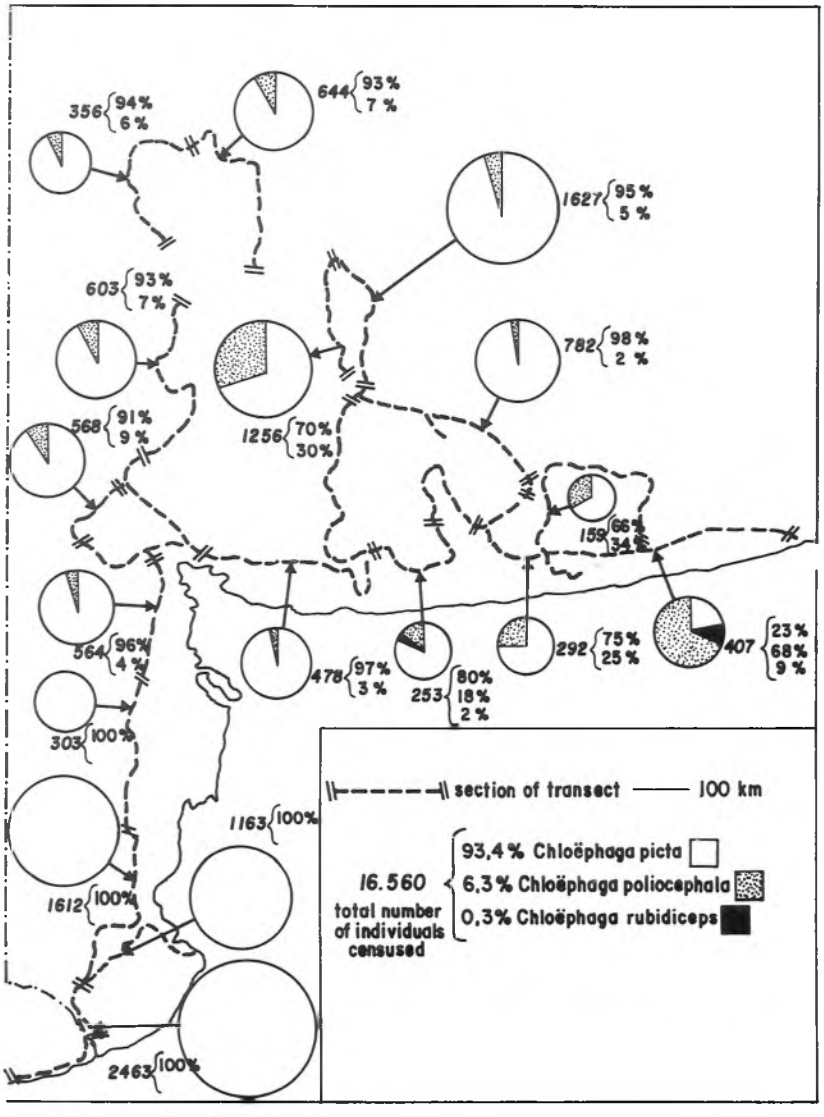

Figure 3. Number and relative abundance of sheldgeese (Buenos Aires, 1984).

and 1984 respectively. The barred birds predominated around the coast whilst the white-breasted males were proportionately more common in the northern part (Fig. 4).

The different species and two morphs of Upland Goose formed mixed flocks in these areas where they occurred together. Flock sizes were variable in size, but never larger than 1000 birds (Fig. 5). The most frequent flock size was 1–25 birds though the numbers they contained only represented 6.6% and 4.6% of the total counted whereas the very few flocks of over 500 accounted for 12.2% and 12.3%. Nevertheless, it can be said that a majority of the birds (64.3% and 54.1%) occurred in flocks of under 250.

Habitat use

Most of the geese occurred on stubble fields, newly sown pastures and pastures

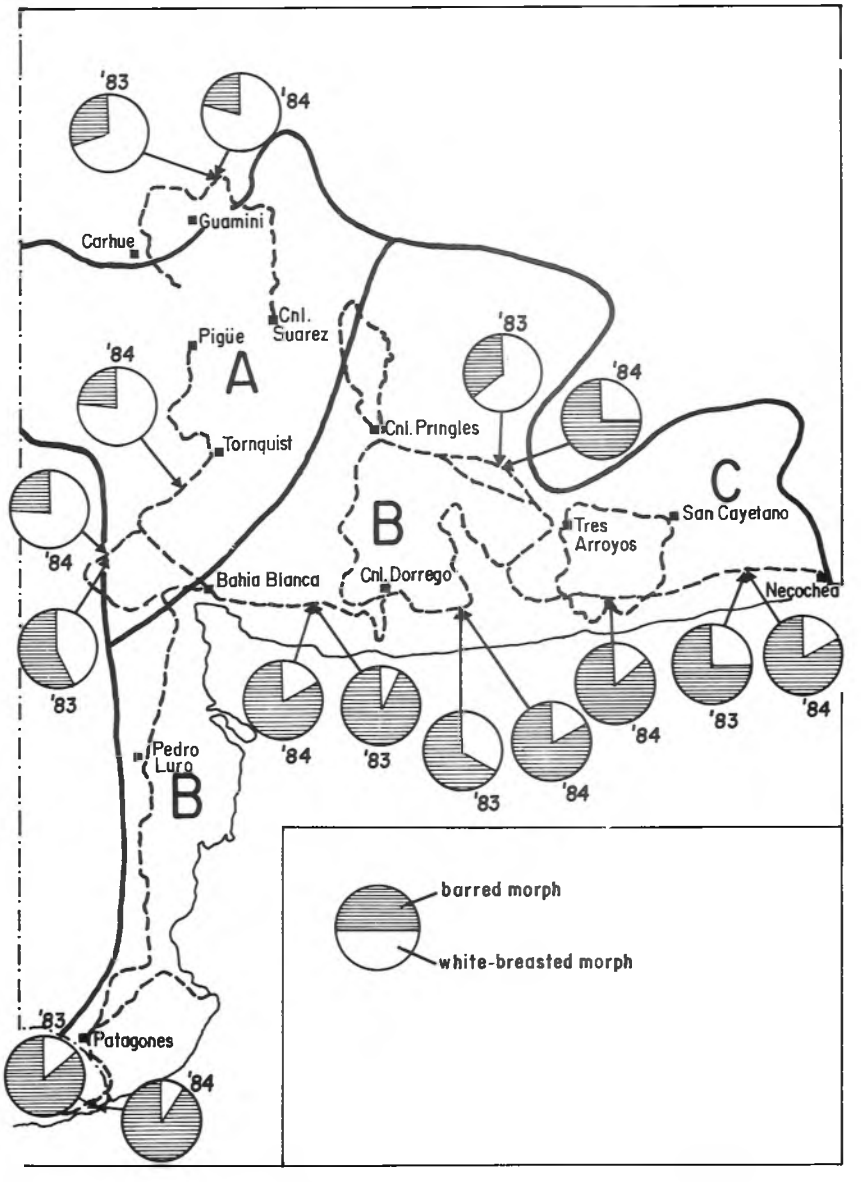

Figure 4. Distribution of *C. picta* (barred and white-breasted morphs).

composed of natural vegetation or paddocks. Relatively few occurred on autumn sown wheat (Tables 1 and 2). In both years Upland Geese selected wheat stubble fields, natural grassland and maize, sunflower and sorghum stubbles, and Ashy-headed Geese selected for newly sown pastures and maize, sunflower and sorghum stubbles. Ruddyheaded Geese selected for newly sown pastures in both years and for wheat fields, natural grasslands or maize, sunflower and sorghum stubbles in either one of the surveys. However, these last indices were derived from the observation of very few individuals.

Densities were calculated for a few fields of known area, values varying between 1.2 and 3.5 geese per ha in wheat fields of less than 25 days growth, and between 0.5 and 3.5 geese per ha in wheat fields of more than 25 days growth.

Discussion

The distribution of the three species of sheld-geese surveyed was similar for both surveys. Upland Geese were widely spread throughout all the area surveyed, whereas both Ashy-headed and Ruddy-headed Geese were found almost exclusively in the main wheat growing area to the east. It was not possible to distinguish differences in relative abundance of habitats which could account for this distribution. However, the east is more productive as a result of better soils and higher rainfall; wheat production is more important in this area and plot sizes are on the whole smaller than in the west.

Plotnick (1961) had suggested that barred birds formed almost the entire population in area B (Fig. 4), that white breasted birds were also present in area A, and area C had many Ashy-headed and Ruddy-headed Geese.

The three species remain in Buenos Aires province from April to August. In winter a large proportion of the habitats available are wheat stubbles, which in some cases are used for grazing cattle or sheep, or maize, sorghum and sunflower stubbles. Geese selectively used these habitats where they

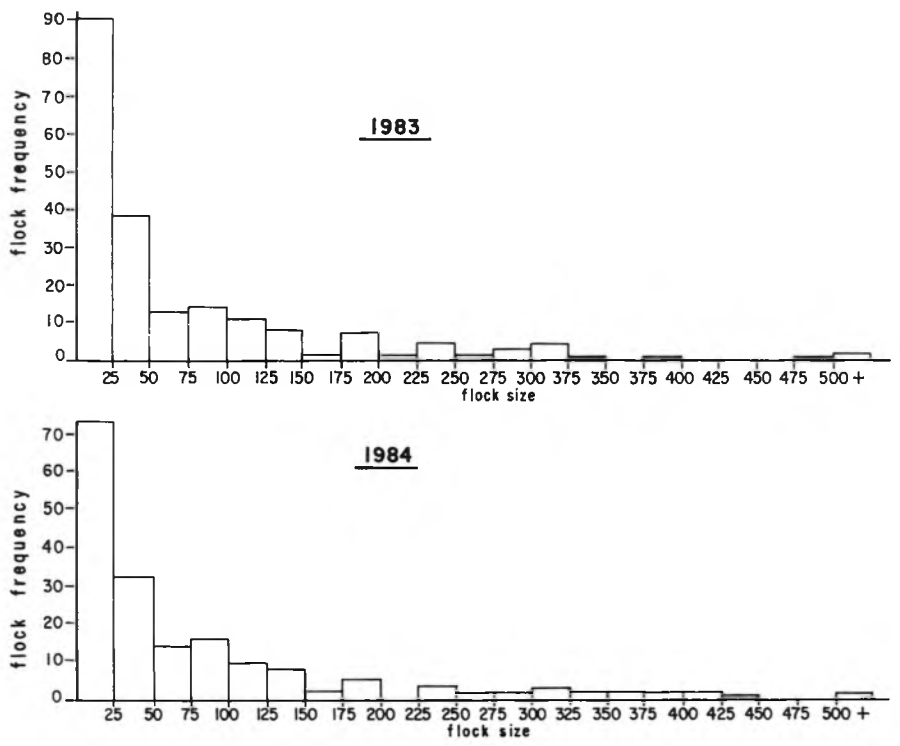

Figure 5. Distribution of flock sizes of sheldgeese (species combined) Buenos Aires province.

Table 1. Relative proportion of the goose populations observed on different field types in Buenos Aires province in winter.

	Upland Goose		Ashy-headed Goose		Ruddy-headed Goose	
	1983	1984	1983	1984	1983	1984
Ploughed fields	0.4	2.6	2.2	–		
Wheat stubble	24.8	22.1	27.7	11.8	–	10
Ploughed wheat stubble	18.2	8.2	0.6	3.2		
Wheat fields (0 to 25 days of growth)	2.4	7.2	7.0	3.9	66.7	–
Wheat fields (more than 25 days of growth)	1.7	10.9	2.8	–		
Young pastures	17.5	1.8	34.3	5.8	33.3	5.0
Established pastures	4.2	6.8	0.3	1.8		
Winter oats	0.3	12.6		0.6		
Natural grassland	21.5	9.6	19.3	18.6	–	30.0
Paddocks	7.7	14.2	4.5	25.9		
Maize, sunflower and sorghum stubbles	1.3	4.0	2.1	28.9		55.0

Table 2. Indices of selection by sheldgeese for different habitats.

	Upland Goose		Ashy-headed Goose		Ruddy-headed Goose	
	1983	1984	1983	1984	1983	1984
Ploughed fields	0.02	0.10	0.07	–		
Wheat stubble	1.90	1.70	2.10	0.64		0.75
Ploughed wheat stubble	0.76	0.53	–	0.23		
Wheat fields (0 to 25 days of growth)	0.29	0.75	0.75	1.20	8.00	
Wheat fields (more than 25 days of growth)	0.25	1.50	0.28	–		
Young pastures	4.58	0.28	8.60	3.60	8.50	3.30
Established pastures	0.11	0.60	–	0.17		
Winter oats	0.08	2.20	–	0.10		
Natural grassland	4.60	1.80	4.10	0.69		2.40
Paddocks	0.76	1.20	0.38	2.50		
Maize, sunflower and sorghum stubbles	17.30	1.55	14.50	5.16		11.20

grazed on rye grass and reseeded wheat which grows on these stubbles.

During the last 10 years there has been a shift from winter wheat, generally sown in May, to spring wheat, which is sown in July and August and which has a more rapid growth. The period in which these crops are vulnerable to goose grazing is therefore much reduced. The use of this type of seed also allows for synchronisation of sowing dates in each area as a result of which there are fewer of the isolated early crops which are more exposed to intensive goose grazing.

Newly sown pastures are selected for by the three species of geese. The plants sown (white clover, rye grass, fescue) probably form the diet of the geese. Geese do not seem to uproot plants according to the comments of most farmers in the area. These pastures are not used for grazing stock until September at the earliest when they are lightly grazed by sheep. This grazing is mainly to encourage tillering and not because this forage is required at this time of the year. Goose grazing on these pastures would therefore not conflict with the use assigned to them during this period. Established pastures however are required for cattle and sheep grazing in early spring, though censuses showed that geese do not select for this type of habitat. Vegetation in these fields is usually above 15 cm which is perhaps too tall for them to graze, or less digestible than short grass.

All these species showed a preference for natural grasslands in at least one of the censuses. However, most of these grasslands are not grazed by cattle at the time.

On the whole flocks contained less than 250 individuals but occasionally flocks of 500 to 1000 geese were observed on one field

in which case their grazing pressure could be high, and would affect the standing crop of the pasture. Goose grazing, however, has been shown to stimulate vegetation growth (Ydenberg & Prins 1981) and could contribute to maintaining a standing crop of high nutritional value.

Farmers at present use scarecrows, gas guns, shooting and aircraft to scare the geese off their crops. The last of these measures is costly and inefficient since geese tend to return to the same area shortly after being driven off. These measures are usually practised in areas which include wintering Ruddy-headed Geese and could possibly be contributing to the decline of this species. However the introduction of the grey fox *D. griseus* to the breeding grounds in Tierra del Fuego is probably the main cause of this species decline (Jaksic & Váñez 1983).

Although geese were distributed in a variety of different habitats most were occupying fields of low agricultural importance at the time of the survey, except young pastures which were selected for by geese. However, it is necessary to extend the observations throughout the entire wintering season and assess the damage that grazing causes, in order to determine whether there is need to develop control measures for these species.

Intensive grazing of winter wheat and oats does not necessarily affect the yields of grain of these crops (Kear 1969).

Summary

The most important cereal growing area in Buenos Aires province, Argentina, is also the wintering ground for three of the sheldgeese *Chloëphaga* spp. which migrate from the south of the country. Their presence in this area causes concern amongst farmers who believe they cause considerable damage to their crops. Two surveys were undertaken in 1983 and 1984 to obtain information on the numbers and distribution of the geese and the use of the different habitats available.

Goose densities were similar in both winters (4.1 and 4.5 geese/km). The majority of the geese (88–93%) were Upland Geese *C. picta* whilst 6–12% were Ashy-headed *C. poliocephala* and 0.1–0.3% were Ruddy-headed *C. rubidiceps* Geese. The latter two species were more abundant in the east of the study area. The white-breasted form of the Upland Goose was proportionately more common in the north-west whilst the barred form was found mainly along the coast. The geese showed a preference for stubble fields (wheat, maize, sunflower and sorghum) where they grazed annual rye grass and reseeded wheat, newly established pastures, where they grazed white clover, alfalfa, and fescue, and natural grassland. Therefore the situations in which sheld-geese come into conflict with agriculture are relatively few.

References

Humphrey, P. S., Bridges, D., Reynolds, P. W. & Peterson, R. T. 1970. *Birds of Isla Grande (Tierra del Fuego)*. Smithsonion Institution, Wash. D.C.

Jaksic, F. M. & Yáñez, J. L. 1983. Rabbit and fox introductions in Tierra del Fuego: History and assessment of the attempts at biological control of the rabbit infestation. *Biol. Conserv.* 26: 367–74.

Kear, J. 1969. The experimental assessment of goose damage to agricultural crops. *Biol. Conserv.* 2: 206–12.

Newton, I. & Campbell, C. R. G. 1973. Feeding of geese on farmland in east-central Scotland. *J. appl. Ecol.* 10: 781–801.

Niello, M. 1966. *Las avutardas de la Provincia de Buenos Aires.* La Res No. 779.

Pergolani da Costa, M. J. I. 1958, Las avutardas, especies que dañan a los cereales y las pasturas. *Idia* 88: 1–8.

Plotnick, R. 1961. Migración de las avutardas. *Idia* 167: 18–28.

Rumboll, M. 1975. El cauquén de cabeza colorada *(Chloëphaga rubidiceps)* Una nota de alarma. *El Hornero* 11: 315–6.

Ydenberg, R. C. & Prins, H. H. Th. 1981. Spring grazing and the manipulation of food quality by barnacle geese. *J. appl. Ecol.* 18: 443–53.

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