BSCE 21 / WP 32
Jerusalem 22-27 March 1992

AVIAN COMMUNITY AT ROME INTERNATIONAL AIRPORT OF FIUMICINO. A STUDY FOR BETTER FACING BIRD HAZARD.

by

A. Montemaggiori

Istituto Nazionale per la Fauna Selvatica
Via Ca' Fornacetta, 9
40064 Ozzano Emilia (BO) - Italy

ABSTRACT

The avian community of Rome International Airport of Fiumicino has been investigated from 1989 to 1991 with a project commissioned by the Operative Security Division of Aeroporti di Roma Society. Linear Transect Method has been used and more than 1700 daily recording forms were filled. 88 species of birds have been observed, 37 non passerine and 51 passerine. Herring Gull (Larus cachinnans), Black-headed Gull (Larus ridibundus), Lapwing (Vanellus vanellus), Starling (Sturnus vulgaris) and Hooded Crow (Corvus corone cornix) resulted to be the most important species for risk of collision with landing and taking off aircrafts. Circannual data about their localization, number, periods of presence, flocking, habitat and time preferences, responses to scaring devices, etc. have been collected. The complete results of the research are at present used for planning a complete renewal programme of all scaring devices system.

1. INTRODUCTION

The risk of collision with birds in airports presents a complex problem which is often difficoult to resolve. The bulk of all precautionary measures applied are rarely based on in-depth knowledge of bird populations, and therefore, tend simply to reduce the influx of certain species. Moreover, despite the economic cost involved, many of these dissuasive measures have not fulfilled the initial expectations, either because the presence of bird populations in airport zones is due to circumstances not necessary related to the airport itself (migratory routes, feeding grounds, etc.), or because the ecosystems surronding the airport greatly predetermine the species and populations densities found.

It is then clear how important could be to undertake a preliminary ornithological study on the qualitative and quantitative variation of the avian community during the year at an airport. This is essential for the better knowledge of the environmental reality and for a proper planning in the use of scaring measures, in order to try to reduce bird hazard.

Considering this situation, in 1990 the S.O.E., Operative Security Division, of the Aeroporti di Roma Society, commissioned an ornithological study at Fiumicino International Airport. This paper is the summary of the most significant results found during the research.

2. STUDY STRUCTURE

A general examination of faunistic, vegetational and geomorphological characteristics of the study site (the runways area) has been conducted, together with the analysis of the more general environmental characters of the region.

An ornithological study has been conducted using two different methods.

Simultaneously the behaviour of the species at the study site has been investigated.

Presence of potential environmental, climatic, etc. factors affecting bird occupation rhythms has been seeked for.

The estimate of scaring measures has been attempted, and finally, considering the results obtained, we suggested some guide-lines for a more practical study concerning scaring measures and environmental situation, in order to plan bird management at the airport.

3. STUDY AREA

Fiumicino Airport "Leonardo da Vinci" is situated in a wide open area bordered by the Tyrrhenian Sea to the West, the village of Fregene to the North, Fiumicino town to the South and cultived fields and pastures to the East. The whole airport area is about 5.000 hectares mostly made by meadows where hay is cultived and regularly mowed (max. grass lenght = 70 cm). Inside there are 3 runways of 4.143 m (runway 1), 3.500 m (runway 2) and 4.214 m (runway 3) respectively.

Inside and around the area there are many drain sewers and water sheets. East-Northeastwards there is a modern garbage dump, only a few km away.

The geomorphological structure of the soil is different inside the airport, with the presence of a vegetational cline; from an arid and steppe-like situation nearer to the coast, to a marshy swamp-like situation more Eastwards.

4. STUDY METHODS

Besides the general analysis conducted about the ecological and environmental reality of the study area, the following methods have been used for the research:

4.1. Data collecting through a daily recording form, filled by the Security Division staff, previously instructed.

This form, FIG. 1, prepared after several visits at the study area, permitted to record data on the most important species.
The most important sectors are, besides observation time and meteoreological conditions, the following:

- Situation observed: Species; No. of individuals (1-10, 11-50, 51-100, etc.); Habitat (runway, taxi-ing way, meadow); Localization (using a coordinate system prepared behind the form wich gives the localization inside squares 700 m x 700 m).

- Scaring measure adopted: Kind (Shell crackers, acoustical device, etc.); Intensity (No. of shell crackers, trait of acoustic system on, etc.).

- Outcome of the device: Escape (Yes/No); Flight direction.

These sectors are repeated several times on the form to allow separation between single observations.

The forms have been used between 23th March 1989 to 4th February 1991. More than 1700 filled forms have been collected in 683 days.

4.2. Linear Transect Method

This ornithological method is perfectly suitable for the homogeneous environment of the airport. For a complete description see JARVINEN & VAISANEN 1973. Data collected during the transects have been worked out obtaining the following parameters which describe the avian community from the ecological point of view:

d = density (No. of individuals per species/area)

S = species richness (number of species in the study area)

f = relative frequence (relative frequence of individuals of a species/total No. of individuals of all species).

% n.P. = % non Passerines. The No. of non Passerine birds is lower in the poorer ecological communities.

ND = No. of dominant species (No. of species with f > 0.05)

H = species diversity (H = D ln D). Diversity increases with the maturity degree of the community.

J = equitability index (J = H/H max, H max = ln S). It indicates the level of realization of maximum possible diversity inside the community.

The transects selected at the study area and covered on foot twice a month were situated along the meadows between the runways and the taxi-ing ways.

Transect no. 1 (runway 1): Lenght = 4.143 m; Surface = 82.86 ha
Transect no. 2 (runway 2): Lenght = 3.143 m; Surface = 62.86 ha
Transect no. 3 (runway 3): Lenght = 4.429 m; Surface = 88.58 ha

The counts were carried on between February 1990 to January 1991, collecting 200 hours of observations and 281.160 km covered on foot.

A 10 x 42 Leica Binoculars has been used for the survey.

Covering the transects by car has been also attempted, but too many informations are lost with this method.

5. RESULTS

The most significant results of the research are presented here. Because of obvious reasons these data are only a sample of the complete results obtained (for the complete report see MONTEMAGGIORI 1991).

88 species of birds have been observed in the airport during the study period, 37 non passerine and 51 passerine. Of each one the present situation inside the runways area, the outcomes of the scaring measures, the behaviour and the level of possible hazard have been described and discussed, together with a concise morphological description, the national and local movements of the species and their ecology. .

5 species resulted the most dangerous for potential risk of collision: Herring Gull (Larus cachinnans), Black-headed Gull (Larus ridibundus), Lapwing (Vanellus vanellus), Starling (Sturnus vulgaris) and Hooded Crow (Corvus corone cornix).

Their daily presence showed as monthly total number of observed individuals and as % of days of presence in each month is shown (FIG. 2, 3).

Flock numbers and the average number of birds per flock of each species have also been recorded.

The resumed localization along the runways of the 5 species, and its magnitude, is showed in FIG. 4.

FIG. 5 presents habitat preference (runway, taxi-ing way, meadow) and 24 hours-time preference of one of the above mentioned species: the Herring Gull.

As an example of the results obtained about the outcomes of the scaring measures, Fig. 6 shows the case of Lapwing.

Finally, the descriptive parameters of the complete ornithological comunity, obtained with the Linear Transect Method, are resumed in TAB. I.

6. DISCUSSION

Data collected allowed quite a satisfactory and complete picture of the ornithological reality inside the airport. The avian community wich inhabit Fiumicino Airport results to be well diversified, with many small species living inside the area and only 5 species seriously involved in security problems.

Herring Gull and Black-headed Gull are present with large flocks all year round, while Lapwing and Starling are only wintering species. Hooded Crow is resident in the area, but its number is usually very low.

Both Herring and Black-headed Gulls seem to use the airport basically as a resting site, particularly during the morning, and they prefer the runways and the taxi-ing ways for day-roosting. Starling and Lapwing, on the contrary, use the airport as feeding ground, and stay on the meadows.

In any case the presence of all such species along the runways during the night seems to be extremely rare.

The favourite areas where Gulls have been observed during the year are the ends of the runways, probably because they are less disturbed by air-traffic. Lapwing and Starling are instead more attracted by dump meadows, wich are confined along runways 2 and 3. Hooded Crow localization is more scattered inside the whole area.

Species responses to scaring devices (gas cannons, acoustical devices, shell crackers and direct inspections) may vary according to periods of the year and meteoreological conditions. The use of gas cannons has not been fully investigated. In any case none of the measures used at present gives completely satisfactory results.

7. CONCLUSIONS

The knowledge of periods of presence, numbers, areas, habitat preference and favourite periods during the day by the different species, together with their responses to the scaring devices, is a very important and useful "tool" for better facing the airport security problems.

This background information results to be essential for a serious line of action to reduce the risk of bird strikes in the airport.

On the basis of that, Fiumicino Airport has recently started a programme of complete renewal of its scaring devices. This involves, among others, the innovative use of a remote controlled video system, able to automatically identify birds' flocks along the runways, and to switch on different scaring devices only when and where they are really necessary, so reducing the accostuming problems.

8. REFERENCES

JARVINEN O. & VAISANEN R.A., 1973. Species diversity of Finnish Birds. I Zoogeographical zonation based on land birds. Ornis Fennica 50: 93-125.

MONTEMAGGIORI A., 1991. Relazione finale di studio sui ritmi di occupazione ornitica dell'Aeroporto "Leonardo da Vinci" in un ciclo annuale. Unpublished report, S.O.E., Aeroporti di Roma, Aeroporto di Fiumicino: 231 pp.

AEROPORTI DI ROMA

SCHEDA RILEVAMENTO VOLATILI

N.

Data:

Ora dalle:
alle:

Temp.: °

Copertura cielo: 8/8

Fenomeno atmosf.: (sereno/pioggia/nebbia grandine/neve)

Vento Forza:
Direz.:

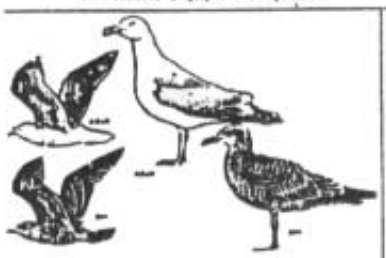
Rilevatore

SITUAZIONE					INTERVENTO			EFFETTO		
SPECIE (A,B,C etc.)	N. individui (1-10/11-50/51-100/ etc.)	Ambiente (Pista/Rullaggio/Prato)	Zona Coord. (1)	Quadro (2)	TIPO (3)	Intensita' (N. colpi in caso 1/ N. cannone in caso 3/ N. altoparlante in caso 4)	Fuga (si/no)	Spostamento (solo se No in colonna preced.)	Zona di spostamento Coordinata (1)	Quadro (2)

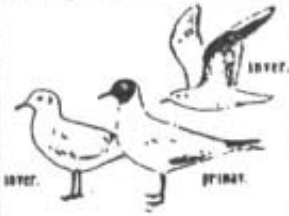
(1) Es. La caserma V.V.F. si trova in G 10 (Gol 10)

(2) Ogni quadro tipo G 10 va ulteriormente suddiviso in 4 quadri numerati in senso antiorario; es. la caserma V.V.F. si trova nel quadro 2

(3) 1 : Presenza umana; 2 : Pistola lanciarazzi; 3 : Cannone a gas; 4 : Altoparlanti



A Gabbiano reale



B Gabbiano comune

C Pavoncella

D Rondine

E Storno

F Cornacchia
G Passero
H Piccione
I Falco
L Altro
specificare

FIGURE 1. The recording form used at Fiumicino Airport.

FIGURE 2. Presence of 4 species at Fiumicino Airport (No. of individuals).

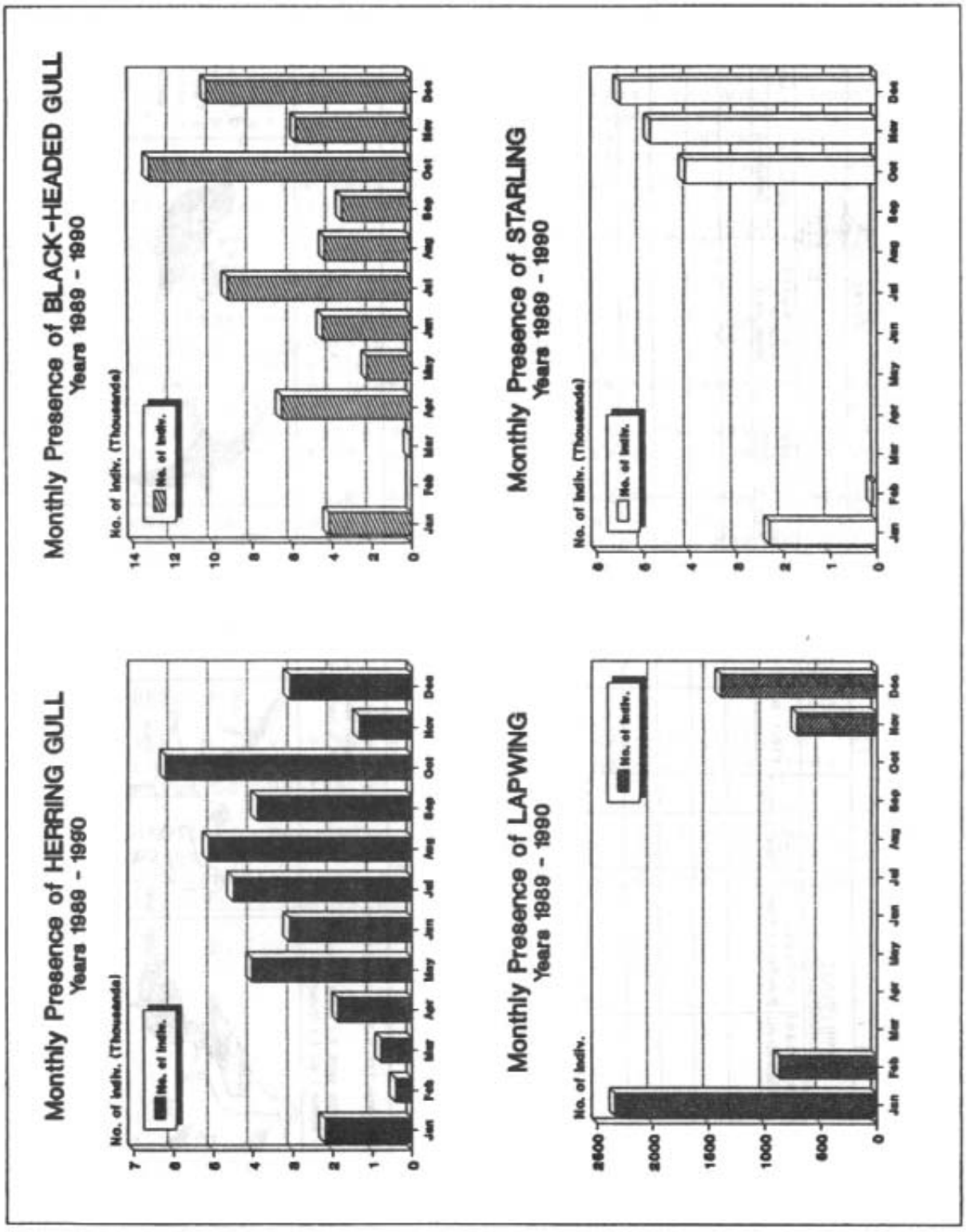


FIGURE 3. Presence of 4 species at Fiumicino Airport (% of days in each month).

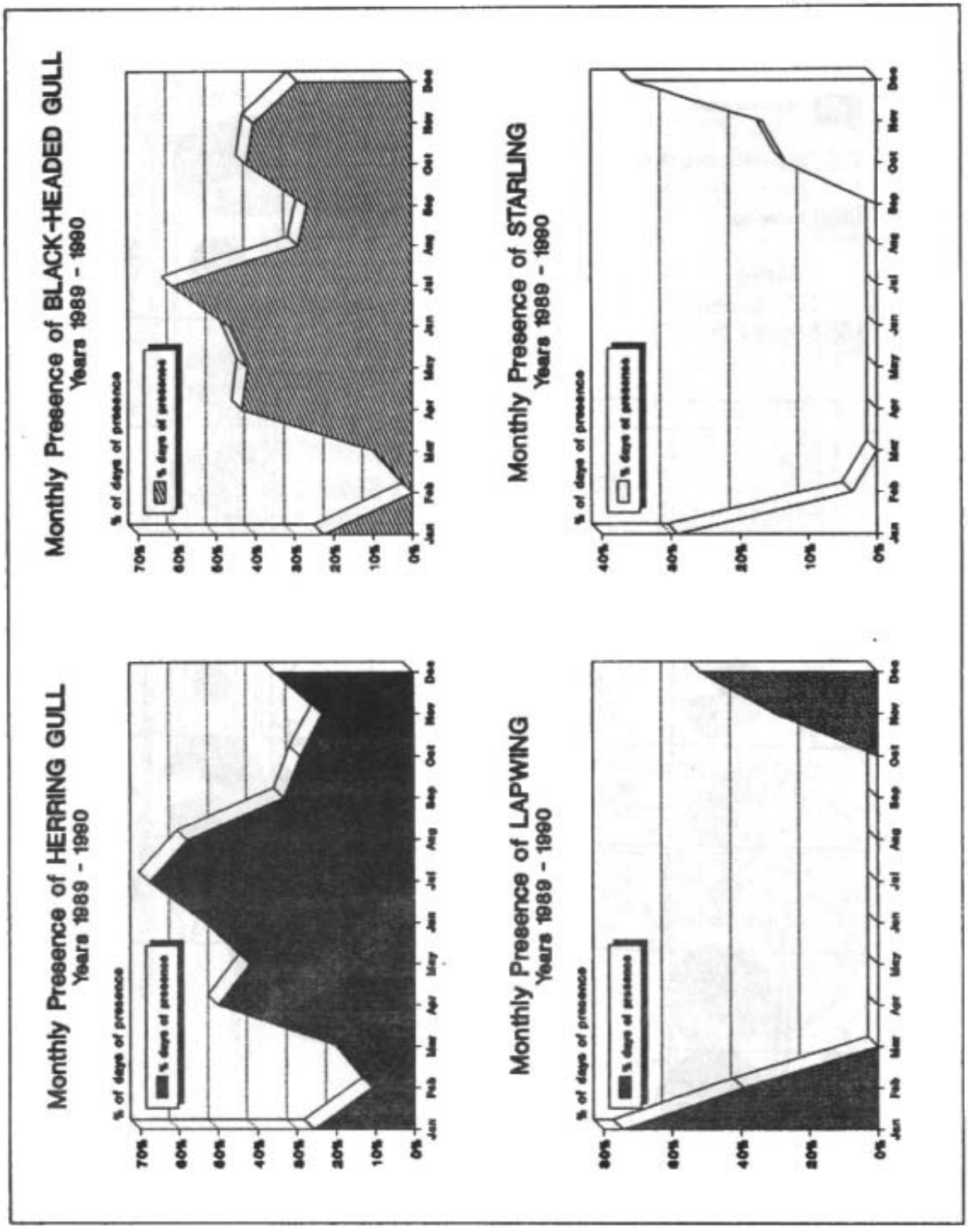


FIGURE 4. Localization of the most important species along the runways and its magnitude.

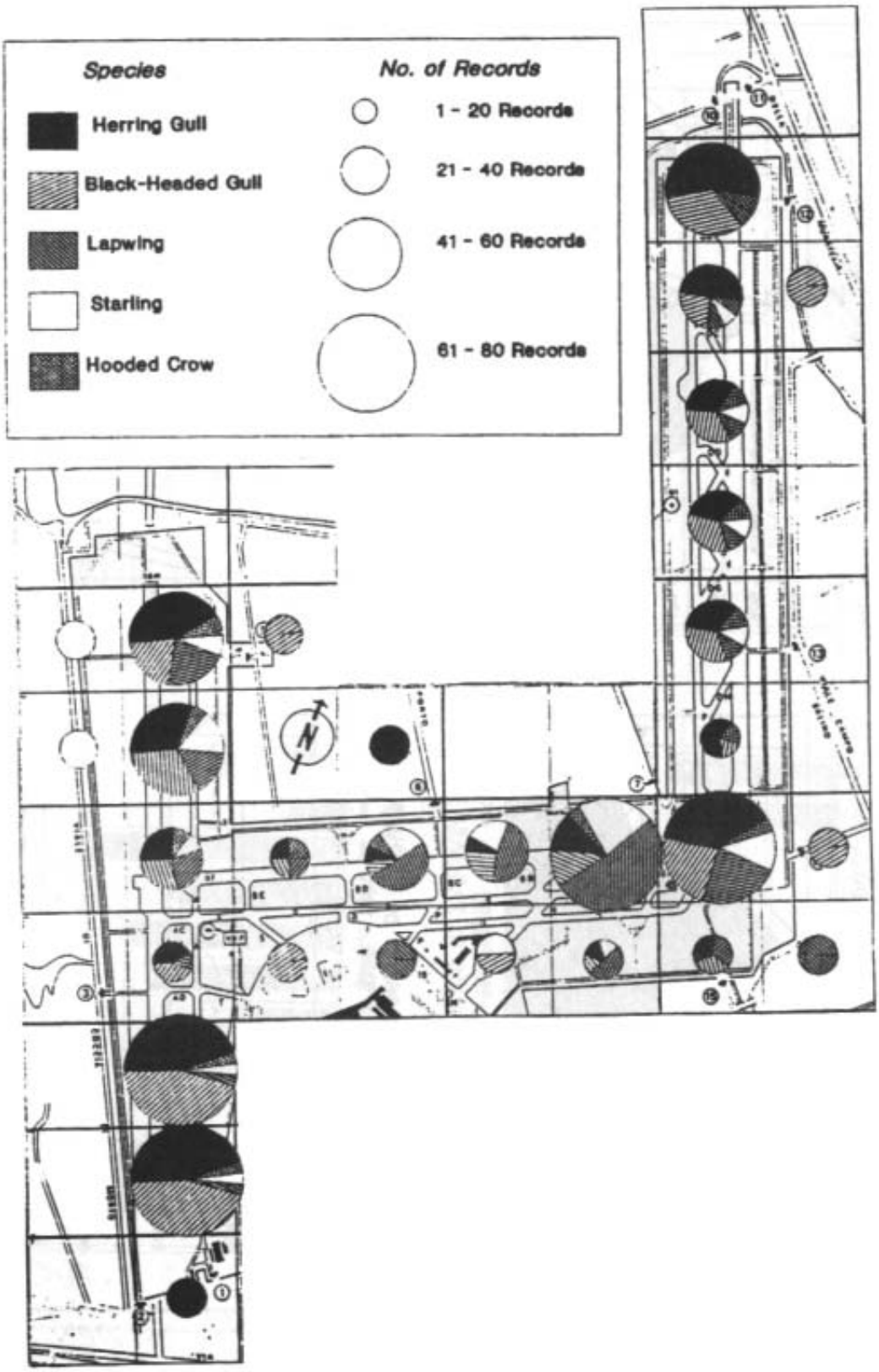


FIGURE 5. Habitat and 24 hours-time preference of HERRING GULL.

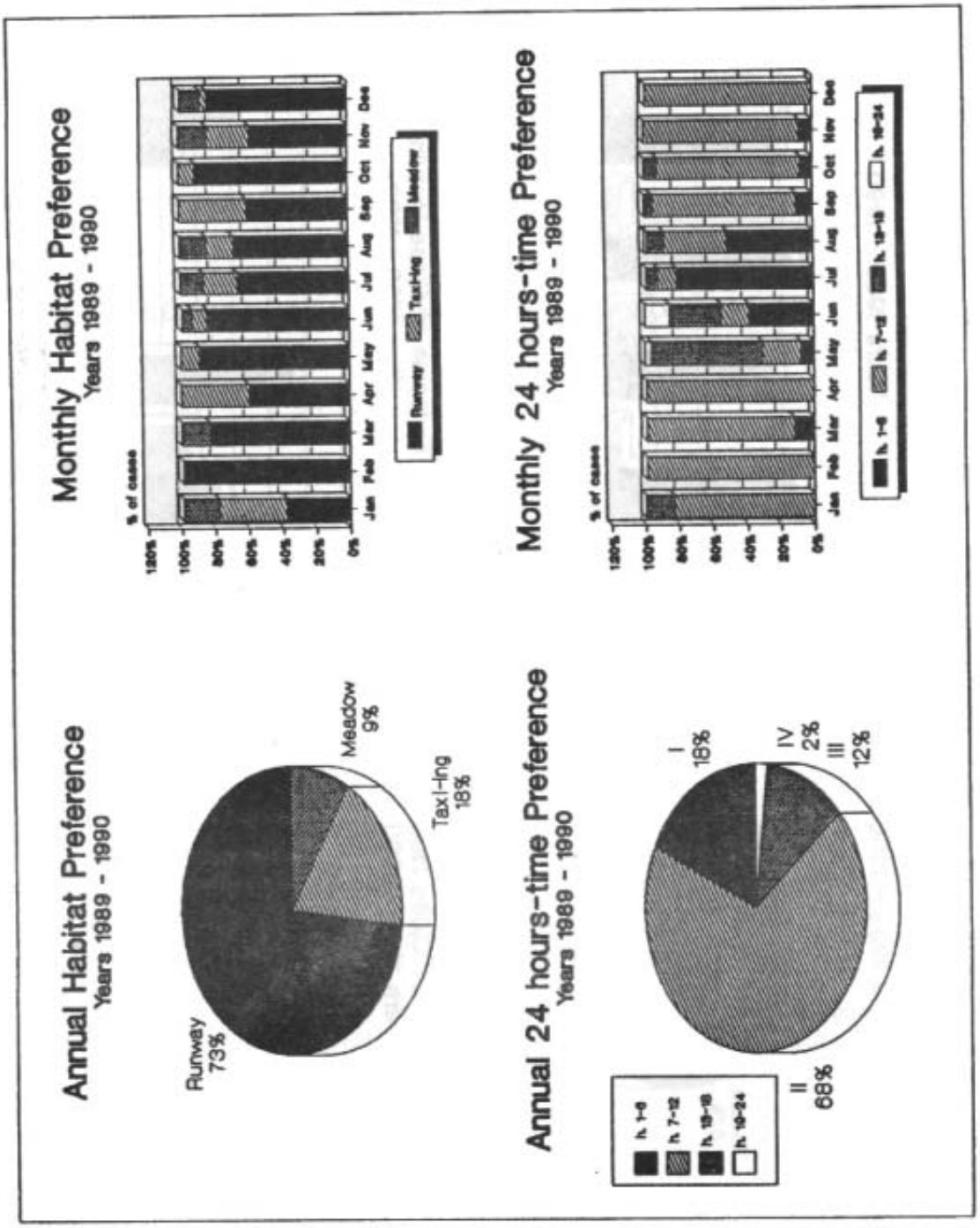


FIGURE 6. Outcome of two scaring measures in LAPWING.

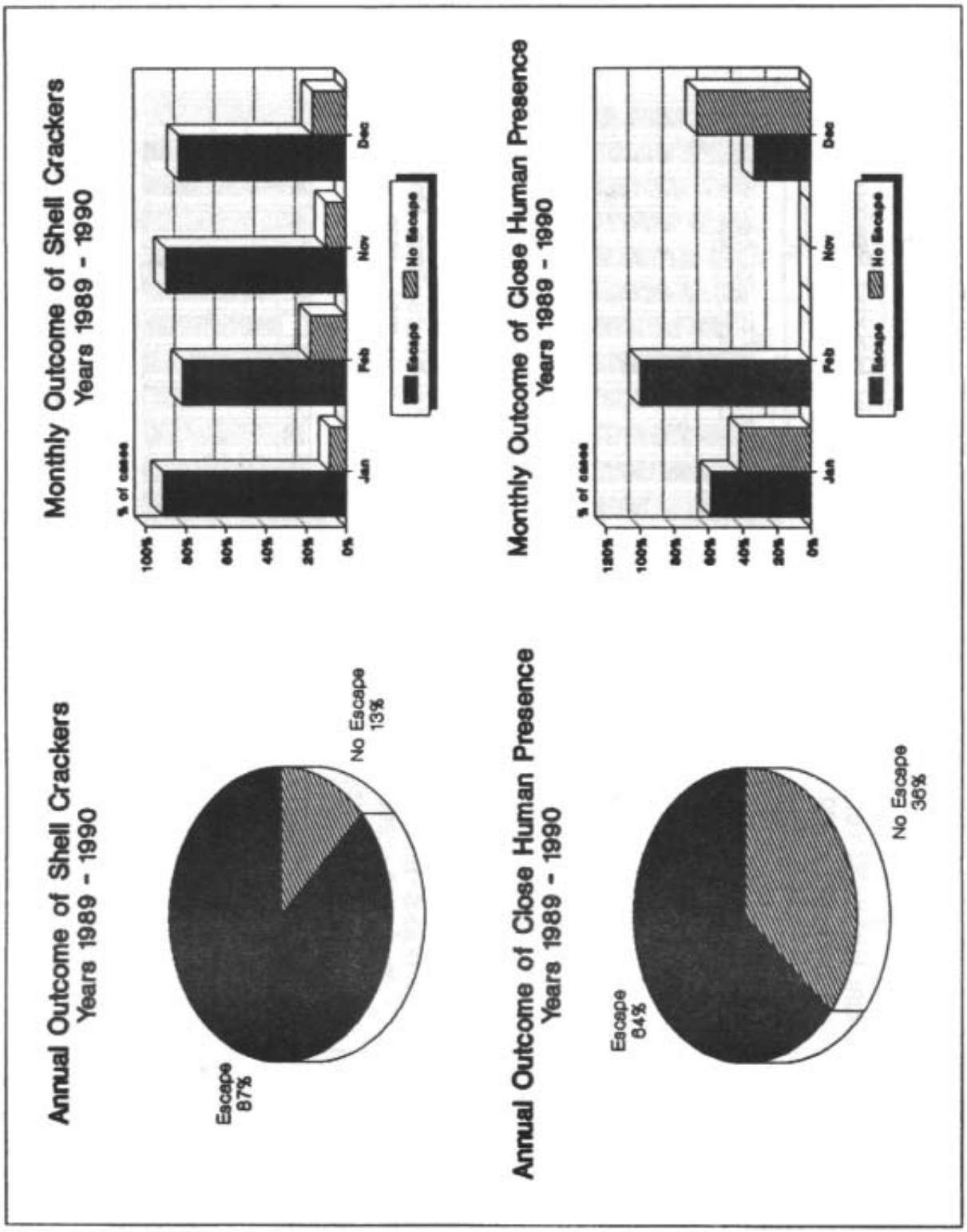


TABLE I. Species Richness (S), Diversity (H), Equitability (J), % non Passerine (% n.P.) and No. of Dominant Species (N.sp.dom.) observed during the transects along Runway 1, 2 and 3, in 1990.

A = Transect 1 (Runway 1)
B = Transect 2 (Runway 2)
C = Transect 3 (Runway 3)

	S	H	J	% n.P.	N.sp.dom.
January 1990					
A	8	1,40	0,67	25,0	3
B	11	1,80	0,75	27,3	5
C	13	1,71	0,67	23,0	6
February 1990					
A	8	1,39	0,67	12,5	4
B	11	1,78	0,74	18,2	4
C	10	1,67	0,73	20,0	4
March 1990					
A	14	1,66	0,63	21,4	5
B	10	1,53	0,74	10,0	5
C	9	1,70	0,77	22,2	5
April 1990					
A	9	1,57	0,71	0,0	4
B	9	1,69	0,77	11,1	5
C	10	1,44	0,63	20,0	3
May 1990					
A	16	1,26	0,45	25,0	3
B	8	1,32	0,63	12,5	4
C	10	1,48	0,64	20,0	4
June 1990					
A	13	1,11	0,43	30,8	2
B	11	2,00	0,83	27,3	6
C	9	1,76	0,80	11,1	6
July 1990					
A	10	1,42	0,62	20,0	2
B	8	1,52	0,73	37,5	4
C	10	1,38	0,60	20,0	4
August 1990					
A	9	1,38	0,63	11,1	4
B	10	1,79	0,78	30,0	6
C	11	1,78	0,74	18,2	4
September 1990					
A	4	0,79	0,57	25,0	2
B	10	1,79	0,78	30,0	6
C	10	1,61	0,70	20,0	4
October 1990					
A	4	0,79	0,57	25,0	2
B	10	1,91	0,83	20,0	6
C	12	1,41	0,57	33,3	5
November 1990					
A	4	0,79	0,57	25,0	2
B	10	1,91	0,83	20,0	6
C	12	1,41	0,57	33,3	5
December 1990					
A	8	1,40	0,67	25,0	3
B	11	1,80	0,75	27,3	5
C	13	1,71	0,67	23,0	6