FIRST APROACHES TO THE REPRODUCTIVE BIOLOGY OF *SICALIS FLAVEOLA* (BIRDS: EMBERIZIDAE) AT THE ALLUVIAL VALLEY OF PARANÁ RIVER, ARGENTINA

QUIROGA, M.[1], **D**EL BARCO, O.[2] & **A**GOSTELLI, F.[2]

SUMMARY

The Saffron Finch (*Sicalis flaveola*) breeding was studied in the boundaries of the Campus of Universidad Nacional del Litoral. The laying began on early November of 2001. The nesting, natality and mortality rates were studied as well as the growth and development of chicks. It was observed that 89.4% of the hatched eggs reached the juvenile state of flying and no significant variations in growth and development of chicks were detected. The clutch size was four eggs (±1), 1 egg/day. The eggs size was 18.91 mm (±1.09) x 13.95 mm (±0.48) and its weight of 1,92 grs. (±0.2).

A research on the reproductive biology of the Saffron Finch is important, specially in areas where dams and canalization of watercourses are planned and because *S. Flaveola* is also used as a pet at the area.

Key words: birds, reproduction, growth, development, Sicalis.

RESUMEN

Primeros aportes a la biología reproductiva de *Sicalis flaveola* (Aves: Emberizisae) en el valle aluvial del Río Paraná, Argentina.

Se estudió la reproducción del Jilgero Dorado (*Sicalis flaveola*) en el predio de la Ciudad Universitaria (Universidad Nacional del Litoral), obteniéndose información sobre algunos aspectos de su biología reproductiva. La postura se inició a principios de noviembre de 2001. Se dan a conocer aspectos de su nidificación y reproducción, referentes a la tasa de natalidad, mortalidad; así como información acerca del crecimiento y desarrollo de los pichones. Se observó que el 89.4 % de los huevos eclosionados alcanzaron el estado de juveniles con capacidad de vuelo y variaciones no significativas en lo que respecta al desarrollo y crecimiento. El tamaño de camada fue de 4 huevos (±1) con una frecuencia de un huevo por día. El tamaño de los huevos fue de 18.91 mm (±1.09) x 13.95 mm (±0.48) y su peso de 1.92 grs. (±0.2).

Un estudio de este tipo es de suma importancia debido a que, en su área de residencia, están proyectadas obras de represamiento y canalización de los cursos de agua; además de la explotación económica que esta tiene en la región debido a su uso como mascota.

Palabras clave: aves, reproducción, crecimiento, desarrollo, Sicalis.

1.- Licentiate in Biodiversity. Instituto Nacional de Limnología (INALI - CONICET). Santo Tomé, provincia de Santa Fe.
2.- Student of Biology. Universidad Nacional del Litoral.
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INTRODUCTION

Saffron Finch (*Sicalis falveola*) geographic distribution extends from Northern Argentina to Río Negro Province (0lrog, 1959), including locations like Mendoza, La Pampa and Buenos Aires. It has been also reported in Uruguay, Paraguay, Southern and Eastern Bolivia and Central and Eastern Brazil. (Olrog, 1979).

This species has got an attractive song, feeds mainly on seeds of grammineal species and nests in holes or abandoned nests of *Furnarius rufus* (Machado Marcondes, 1988). *S. flaveola* builds a half-cup shaped nest using dry grass. The average clutch size is five eggs and their average size are 19.2mm x 14.4mm. A reproduction period from October to January is also mentioned. (De la Peña, 1995).

There are several studies about the reproductive biology of birds, which include the variables studied in the present research (clutch size, egg laying date, chicks weight and size, etc.) (Hatch & Hatch, 1989; Peris 1982; Beltzer *et al*, 1995; Morales *et al*, 2002; Pearce-Higgins & Yalden, 2002), but just a few are related to this species.

Previous information related to reproduction of *S. flaveola* is poor and it is based mainly on occasional or anecdotal data obtained from other geographical areas. For Brazil Machado Marcondes (1982 a & b,1988) mentioned *S. flaveola* as a monogamous bird. Males and females share the rearing of chicks and are sensitive to daylight periods in order to control their reproductive activities.

The alluvial floodplain of Paraná River is of special interest because of dams and canalization projects that are planned there. Besides, due to its song and color, *S. flaveola* is frequently used as a pet.

It is necessary to mention that the data gathered in the present research is important to plan actions to prevent or mitigate a possible decrease in the population levels, like rearing of chicks in captivity and recolonization of natural habitats.

MATERIALS AND METHODS

AREA OF STUDY

This research was carried out at the Universidad del Litoral´ campus in Santa Fe City (Argentina). This area is located at the Paraná river floodplain and is surrounded by many watercourses like Setubal lagoon and Santa Fe steam. The site is adjacent to a natural reserve (a seasonally flooded marsh/ woodland) on the river's bank. Species like *Salix humboltiana, Acacia caven, Tessaria integrifolia, Azola* sp., *Salvinia* sp and *Pistia stratiotes* are strongly represented. It includes environmental units like aquatic vegetation, forest, beach and gallery forest.

METHODS

Sixty-three nest boxes were set up at the place tied to a wire fence that is surrounding the area. The boxes were placed about 1.8m height. Another 20 were placed on the roof of the building, four floors (12 m.) above the ground. The nest boxes in both places are separated by 18 m.

The nests were monitored every day during the nest building and egg laying period, and every two days during the chick-rearing period. Chicks were weighed by using a Pesola spring scale until they were 12 days old. For wing size, the length of the ninth primary wing feather was measured. The length of the beak plus head was measured with dial calipers to the closest 0.01 mm. Other developmental landmarks (like the day in which eyes were opened, when primaries, secondaries and tail feathers appear) were

registered as well.

The specific birth rate was calculated according to the following equation:

$$\Delta N_n / N \Delta t$$

where N_n is the number of eggs, N the number of pairs and the time.

With regard to the death rate, the raw death rate was estimated according to:

$$Mx = [(No - Nt)/No] * 100$$

where No is the initial number of individuals and Nt the final number.

The volume of eggs content was calculated by using a volume indeXx (Byrkjedal y Kalas, 1985):

$$Volume\ Index = (L * B^2) 100$$

where L= length of eggs (millimeters) and B= breadth of egg (millimeters).

Two single linear regressions were conducted by using the SPSS 7.5 software.

The relation between bird weight (independent variable) and wing length (dependent variable) as well as the relation between bird weight (independent variable) and head + beak length (dependent variable) were estimated, based on 108 pairs of data, which covered weights ranging from 1.3 to 15.25grs.

Besides, an analysis of the evolution of the studied variables through time was conducted.

RESULTS

In all cases no aggressive interspecific interactions were registered.

The construction of nests was not synchronous starting in October to early November. It took birds form 6 to 16 days to build the nests.

The average clutch size was four eggs (±1), one egg/day. Clutches with three and five eggs were also found. The eggs were brownish white with dark brown dots, being more frequents at the bottom of the egg (short axis) and decreasing to the opposite pole (long axis). The size of the larger axis of the egg was 18.91mm (±1.09), the minor axis is 13.95mm (±0.48), an average weight of 1.92grs. (±0.2) and a volume of 3.67mm^3 (±0.2).

The incubation period was of 16 days (±0.71). Apparently, the female was in charge of incubation of eggs.

The total number of eggs laid by the five couples studied was 21. In consequence the birth rate was of 0.25 in 17 days.

Related to the dead rate, 19 was the initial number of individuals and 17 the final number (one egg disappeared, one egg did not hatch, one chick was found dead and another disappeared by unknown causes). This led to a mortality rate of 10.53%.

The obtained values for the regression analysis, were positive and showed a strong dependence of the studied variables (bird

Correlation Index	0.9442952
Determ. Index R^2	0.89169343

Weight – Wing Size (Fig. 1)

Correlation Index	0.97952477
Determ. Index R^2	0.95946878

Weight – Head + Beak (Fig. 2)

An increase in the values of the studied variables (birds weight, wing size and beak + head size) through time was observed. While the length of wing and body weight increased almost exponen-tially, the values for the head + beak measure increased but not as steeply as the former (Fig. 3).

For developmental landmarks, chicks opened the eyes and primaries and secondaries feathers showed up between the 6th and 7th day of age.

DISCUSSION

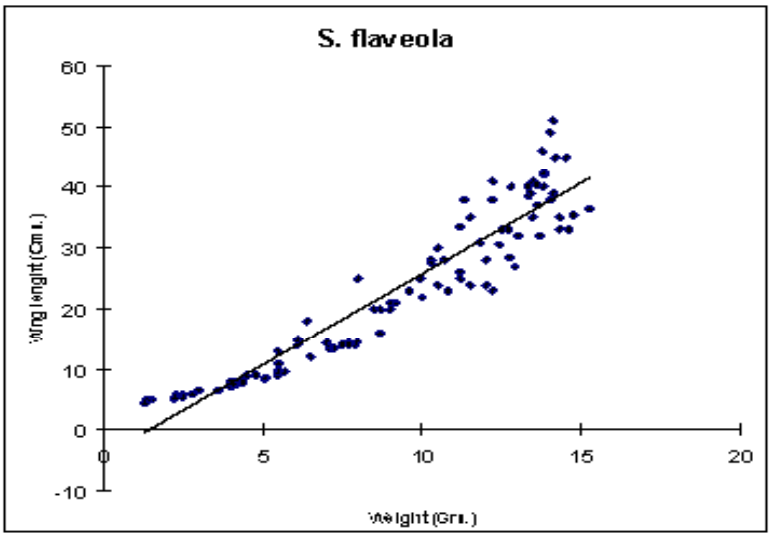

Figure 1: Body weight and Wing length regression. Coef. of multiple correlation: 0.9442952.

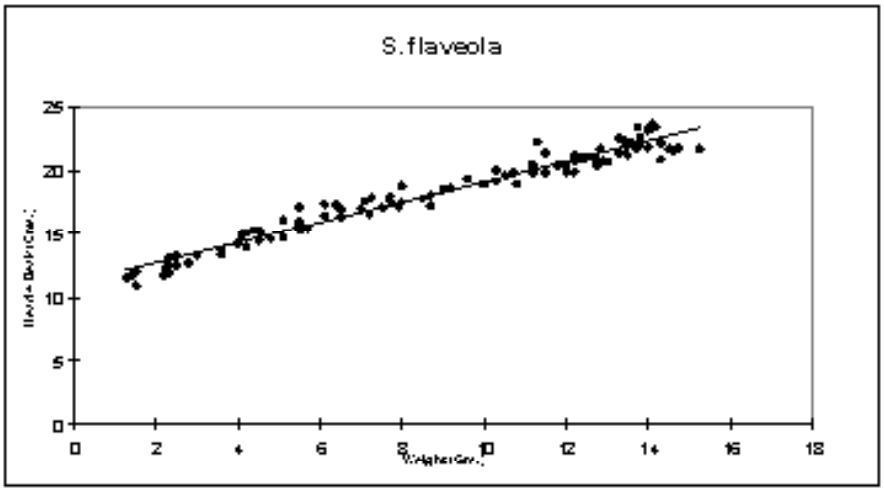

Figure 2: Body weight and Head + Beak regression. Coef. of multiple correlation: 0.97952477

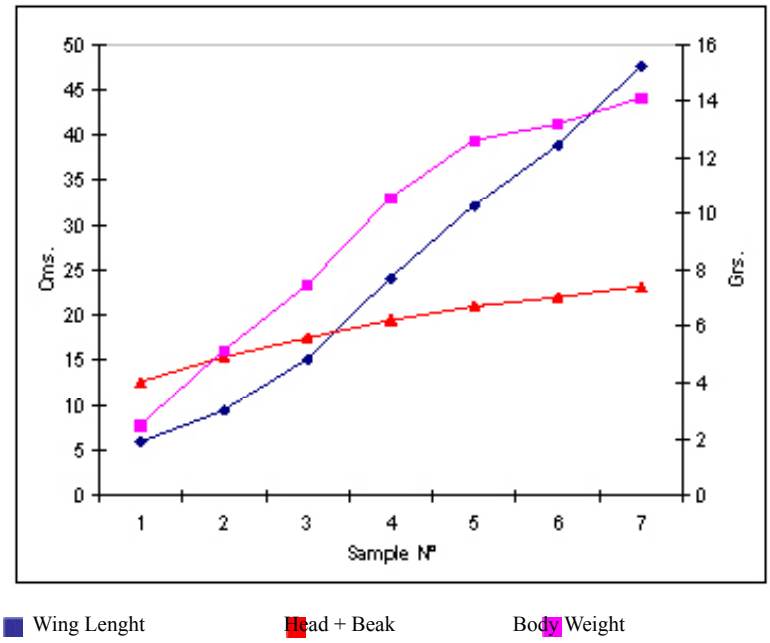

Figure 3 – Evolution of variables through out of the chicks development

As stated previously, most information about of *S. flaveola* are based on occasional data and related to other geographical areas (Olrog 1959, Olrog, 1979) but only a few to its reproductive biology (De la Peña, 1995; Machado Marcondes, 1982 a & b, 1988).

With respect of nest structure, what birds built inside the nest boxes were similar to the previous observations in natural nests of *S. flaveola* (De la Peña, 1995) as well as the clutch size and nesting period (October to January). However an active nest was found in March (Quiroga, personal observations.).

The incubation period found was slightly longer than previous information for this species in the area (De la Peña, 1995). The females laid 1 egg per day, which is similar to what has been mentioned for other passerine birds. The egg size and weight is similar to what was reported by De la Peña (1995) but no previous data was found for the eggs content volume and the growth and development of chicks.

Despite of the low number of samples used, the data exposed here, plus the birth and dead rates mentioned previously, represent the first contribution to the reproductive biology of *S. flaveola* for the study area, which is of great importance due to dams and canalization projects that are planned to be carried out there. In addition , because of its song and color, *S. flaveola* is frequently used as a pet.

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