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ECTOPARASITIC LOAD OF MONK PARAKEET (*MYIOPSITTA MONACHUS*, PSITTACIDAE) NESTLINGS

Rosana Aramburú[1,3] , Sebastián Calvo[1], M. Eugenia Alzugaray[1] & Armando Cicchino[2]

[1]Departamento Científico Zoología Vertebrados, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Paseo del Bosque s/n (1900) La Plata, Argentina.

[2]Departamento de Biología, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Mar del Plata, Deán Funes 3250 (7600) Mar del Plata, Argentina.

Carga ectoparasitaria de pichones de Cotorra Argentina (*Myiopsitta monachus*, Psittacidae).

Key words: Monk Parakeet, *Myiopsitta monachus*, nestlings, ectoparasites, *Ornithonyssus bursa*, *Psitticimex uritui*, *Paragoniocotes fulvofasciatus.*

INTRODUCTION

Ectoparasites are an important cause of mortality, morbidity, and/or reduced fecundity in birds (Feare 1976, Duffy 1983). These risks are increased in birds, like the Monk Parakeet (*Myiopsitta monachus*), that breed in domed nests reused for several breeding seasons (Bucher 1988). Monk Parakeets are common in Paraguay, Uruguay, Bolivia, south of Brazil, and north and center of Argentina (Collar 1997). They are the only parrots that do not nest in a cavity. Instead, they build a stick structure that can house a single nest or be a larger complex with a dozen or more separate chambers (Forshaw 1989). Nests are used as breeding chambers (since September–October) and dormitories throughout the year (Martella & Bucher 1993, Aramburú 1995). The cimicid bug *Psitticimex uritui* (Lent & Abalos) (Hemiptera: Cimicidae) is one of the most abundant parasites of Monk Parakeet nests (Aramburú 1991, Spreyer & Bucher 1998), but parasitizes only that species (Wygodzinsky 1951, Usinger 1966). Monk Parakeet nests are also parasitized by a blood–eating mite, *Ornithonyssus bursa* (Berlese) (Acarina: Macronyssidae; Aramburú *et al.* 2002), a common nest parasite of passerines (Proctor & Owens 2000). Two chewing lice, *Paragoniocotes fulvofasciatus* (Picaglia) (Phthiraptera: Philopteridae) (Cicchino & Castro 1997a), and *Heteromenopon* (*Heteromenopon*) *macrurum* (Eichler) (Phthiraptera: Menopodidae) (Cicchino & Castro 1997b) are permanent parasites of Monk Parakeets.

The effects of above-mentioned parasites on Monk Parakeet survival and fertility are unknown (Aramburú 1998). Therefore, the objective of this paper was to determine the prevalence, abundance, degree of dispersion, and aggregation index of *Psitticimex uritui, Ornithonyssus bursa*, *Paragoniocotes fulvofasciatus,* and *Heteromenopon* (*H.*) *macrurum* in nestlings of this parrot species.

[3]*E–mail:* aramburu@museo.fcnym.unlp.edu. ar

METHODS

A total of 52 Monk Parakeet nestlings were obtained during December 1998 and 1999 at Cañuelas and Villanueva localities (Buenos Aires Province, Argentina). In this area, a chemical control is currently carried out on nests of the Monk Parakeet because this species has been considered as a crop pest since 1935 (Dabbene 1935). The age of nestlings (between 3 to 40 days) was determined according to the length of the ninth primary and wing chord, using a formula developed by Aramburú (1997). Each bird was fumigated in a plastic bag containing cotton soaked in ethyl acetate for killing ectoparasites (Clayton *et al.* 1992). Three methods of quantitative sampling were used: 1) nasal (n = 48) and tracheal (n = 23) wash, with 10% acetic acid; 2) visual sampling in the case of nestlings less than 10-day old (n = 4); and 3) feather agitation or brushing for nestlings more than 10-day old (n = 48). Sexes of nestlings were determined following dissection.

Ectoparasites were identified, and a representative series was prepared on microslides. Lice were prepared using 5% potassium hydroxide, 10% acetic acid, a 70–96–100% ethanol series, xylene, and Canada Balsam. Bugs were cleared in sodium hydroxide and phenol, and mounted in Canada Balsam. Mites were cleared in lactophenol and mounted in Hoyer´s medium (Krantz 1978, Wheeler & Threlfall 1986).

For each parasite species, the following parameters were determined (Margolis *et al.* 1982): prevalence (proportion of parasitized nestlings), abundance (mean number of parasites per examined host), and degree of dispersion (evaluated with the variance/mean ratio and the aggregation index K) (Southwood 1978, Elliot 1983). Data on the degree of dispersion were fitted to mathematical models (Hudson & Dobson 1997), and analyzed using *G*-test (Zar 1996). The age of hosts at the first infestation was determined for each parasite species.

RESULTS

Nasal and tracheal forced-washing methods were negatives in all cases. *Heteromenopon* (*H.*) *macrurum* has not been found in the two local populations examined. Out of 52 birds (visual sampling and feather agitation), 26 were infested (50%). A single species of parasite (mites or lice) or two species of parasite (mites + bugs, or mites + lice) were found on 19 (73%) and 6 (23%) parasitized nestlings, respectively. Three species were found on only one (4%) bird. Significant differences were noted among ectoparasites in terms of the abundance (KW = 30.9, $P < 0.001$; Dunn's test among mites and others, $P < 0.001$).

Psitticimex uritui. Bugs occurred on 5 (9.6%) nestlings. Abundance was 0.17 (SD = 0.58). No significant differences in abundance were observed between male and female nestlings (Mann–Whitney *U*-test = 295, $P = 0.85$). The maximum number of bugs on a single nestling was 3. The variance/mean ratio (= 2) and the aggregation index (K = 0.17) show that the distribution is aggregated. The zero class was the greatest one (90%). The negative binomial fits well ($G = 3.18$, $P > 0.05$). All the bugs recovered from host's bodies were nymphs. Eggs were observed during this study. They are laid individually and glued to nest material with a glandular cement. They are whitish, transparent, and elongated–oval in shape, with the anterior end bent obliquely, like in other cimicid species (see Usinger 1966). Of seven nymphs hatched in the laboratory, at room temperature, one survived for 16 days (mean = 5.57 days, SD = 5.09). The minimum age of a parasitized host with bugs was 17 days.

Ornithonyssus bursa. Mites occurred in 25 (48

%) nestlings. Abundance was 12.35 (SD = 25.97). No significant differences in abundance were noted between male and female nestlings (Mann–Whitney *U*-test = 284.5, *P* = 0.7). The maximum number of mites on a single nestling was 135. The variance/mean ratio (= 53.58) and the aggregation index (K = 0.23) show that the distribution is aggregated. The zero class was the greatest (52%). The negative binomial fits well (*G* = 26.56, *P* > 0.01). The minimum age of parasitized hosts with mites was 12 days. Adults and deutonymphs were found, but there were no other nymphal instars or eggs. Females were much more abundant than males (ratio 9:1).

Paragoniocotes fulvofasciatus. Lice occurred in 5 (9.6%) nestlings. Abundance was 0.73 (SD = 3.08). No significant differences in abundance were observed between male and female nestlings (Mann–Whitney *U*-test = 281, *P* = 0.63). The maximum number of lice on a single nestling was 21. The variance/mean ratio (= 13) and the aggregation index (K = 0.06) show that the distribution is aggregated. The zero class was the greatest one (90%). The negative binomial fits well (*G* = 6.54, *P* > 0.05). Lice were 67% nymphs (32% nymph-I, 32% nymph-II, and 3% nymph-III) and 33% adults. Out of these, 67% were females and 33% were males. Ischnocera have more female–biased sex ratios (Clayton *et al.* 1992), but in this study no significant differences were found between sexes ($c^2 = 1.33$, df = 1). The minimum age of parasitized hosts with lice was 30 days, but nymphal instars were found in nestlings aged 38 days or older.

DISCUSSION

Ornithonyssus bursa was the more prevalent and abundant ectoparasite in Monk Parakeet nestlings. *Psitticimex uritui* and *O. bursa* are temporary parasites (Clayton & Moore 1997) and are absent from host's body for varying periods. Cimicids feed during short periods, then they remain in the nest where they can starve for long time. *Paragoniocotes fulvofasciatus* is a permanent ectoparasite that transfers between parents and their offspring (Clayton *et al.* 1992, Clayton & Moore 1997). However, prevalence on Monk Parakeet nestlings was low. The mean prevalence of Ischnocera was reported to be higher for several Neotropical birds (74.4%); in many cases, low prevalence is related to effective preening (Clayton *et al.* 1992).

During their development, nestlings were parasitized, first, by haematophagous species (bugs and mites), then by chewing lice, in accordance with their trophic habits. Ischnocera cannot colonize a host until its feathers have grown in, because they provide a substrate for mobility, and the lice are dependant on barbules for food. In this study, vertical transmission of lice seems to take place at the nymphal instar-II or in females, after acquisition of full definitive plumage (age of 25 days or older; see Aramburú 1997).

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