FORD, E. R. 1956. Birds of the Chicago region. Chicago Acad. Sci. Spec. Publ. 12.

FREEMARK, K., AND B. COLLINS. 1992. Landscape ecology of birds breeding in temperate forest fragments. Pages 443-454 *in* Ecology and conservation of Neotropical migrant landbirds (J. M. Hagan III and D. W. Johnston, Eds.). Smithsonian Institution Press, Washington, D.C.

GIBBS, J. P., AND J. FAABORG. 1990. Estimating the viability of Ovenbird and Kentucky Warbler populations in forest fragments. Conserv. Biol. 4:193-196.

GRABER, J. W., AND R. R. GRABER. 1973. Nesting distribution of the Veery in Illinois. Illinois Audubon Bull. 164:50-52.

GRABER, R. R., J. W. GRABER, AND E. L. KIRK. 1971. Illinois Birds: Turdidae. Illinois Nat. Hist. Surv. Biol. Notes 75.

HERKERT, J. R. (Ed.). 1992. Endangered and threatened species of Illinois: Status and distribution. Vol. 2, Animals. Illinois Endangered Species Protection Board, Springfield.

NELSON, E. W. 1876. Birds of north-eastern Illinois. Essex Inst. Bull. 8:90-155.

O'NEILL, R. V., J. R. KRUMMEL, R. H. GARDNER, G. SUGIHARA, B. JACKSON, D. L. DEANGELIS, B. T. MILNE, M. G. TURNER, B. ZYGMUNT, S. W. CHRISTENSEN, V. H. DALE, AND R. L. GRAHAM. 1988. Indices of landscape pattern. Landscape Ecol. 1:153-162.

PATON, P. W. C. 1994. The effect of edge on avian nest success: How strong is the evidence? Conserv. Biol. 8:17-26.

PRATT, W. C. 1890. Notes from Lake Forest, Illinois. Ornithologist and Oologist 15:70.

ROBBINS, C. S. 1980. Effect of forest fragmentation on breeding bird populations in the Piedmont of the mid-Atlantic region. Atl. Nat. 33:31-36.

ROBBINS, C. S., D. K. DAWSON, AND B. A. DOWELL. 1989. Habitat area requirements of breeding forest birds of the middle Atlantic states. Wildl. Monogr. 103.

TEMPLE, S. A. 1986. Predicting impacts of habitat fragmentation on forest birds: A comparison of two models. Pages 301-304 *in* Wildlife 2000: Modeling habitat relationships of terrestrial vertebrates (J. Verner, M. L. Morrison, and C. J. Ralph, Eds.). Univ. Wisconsin Press, Madison.

VILLARD, M. A., P. R. MARTIN, AND C. G. DRUMMOND. 1993. Habitat fragmentation and pairing success in the Ovenbird (*Seiurus aurocapillus*). Auk 110: 759-768.

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First Nesting Record of the Tamarugo Conebill (*Conirostrum tamarugense*)

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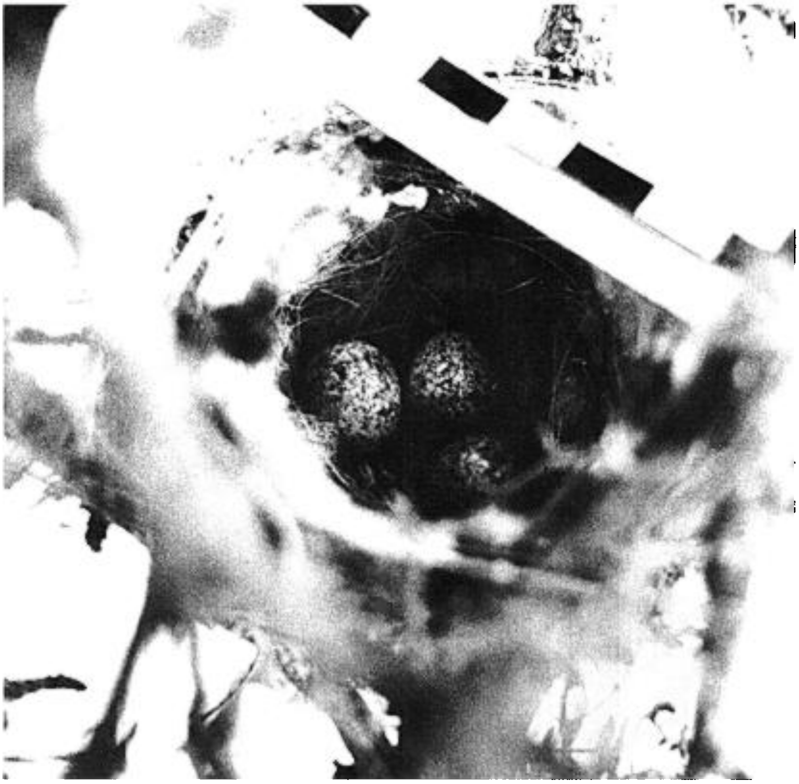
The Tamarugo Conebill (*Conirostrum tamarugense*), an endemic bird of the arid regions of northern Chile and southern Perú, is a species known to science for only two decades (Mayr and Vuilleumier 1983). Since its formal description (Johnson and Millie 1972), there are many aspects of the species' biology that have remained unknown. The lack of information about its population size, seasonal movements, breeding behavior, distribution, and other aspects of its natural history have resulted in national and international organizations including this species in the "insufficiently known" category (Glade 1988, Rottmann and López-Calleja 1992, Collar et al. 1992). In this paper, we report on the nesting of *C. tamarugense* and describe some patterns of its breeding habitat use.

Study area and methods.—Observations were made at the "Pampa del Tamarugal" National Reserve (20°24'S, 69°44'W) in the Tarapacá region of Chile. This area, located at 1,000 m altitude, has an extreme desert climate with a mean annual rainfall of only 0.3 mm (di Castri and Hajek 1976). Both temperature and relative humidity undergo wide daily variations (8° to 30°C, and 3-8% to 80-100%, respectively, in October; Sudzuki 1985).

Originally covered with extensive savannas of tamarugo (*Prosopis tamarugo*), a highly specialized tree that can obtain water from as deep as 50 m below the surface, the "Pampa del Tamarugal" was intensively exploited during the last four centuries, almost leading to its disappearance (Briones 1985). To reverse this situation, the Chilean government started a plantation program in the 1930s that has allowed the recreation of 14,600 ha of tamarugo forest (Aguirre and Wrann 1985).

As a part of an assessment of the conservation status of *C. tamarugense*, we visited the reserve between 25



October and 2 November 1993, and noted breeding activity of this species. We characterized the nests by their size, by the materials used for their construction, and by their position in the tree. The activity at the nests was determined by direct observations of the bird's incubation behavior, or by the presence of eggs or fledglings. Observations inside the nests were made with the help of a telescopic mirror. As a precaution, eggs were not handled, so no precise measurements of them are provided.

Based on a preliminary study of the forest use by the species (Estades unpubl. data), we selected a representative stand belonging to a 690-ha group of the oldest plantations (trees planted 1932 to 1947) and surveyed and mapped all the nests inside a rectangle of 68 × 284 m (1.9 ha). We also characterized the trees of this plot based on their foliage volume, an expression of overall size. A similar evaluation was carried out in a 60-ha managed stand. The trees of this stand had been intensively pruned two years earlier for the production of timber and charcoal, almost eliminating the lower half of the foliage.

Results and discussion.—The nest of *C. tamarugense* is a hemispheric structure with a slightly longer vertical axis ($n = 6$). Its dimensions are small, with a 6.5 to 9.0 cm diameter and 7.0 to 10.0 cm of height. The inside diameter is 3.5 to 5.0 cm, and its depth is 5.0 to 6.5 cm. No statistical significance is provided since some measurements were only estimated from a distance. The nest is carefully constructed using small twigs, feathers, sheep wool, and the rachis of tamarugo leaves.

The eggs are approximately 1.7 cm long and 1.2 cm wide. The background color is pale gray with irregular brown spots (Fig. 1, above). Three eggs were found in each nest ($n = 5$). The small sample size was due to the difficulty of making clear observations inside the nests and because the parents sometimes covered the eggs with wool and feathers when leaving the nest. Johnson (1967) reported the same clutch size and very similar egg colors and nest shape for the Cinereous Conebill (*C. cinereum*) in northern Chile.

The nest is placed preferentially in the central third of the tree, with a mean height of 4.28 ± SD of 1.67 m ($n = 27$). The species principally uses descending (63%) and horizontal (18.5%) terminal branches for attaching the nest (Fig. 1, below). Such placement may represent a strategy to avoid predation on the eggs and nestlings by lizards (*Microlophus atacamensis*), which frequently climb the main branches of the trees when looking for food. Even though we have no evidences to support this hypothesis, the first author observed an attack from one of these lizards on a fledgling that had fallen to the ground.

We noted a tendency for the nests to be aggregated in the forest. We found 31 nests of different years of construction in 22 of the 75 trees in the study plot. No more than one active nest was found in a single tree as *C. tamarugense* showed a markedly territorial behavior. There is no significant difference between the foliage volume of the occupied trees and that of the nonoccupied ones (Mann-Whitney test, $P = 0.937$), nor does this variable explain the number of nests per tree (linear regression, $P = 0.508$).

Considering that *C. tamarugense* does not select the nesting trees by their size and that potential nesting sites were abundant all over the plot, the presence of up to four nests of different ages (three old and one active) in a single tree suggests that pairs of birds may use the same tree in consecutive years.

Inside the study plot we found five active nests. Projecting this value to the total area (690 ha) of unmanaged mature forests gives a estimate of 1,800 active nests. Another five nests in the plot showed evidence of unconfirmed activity.

A significant negative effect of pruning on the nesting of *C. tamarugense* was detected at the managed forest plot. In the 1.9-ha site, only one old nest was found, and it was probably constructed before the stand's management. Whether this effect is due to a reduced foraging site availability or to the loss of nesting sites is something that remains to be proven.

Although nesting in the young stands (years 1966–1972) was not formally evaluated, we observed a major difference between activity in younger and older forests. In fact, we could find only a few nests in many hectares of young plantations surveyed, and most nests were located near the mature forests.

Our finding of intense breeding activity of *C. tamarugense* at the "Pampa del Tamarugal" National Reserve suggests that, even though the species is not restricted to tamarugo forests (McFarlane 1975, Tallman et al. 1978, Schulenberg 1987), this bird may depend on this habitat for its reproduction.

Johnson and Millie (1972), Tallman et al. (1978), and Fjeldså and Krabbe (1990) suggested that *C. tamarugense* could breed at high elevations and winter in adjacent lowlands. Contrary to this hypothesis, our results show that, in northern Chile, the species breeds at mid-elevations from September to December and then probably migrates north and to higher elevations. This would explain the failure of Schulenberg (1987) to find the species nesting during the breeding season at high elevations in southern Perú (January–March).

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Fig. 1. (Above) Tamarugo Conebill nest with three eggs (scale in centimeters). (Below) Characteristic location of nest in tree (nest indicated by arrow).

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Literature Cited

AGUIRRE, J. J., AND J. WRANN. 1985. Especies del género *Prosopis* y su manejo en la Pampa del Tamarugal. Pages 3-33 *in* Estado actual del conocimiento sobre *Prosopis tamarugo* (M. A. Habit, Ed.). United Nations, Food and Agriculture Organization, Santiago.

BRIONES, L. 1985. Visión retrospectiva antropológica del *Prosopis*. Pages 51-53 *in* Estado actual del conocimiento sobre *Prosopis tamarugo* (M. A. Habit, Ed.). United Nations, Food and Agriculture Organization, Santiago.

COLLAR, N. J., L. P. GONZAGA, N. KRABBE, A. MADROÑO NIETO, L. G. NARANJO, T. A. PARKER III, AND D. C. WEGE. 1992. Threatened birds of the Americas. ICBP/IUCN Red Data Book, 3rd ed., part 2. International Council for Bird Preservation, Cambridge.

DI CASTRI, F., AND E. R. HAJEK. 1976. Bioclimatología de Chile. Universidad Católica de Chile, Santiago.

FJELDSÅ, J., AND N. KRABBE. 1990. Birds of the High Andes. Zoological Museum, Univ. Copenhagen and Apollo Books, Svendborg.

GLADE, A. A. (Ed.). 1988. Libro rojo de los vertebrados terrestres de Chile. Corporación Nacional Forestal, Santiago.

JOHNSON, A. W. 1967. The birds of Chile and adjacent regions of Argentina, Bolivia and Perú. Platt Establecimientos Gráficos, Buenos Aires.

JOHNSON, A. W., AND W. R. MILLIE. 1972. A new species of conebill (*Conirostrum*) from northern Chile. Pages 3-8 *in* Supplement to the birds of Chile and adjacent regions of Argentina, Bolivia and Perú (A. W. Johnson, Ed.). Platt Establecimientos Gráficos, Buenos Aires.

MAYR, E., AND F. VUILLEUMIER. 1983. New species of birds described from 1966 to 1975. J. Ornithol. 124:217-232.

MCFARLANE, R. W. 1975. The status of certain birds in northern Chile. Bull. Int. Counc. Bird Preserv. 12:300-309.

ROTTMANN, J., AND M. V. LÓPEZ-CALLEJA. 1992. Estrategia nacional de conservación de aves. Servicio Agrícola y Ganadero, División de Protección de los Recursos Naturales Renovables, Serie Técnica 1, Santiago.

SCHULENBERG, T. S. 1987. Observations on two rare birds, *Upucerthia albiqula* and *Conirostrum tamarugense*, from the Andes of southwestern Perú. Condor 89:654-658.

SUDZUKI, F. 1985. Utilización de la humedad ambiental por *Prosopis tamarugo* Phil. Pages 35-50 *in* Estado actual del conocimiento sobre *Prosopis tamarugo* (M. A. Habit, Ed.). United Nations, Food and Agriculture Organization, Santiago.

TALLMAN, D. A., T. A. PARKER III, G. D. LESTER, AND R. A. HUGHES. 1978. Notes on 2 species of birds previously unreported from Perú. Wilson Bull. 90:445-446.

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Body Pterylosis of Woodcreepers and Ovenbirds (Dendrocolaptidae and Furnariidae)

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The Dendrocolaptidae and Furnariidae, two groups of Central and South American suboscine passerines, have always been considered closely related. With 52 species, the woodcreepers occur from northern Mexico to central Argentina in forest, forest-edge, and open-woodland habitats, where they nest in holes or cavities. Their body lengths range from 13.5 to 37 cm, and their mass from 12 to 120 g; the plumage is generally dull rufous brown, often streaked or spotted. The most distinctive external features of dendrocolaptids are: usually large, laterally compressed, often decurved bills used as foraging probes on tree trunks; and their rigid, spiny-tipped rectrices used as props against those trunks. Their ecology, behavior, and superficially homogenous morphology reflect the scansorial habits of woodcreepers. The much larger group of ovenbirds (218 species) occurs from central Mexico to Patagonia and the Falkland Islands. The