

This furnariid is restricted to a few small patches of humid Polylepis woodland at 3,700-4,550 m in the departments of Cuzco and Apurímac, south-central Peru: these woodlands are being cleared for firewood, and intervention is urgently required.

DISTRIBUTION The White-browed Tit-spinetail (see Remarks) is known from a very small area in Cuzco and Apurímac departments, south-central Peru. Coordinates below, unless otherwise stated, are from Stephens and Traylor (1983).

Cuzco The type-specimen (in USNM) was collected in 1915 at 4,267 m (Chapman 1921a,b) above Torontoy (c.13°10'S 72°30'W: presumably the wood situated on Nevada Veronica, c.6 km north-east of Torontoy; B. P. Walker *in litt.* 1989) on the right bank of the río Urubamba, c.12 km upstream from Machu Picchu. This specimen was the only record of the species until August 1974, when it was found nearby in the small *Polylepis*–*Gynoxys* woodlands far above the treeline (which is at 3,900 m), in the vicinity of Abra Málaga (13°08'S 72°19'W) at: Canchaillo (13°07'S 72°22'W), 10 km north-west of Abra Málaga (elevation 4,315 m on recent tourist maps); and 1.5-3.5 km south-west of Abra Málaga (c.30 km east-north-east of the type-locality) at 3,900 to 4,300 m (Parker and O'Neill 1980). These woodlands were visited by several ornithologists in the 1970s and 1980s, and 12 additional specimens were collected (in AMNH, FMNH, LSUMZ and ZMUC), in three adjacent woods: c.10 km north-north-east of Abra Málaga (B. P. Walker *in litt.* 1988); c.35 km south-east of Abra Málaga, in the valley ending at Urubamba town (c.5 km east-north-east of the town), at an altitude of 3,800-4,500 m (Fjeldså 1987); and Yanacocha lakes (13°17'S 71°59'W), at the head of Huayocari valley, on the slope of Nevada Chicon, at 3,700-3,800 m (B. P. Walker *in litt.* 1989).

Apurímac In November 1989, the White-browed Tit-spinetail was found at 4,100-4,550 m in remnant patches of mature *Polylepis* woodlands in the mountains south-east of Abancay (Fjeldså 1991). Ten patches of habitat, each 1-4 ha, were found in the Cerro Runtacocha–Cerro Morococha region at 13°40-41'S 72°46'W, with c.30 patches at 13°41-46'S 72°35-42'W, one of them being a cluster covering c.75 ha on Cerro Balcón at 13°42'S 72°42'W, the rest covering only 1-4 ha each: this species was found in five of the 10 *Polylepis* woods investigated (J. Fjeldså *in litt.* 1989, 1990: coordinates read from IGM 1978a with the patches indicated by J. Fjeldså).

This species presumably occurs in any patch of *Polylepis* between or near the known localities, but the size and location of these patches has yet to be defined. Searches for the bird in similar woods along the “Inca trail” on the left bank of the río Urubamba have proved fruitless (B. P. Walker verbally 1986), and early collectors failed to find it in the Aricoma Pass, Puno department, a locality now almost devoid of *Polylepis* (Fjeldså 1987). It is absent from other known *Polylepis* woods in Puno (Fjeldså 1987), but may occur in unexplored parts of Cordillera Carabaya, Cuzco (NK), where much habitat has been noted from the air (TAP).

POPULATION In 1987 the population of the wood 1.5-3.5 km south-west of Abra Málaga was estimated at 15 families or c.50 birds, and of the Chaiñapuerto wood at 10 families or c.35 birds (both woods apparently at carrying capacity) (Fjeldså 1987); in 1989 the wood at Yanacocha was estimated to hold about 20 families or c.70 birds (B. P. Walker *in litt.* 1989); however, only one family of three birds was recorded in the Canchaillo wood (Parker and O'Neill 1980), with no numbers estimated for the wood north-north-east of Abra Málaga. Other small woodlands in the Vilcanota mountains may also be found to have dense populations (NK).

In contrast, this bird occurs at very low densities in the woodlands south-east of Abancay, Apurímac department, with a maximum one to two pairs in each, and in November 1989 only 25 pairs were estimated to occur in this entire region (J. Fjeldså *in litt.* 1990).

ECOLOGY All observations of the White-browed Tit-spinetail are from *Polylepis* and *Polylepis*–*Gynoxys*, save one possibly resident family in *Escallonia* below a *Polylepis* wood (TAP). The woodland at Chaiñapuerto is in a semi-humid glacial cirque valley with *Polylepis weberbaueri* forest at the valley bottom, continuing up ravines and crevices on the surrounding rocky slopes: in the lower part of the forest some of these trees are 0.5 m in diameter, and in certain areas there is *Gynoxys*, *Escallonia* and *Vallea* (Fjeldså 1987). Owing to cutting and grazing, the forest has some open parts with grassland, patches of *Berberis* scrub and dense *Brachyotum*, *Vaccinium* and composite brush, with a variety of herbs; in the

upper parts, some coarse grass, moss, and mats of *Muehlenbeckia volcanica* fringe the talus (Fjeldså 1987). The wood 1.5-3.5 km south-west of Abra Málaga is semi-humid, comprising mainly (unidentified) *Polylepis*, with some well-sized trees mixed with some *Gynoxys*, and growing on a steep, north-facing, rocky slope: in several places the rocks are covered with thick layers of moss (Parker and O'Neill 1980, Fjeldså 1987, NK). The Canchaillo and Yanacocha woods are *Polylepis* mixed with *Gynoxys* (Parker and O'Neill 1980, B. P. Walker *in litt.* 1989), with another composed mainly of *Polylepis* (B. P. Walker verbally 1986). In Apurímac, birds were found in four patches of mature woodland, and in one with smaller trees and fewer vines: the mature woodlands (*Polylepis incana* and *P. subsericans*) were exceptionally dense and lush, most trees being 10-15 m tall with trunks 40-100 cm in diameter; dense regrowth existed along most edges and in clearings, and the larger trees were heavily laden with mosses and vines, the most important vine being *Salpichroa* (Solanaceae), which formed curtains 5-10 m high, hanging from the canopy and adorned with yellow tubular flowers (J. Fjeldså *in litt.* 1990). During snowstorms, birds often descend to the lowest parts of the woods, but some have also been seen remaining high (Fjeldså 1991).

The White-browed Tit-spinetail moves in pairs or family groups of three or four, and forages along thicker branches and trunks, picking insects from bark, moss, lichens, twigs, dense masses of hanging dead branches and dead leaves, only rarely probing clusters of green leaves (Parker and O'Neill 1980, Fjeldså and Krabbe 1990, J. Fjeldså *in litt.* 1990, Fjeldså 1991). It is somewhat more deliberate, and spends less time in the thinnest branches and twigs than the near-threatened (longer-billed) Tawny Tit-spinetail *Leptasthenura yanacensis* (Fjeldså and Krabbe 1990), which occurs at the same localities (Parker and O'Neill 1980, Fjeldså 1987): in some *Polylepis* woods in Cuzco and Puno, the White-browed Tit-spinetail is replaced by the Andean Tit-spinetail *L. andicola* (Fjeldså and Krabbe 1990).

The White-browed Tit-spinetails observed at Abra Málaga were very aggressive, constantly chasing conspecifics (Fjeldså and Krabbe 1990), and although this could be the nature of the species, it may be unnaturally frequent as a result of the slowly shrinking habitat (NK). Like most congeners, both sexes are very vocal (Fjeldså and Krabbe 1990), and are easily attracted to playback of their song (NK). No nests have been found, but other tit-spinetails use the abandoned nests of canasteros *Asthenes*, thornbirds *Phacellodomus*, etc., or place their nest in a hole in a bank, tree, rock-crevice or similar cavity (Fjeldså and Krabbe 1990). No definite proof of the breeding season exists, all specimens with data on gonads having been collected in July and December, and all reported inactive: one December specimen, however, was in heavy (probably post-breeding) moult (Fjeldså and Krabbe 1990).

THREATS The major threat is habitat destruction, caused by cutting for firewood and a lack of regeneration due to grazing and burning of grass between the trees. At Abra Málaga, the woods are the only source of fuel for the local community of 3-5 families, and trees or large branches are being cut regularly (J. Fjeldså *in litt.* 1990, NK). The Chaiñapuerto wood is subject to less cutting, as the woodland immediately below it is more easily accessible; however, *Polylepis* is collected daily by a few shepherds and, in contrast to the Abra Málaga woods (where only cattle graze), is being grazed by sheep and goats (Fjeldså 1987). The woodlands in Apurímac, though less important for the present species, are also dwindling (see Threats under Royal Cinclodes *Cinclodes aricomae*).

MEASURES TAKEN So far only the Apurímac woodlands have received attention (see account of Royal Cinclodes).

MEASURES PROPOSED There is an urgent need for the woodlands between the known sites, and in Cordillera Carabaya, to be mapped and surveyed for the presence of this species (Fjeldså *et al.* 1987). Reforestation with *Polylepis* should be initiated around the existing woods (for fastest propagation methods see Measures Proposed under Royal Cinclodes). Above Urubamba town the replacement of native trees with *Eucalyptus* should be prevented, not just for the sake of the survival of the endemic *Polylepis* fauna and flora, but also because of the devastating impact of *Eucalyptus* on soil quality (whereas *Polylepis* forms a very rich soil) (Fjeldså 1987). Nevertheless, planting of *Eucalyptus* on the *Dodonea*-covered slopes lower down the valley should not be opposed, as this may lessen the local exploitation of *Polylepis* (Fjeldså 1987). Various woods in Cuzco and the woodlands in Apurímac department are also inhabited by two other threatened *Polylepis*-adapted bird species: the Ash-breasted Tit-tyrant *Anairetes alpinus* and Royal Cinclodes (see relevant accounts), and any conservation initiatives

in these areas should take into consideration the requirements of all three species (the threatened White-tailed Shrike-tyrant *Agriornis andicola* may also occur sympatrically, although apparently with different habitat requirements).

REMARKS On the basis of one specimen, Vaurie (1971, 1980) synonymized *L. xenothorax* with the nominate subspecies of Rusty-crowned Tit-spinetail *L. pileata pileata*, a view that has been accepted elsewhere (e.g. Morony *et al.* 1975). However, the 12 additional specimens obtained since Vaurie's revision, as well as field observations, strongly suggest that this bird is a valid species (Parker and O'Neill 1980, J. P. O'Neill *in litt.* 1986, Fjeldså and Krabbe 1990).