Observations on the ecology of *Tauraco ruspolii* and *T. leucotis* in southern Ethiopia

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Two species of the genus *Tauraco* are endemic to the Abyssinian plateau: Prince Ruspoli's Turaco *T. ruspolii* and the White-cheeked Turaco *T. leucotis*, the latter with two subspecies, the nominate and *donaldsoni*. They form a superspecies with *T. hartlaubi* of the Kenyan plateau. *T. leucotis* is widely distributed across most of Ethiopia, and even penetrates marginally into Eritrea and south-eastern Sudan, while *T. ruspolii* has a very restricted distribution in the southern part of the country (Fig. 1).

Following the theory first proposed by Moreau (1958), the ancestor of the two turacos was cut into two by the Rift Valley during a dry period, giving rise to *leucotis* on the western and *ruspolii* on the eastern side. When the climate ameliorated, *leucotis* crossed the Rift, differentiated there into the subspecies *donaldsoni*, and pushed *ruspolii* southwards. Still later, *leucotis* crossed the barrier again, driving *ruspolii* into its last refuge on the southern margin of the highlands. According to this view, *T. ruspolii* would be a relict species, competitively inferior to *T. leucotis* and gradually disappearing. Owing to this and to habitat alteration within its extremely restricted range, *T. ruspolii* is therefore now considered an endangered species (Ash & Gullick 1989, Dellelegn 1991, Collar *et al.* 1994) and is listed in the African Red Data Book (Collar & Stuart 1985).

In order to evaluate the status of *T. ruspolii*, a survey was undertaken between 23 March and 5 June 1995. Some data on its habitat requirements and those of *T. leucotis* were collected, providing new insight into the competition between and evolution of the two species. This new information is reported in this paper.

The area surveyed extends over about 35,000 km^2 in the Ethiopian administrative regions of Sidamo, Borana and Bale, and lies at the southern margin of the Abyssinian plateau. Elevation reaches over 2000 m in the northern sections, descending southwards to about 800 m. Habitats comprise *Podocarpus gracilior* montane forests in the wetter areas (mainly in the north); in drier localities, but still receiving a good amount of water, often in the form of mist, another kind of montane forest develops, dominated by *Juniperus procera*. The forests gradually merge into increasingly dry *Acacia* woodlands where elevation and rainfall decrease.

During the survey, 49 sites were visited (Fig. 2) within and around the known range of *T. ruspolii*. The species was found in all the previously known localities, including Genale (5°40′N, 30°32′E), where it was thought to have disappeared in recent times (Ash & Gullick 1989), and in numerous previously unreported sites. The habitats frequented ranged from *Podocarpus* and *Juniperus* forests and forest

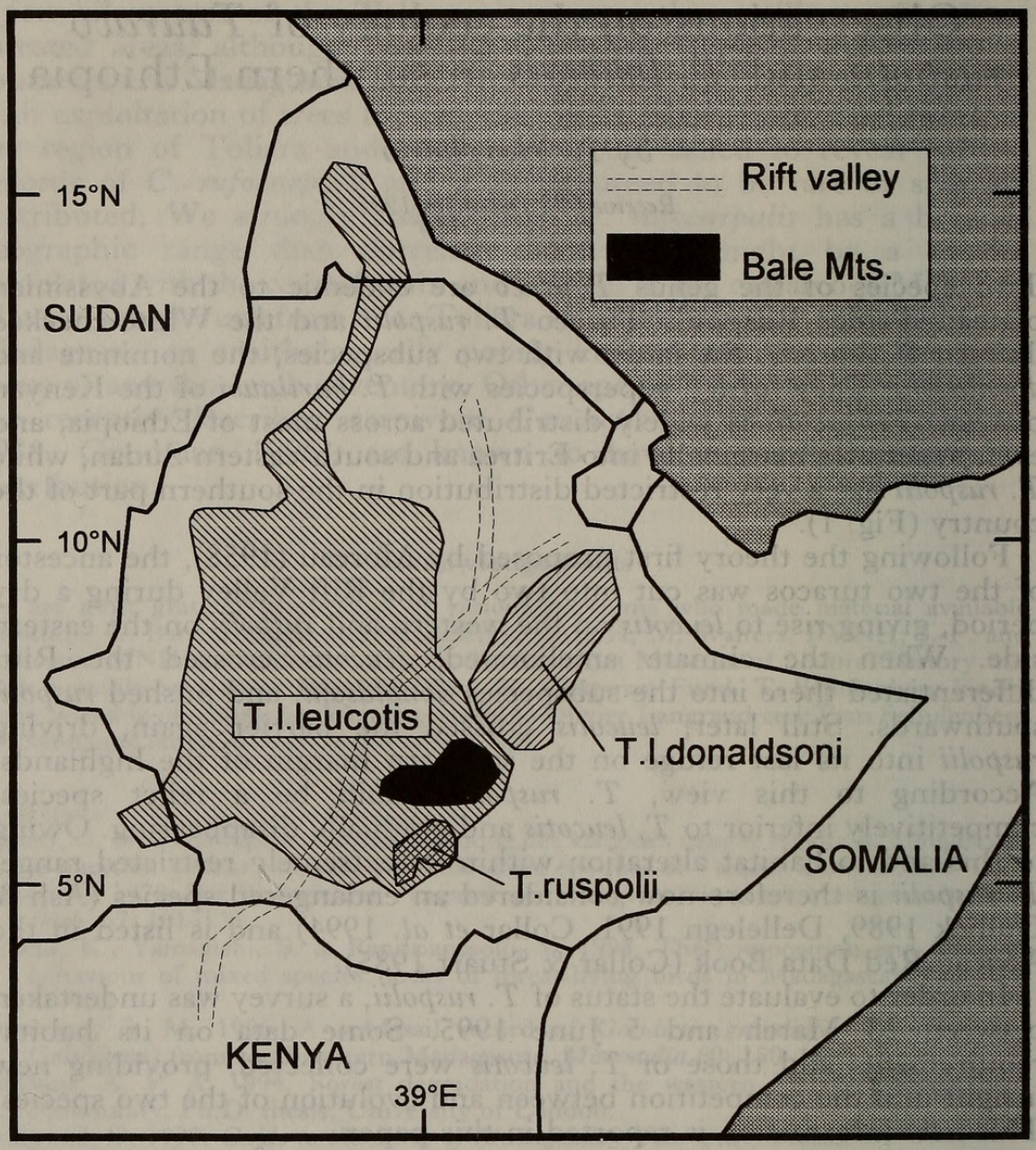

Figure 1. Distribution of the Ethiopian turacos.

margins up to *Acacia*-dominated woodlands, in the latter only as long as the preferred food plants, especially figs (*Ficus sycomorus*, *F. thonningii*, *F. vasta*), were present. Densities in *Podocarpus* forests were very low and only four individuals were met with there during over 90 hours of search in different localities; since the fruits of isolated *Podocarpus* trees growing outside forests were readily eaten by *T. ruspolii*, *Podocarpus* forests should not in themselves represent a hostile environment for the species; in fact the main reason for its absence is probably related to competition from *T. leucotis* (see below). In summary, the preferred habitats of *T. ruspolii* were forest margins and woodlands, where 10 to 20 individuals were regularly observed in a single day. Also *Juniperus* forests, the habitat where the species was initially re-found by Benson (1942, 1945), held good numbers.

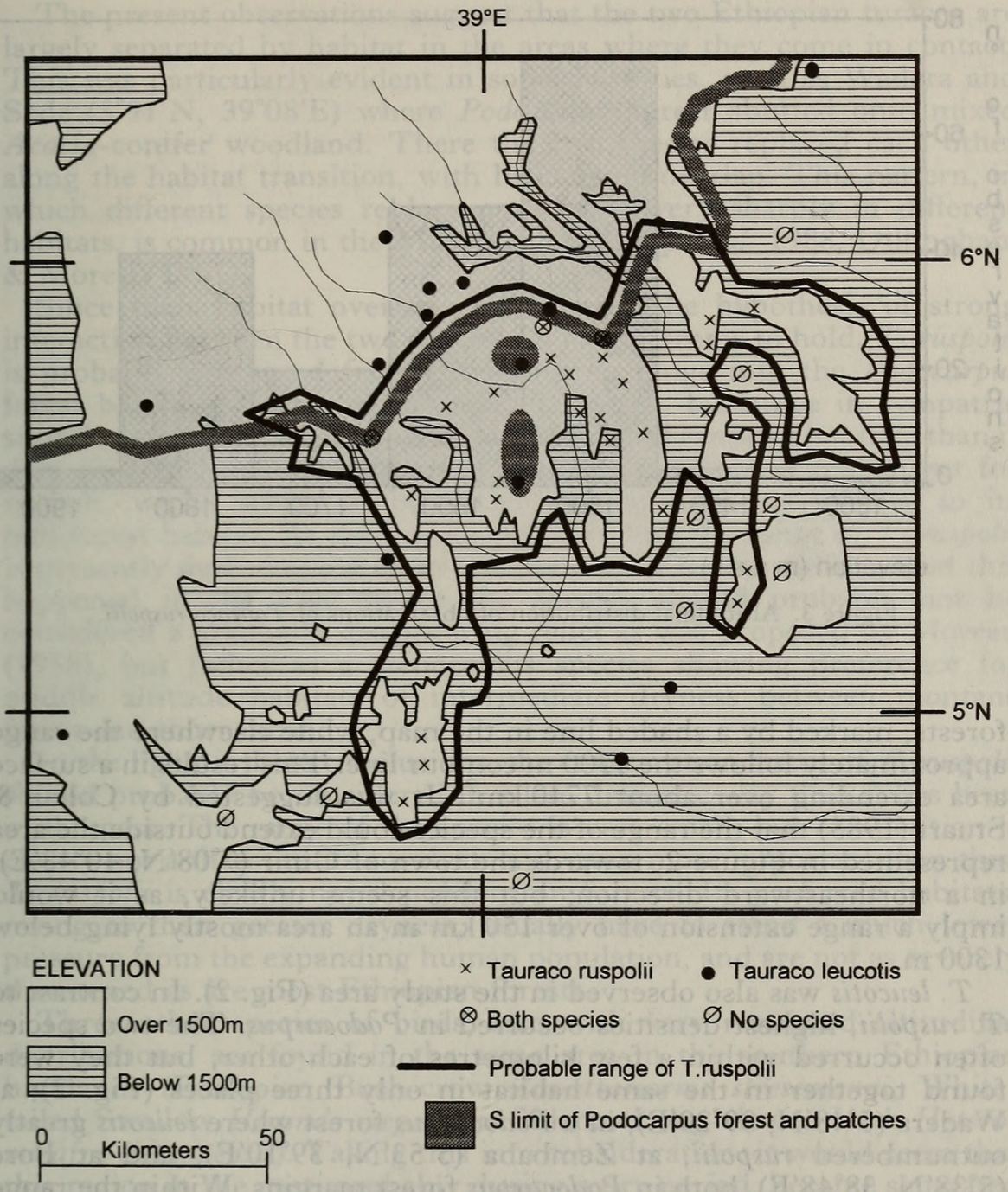

Figure 2. Map of the survey area.

Figure 3 shows the altitudinal distribution of the observations of *T. ruspolii*, which ranged from 1250 to 1860 m a.s.l. The upper limit roughly coincides with that of the most elevated localities in the study area; the lower one, which is reached after descending steeply from about 1500 m, appears to form an altitudinal limit to the species' distribution. As can be seen in Figure 2, the localities where *T. ruspolii* occurred were all within, or very near to, the 1500 m contour line.

The geographic distribution of *T. ruspolii*, inferred from present information, is recorded in Figure 2. In this map the northern limit of the species is seen to coincide with the southern limit of *Podocarpus*

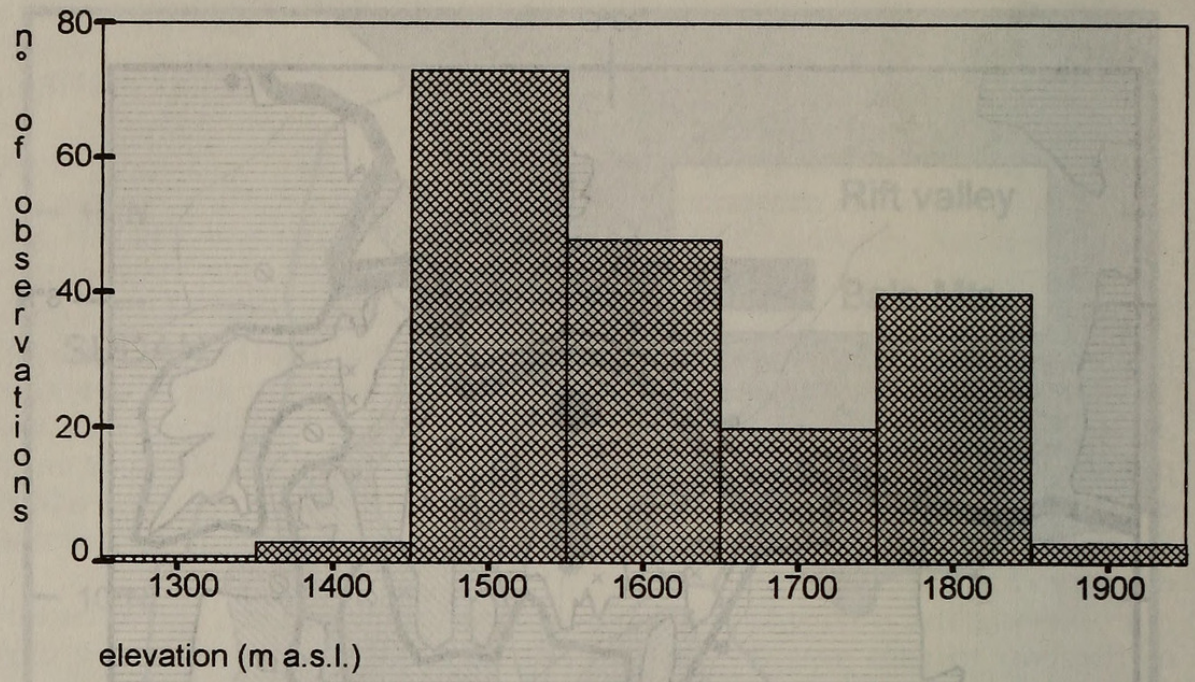

Figure 3. Altitudinal distribution of observations of *Tauraco ruspolii*.

forests, marked by a shaded line in the map, while elsewhere the range approximately follows the 1500 m contour line. This results in a surface area extending over about 7740 km^2. It was suggested by Collar & Stuart (1985) that the range of the species could extend outside the area represented in Figure 2, towards the town of Ginir (7°08′N, 40°43′E), in a northeastward direction; but this seems unlikely, as it would imply a range extension of over 150 km in an area mostly lying below 1300 m.

T. leucotis was also observed in the study area (Fig. 2). In contrast to *T. ruspolii*, highest densities occurred in *Podocarpus*. The two species often occurred within a few kilometres of each other, but they were found together in the same habitat in only three places (Fig. 2): at Wadera (5°48′N, 39°20′E), in a *Podocarpus* forest where *leucotis* greatly outnumbered *ruspolii*, at Zembaba (5°53′N, 39°10′E), and at Bore (5°38′N, 38°48′E), both in *Podocarpus* forest margins. Within the range of *ruspolii*, *leucotis* was never found in woodlands, and it was less common in *Podocarpus* forest margins; thus, it was almost exclusively present in *Podocarpus* forests. Erard & Prévost (1970) found that at Wadera *ruspolii* occurred inside and *leucotis* outside the forest, but this was not the case in 1995. Outside the range of *ruspolii*, *leucotis* occurred commonly in habitats drier than forests (i.e. forest margins, riverine vegetation and woodlands) that were similar to those occupied by *ruspolii* alone in the area of their co-existence. Elsewhere in Ethiopia, *T. leucotis* is not considered a specialised species of *Podocarpus* forests, but is seen to exploit a relatively wider range of habitats than its congener (Urban & Brown 1971, pers. obs.), and is reported to occur at elevations as low as 850 m in the Omo Valley (Fry *et al.* 1988).

The present observations suggest that the two Ethiopian turacos are largely separated by habitat in the areas where they come in contact. This was particularly evident in some localities, such as Wadera and Sede (5°31'N, 39°08'E) where *Podocarpus* forest abutted onto mixed *Acacia*-conifer woodland. There the two species replaced each other along the habitat transition, with little or no overlap. This pattern, in which different species replace each other very sharply in different habitats, is common in the Musophagidae (Fry *et al.* 1988, Dillingham & Moreau 1961).

Since their habitat overlap is restricted, the hypothesis of strong interaction between the two species no longer seems to hold. *T. ruspolii* is probably prevented from extending its range into the *Podocarpus* forest by the presence of the related species, but since in sympatric situations *T. leucotis* occupies a more restricted range of habitats than it does in allopatry, competition is not likely to be a severe threat for *ruspolii*, which seems to be better adapted than its relative to its non-forest habitat. As there is no evidence that the range of *T. ruspolii* is presently declining owing to competition, it is also unlikely that this happened in the past; hence the species should probably not be considered a gradually disappearing relict as was proposed by Moreau (1958), but rather as a stenoecious species showing preference for middle altitude habitats of intermediate dryness between montane forest and thorn-bush.

In the light of these conclusions, the conservation status of *T. ruspolii* should probably be considered in a less dramatic way than it has been in the past. The range of the species is very small, but competition is clearly not a threat to its survival, and, even more important than this, *T. ruspolii* is clearly not dependent on forests. Its preferred habitats, owing to their greater dryness, usually have to stand a much lower pressure from the expanding human population, and are not as severely threatened as are most Ethiopian forests.

Three other species of birds, also with very restricted altitudinal distributions, are found in the same area in the southern Ethiopian highlands (Ethiopian Bush-crow *Zavattariornis stresemanni*, White-tailed Swallow *Hirundo megaensis*, Sidamo Long-clawed Lark *Heteromirafra sidamoensis*). Taking this into consideration, it would seem that this region in the past, probably during a dry period, became separated from the rest of the Ethiopian highlands by the barriers formed by the Rift Valley to the west and by the huge block of the Bale mountains (reaching over 4200 m; Fig. 1) to the north; this isolation provided the conditions for the evolution of the four restricted-range bird species.

T. ruspolii seems therefore to have evolved *in situ* in the southern highlands of Ethiopia and, owing to its restricted altitudinal distribution, which certainly reduces its chances of dispersion, it may have never occupied a much wider range than today. On the other hand *T. leucotis*, which, as Moreau (1958) correctly pointed out, was initially restricted to the western side of the Rift valley, thanks to its ability to colonise localities at lower elevations, was able to cross the barrier and occupy a much wider area, which at present almost completely encircles *T. ruspolii*.

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Further observations on the nesting of the Azure-rumped Tanager

by Héctor Gómez de Silva Garza

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This paper describes observations on a nest of the Azure-rumped Tanager *Tangara cabanisi* in the El Triunfo Biosphere Reserve, southeastern Chiapas, Mexico. The nest was discovered by Angie Tyner on 26 April 1993, while the birds were still building it, and from 1 to 17 May the author was able to make occasional visits while conducting observations on the natural history of the Horned Guan *Oreophasis derbianus* and censusing the birds in the upper montane forest of El Triunfo.