

## Distribution, status and notes on the ecology of Purple-backed Sunbeam *Aglaeactis aliciae* in north Peru

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*Aglaeactis aliciae* es un colibrí endémico del área del alto río Marañón y recientemente considerado como críticamente amenazado. En junio de 2006 llevamos a cabo una evaluación de la distribución de *Aglaeactis aliciae* en el departamento de La Libertad, Perú. Visitamos las tres localidades conocidas para la especie, y además llevamos a cabo búsquedas en zonas adyacentes. En este artículo se reporta 17 nuevas localidades para la especie, nuevas especies que conforman su dieta y se hace una re-evaluación de su status de amenaza.

Purple-backed Sunbeam *Aglaeactis aliciae* is endemic to the upper Marañón drainage, dpto. La Libertad, Peru, where it occurs at three sites in the temperate zone (c.3,000–3,500m), in vegetation dominated by montane shrubs and *Alnus* trees<sup>6</sup>. The only location where the species was regularly recorded in 1979–2005 was El Molino, La Libertad, where (at least until 2005) it was ‘locally common’<sup>3</sup> (C. Bushell *in litt.* 2006). All three localities lie east of a broad ridge separating two very deep river valleys, the upper Chusgón and the Marañón (Fig. 1). The Chusgón flows north-east and enters the Marañón north-east of Cajabamba.

Purple-backed Sunbeam is globally threatened. Until recently, BirdLife International considered the species Vulnerable due to its limited range, but this was ‘uplisted precautionarily’ to Critically Endangered in mid 2006 because of new evidence that its known habitat, *Alnus acuminata* woodland, was being replaced by *Eucalyptus* plantations<sup>3</sup>. Whilst the species has been reported feeding at *Eucalyptus* flowers and even to roost there, its ability to tolerate replacement of natural vegetation with plantations of exotic *Eucalyptus* is unknown, especially in relation to breeding.

Furthermore, in 2005, it was reported that less than 1 ha of alder woodland remained at El Molino<sup>3</sup> (G. Engblom *in litt.* 2005 to BirdLife International), and that habitat loss was occurring throughout the region as *Eucalyptus* plantations were being established to provide timber for the mining industry.

Given increased concern as to the conservation status of Purple-backed Sunbeam, the American Bird Conservancy (ABC) and their Peruvian partner Asociación Ecosistemas Andinos (ECOAN) proposed urgent survey work be undertaken as part of their project on threatened and endemic birds in the Marañón: ‘Conservation corridor of the threatened and endemic birds in the Marañón and Alto Mayo rivers’. Thus, we specifically examined the distribution and status of Purple-backed Sunbeam, between 26 June and 1 July 2006. This paper outlines the findings of our brief survey.

### Historical distribution

Purple-backed Sunbeam was first collected around Succha (07°54’S 77°41’W: Collar *et al.*<sup>4</sup>) at 10,000–10,500 ft (3,048–3,200 m), by O. T. Baron between 20 February and 20 March 1895<sup>1</sup> (Fig. 1). Baron took at least 24 specimens, now distributed between seven museums. Subsequently, Carriker collected at least seven near Soquián on 20–21 June 1932, for which coordinates are given as 07°51’S 77°41’W<sup>4</sup>. There are two unpublished specimens, collected by Baron, in European collections (Paris, Warsaw) labelled as from ‘Huamachuco’ (T. Schulenberg *in litt.* 2006, BirdLife International files), which according to Baron<sup>1</sup> is c.8 leagues west of Chusgón, or the equivalent of 38.64 km. Stephens & Traylor<sup>7</sup> place Huamachuco at 3,170 m at the headwaters of the río Crisnejas, a tributary of the Marañón: the town is, however, just 18 km west of Chusgón, not the eight leagues reported by Baron<sup>1</sup>. Unfortunately, the specimen from Huamachuco in the Muséum National d’Histoire Naturelle (Paris) has no altitudinal data or date (BirdLife International files), and we have no information on the other ‘Huamachuco’ specimen, which is in

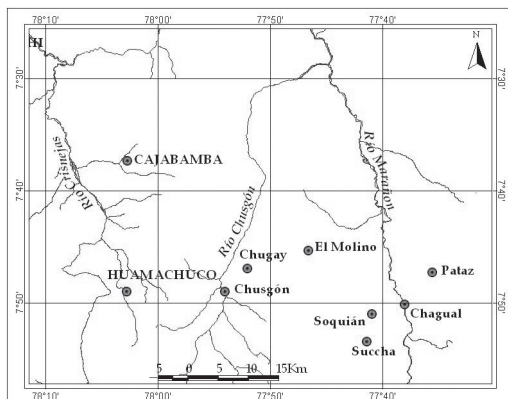


Figure 1. Map of the general range of Purple-backed Sunbeam *Aglaeactis aliciae*, between the ríos Marañón and upper Chusgón, dpto. La Libertad, Peru.

Warsaw (T. Schulenberg *in litt.* 2006). Furthermore, to confuse the issue of the provenance of the specimens, Baron<sup>1</sup> also indicated that three of his collecting sites, namely Chusgón, Viña and Succha, are part of Huamachuco, a subdistrict. Given that Baron<sup>1</sup> did not describe Huamachuco as a separate collecting site, it seems most likely that these two specimens were collected somewhere close to Succha.

Apart from these old records, the only confirmed records were from the vicinity of the small town of El Molino (07°45'S 77°46'W; c.3,250 m), north-west of Succha, where the species was discovered in 1979. Succha, Soquián and El Molino are all in dpto. La Libertad.

There is also a sight record (A. Goodwin *in litt.* to Fjeldsà & Kessler<sup>5</sup>) from the *Polylepis* zone of quebrada Llanganuco, Cordillera Blanca, c.140 km south of the La Libertad sites, in dpto. Ancash. T. Schulenberg (*in litt.* 2006) notes that it is possible, though he considers it unlikely, that Purple-backed Sunbeam extends south to the east side of the Cordillera Blanca, and that the Llanganuco bird had somehow wandered over the crest. Many birders visit this area annually, yet there have been no additional records and it is thus possible that the sighting was a misidentification. In 2000, searches of alder patches between Buldibuyo (08°07'S 77°23'W), Tayabamba (08°16'S 77°17'W) and Huacrachuco (08°29'S 77°13'W) produced no sightings (G. Engblom *in litt.* to BirdLife International).

### Results of the 2006 survey

During our brief survey in 2006, we initially visited El Molino and the environs of Soquián since these are known sites. The sunbeam was easily found in remnant patches of *Alnus* downslope from El Molino, where we identified several food plants. Of these, a red-flowered mistletoe that seems to grow exclusively on *Alnus* (*Tristerix* aff. *longebracteatus* [Desr.] Barlow & Wiens [Loranthaceae]: Fig. 2) was clearly a very important food source, with the majority of the mistletoes in flower at the time of our visit.

Subsequently, when we visited some scraps of remnant natural vegetation on the steep slopes above the village of Cachimarca, itself above Soquián (south-east of El Molino), we found Purple-backed Sunbeam to be common. Here, the species was feeding in a tall shrub / small tree with large yellowish flowers, locally known as *uñico* (*Oreocallis grandiflora* [Lam.] R. Br. [Proteaceae]: Fig. 3). A large percentage of the *uñico* plants at this site and at others we visited were flowering during our survey.

Using our knowledge of these two foodplants, we thereafter explored various similar valleys north of El Molino and south of Soquián, including

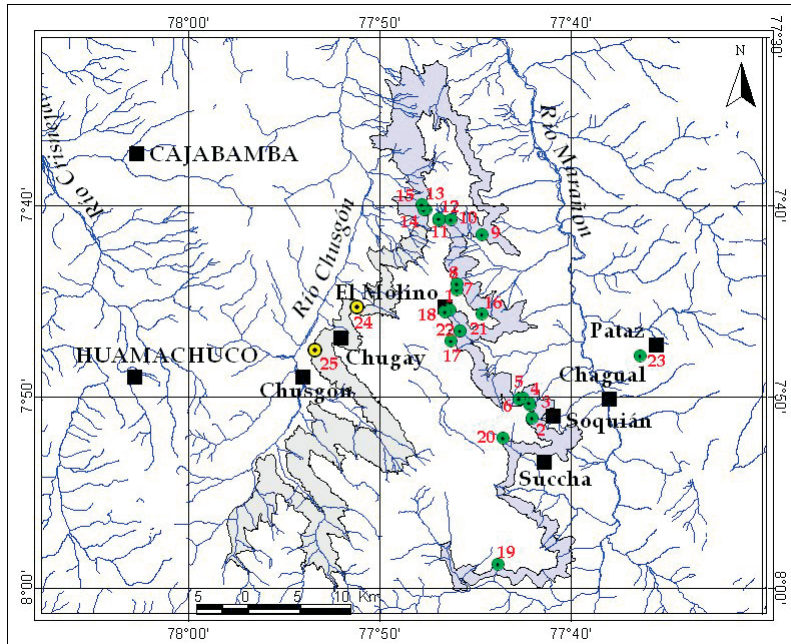
areas around Succha, the other historical locality. The village of Succha is at 2,600 m, which we considered too low for Purple-backed Sunbeam and it is at least 450 m below where Baron<sup>1</sup> collected his specimens. Hence, we approached Succha from above and searched for sunbeams c.5 km north-west of the village. We identified patches of natural vegetation with *Alnus* or *uñico* from considerable distances, and accessed these patches whenever possible. In some places, we were unable to find the mistletoe or *uñico*, and in such circumstances concentrated our search on areas with some natural habitat that might attract hummingbirds, including flowering shrubs or herbs. We found Purple-backed Sunbeam to be relatively common, and located it at 17 places in these valleys (Fig. 4, Table 1), but did not see any Shining Sunbeams *Aglaeactis cupripennis* at these localities.

We also searched two sites in the very deep upper Chusgón Valley, which is separated from the other valleys we visited by a broad high-altitude ridge, both on the east side of the Chusgón and therefore adjacent to sites where Purple-backed Sunbeam was found on the other side of the ridge. The first site was beside the road between Sartinbamba and Santa Rosa, where we found Purple-backed Sunbeam between c.3,342 m and c.3,409 m, at 07°40'S 77°47'W and 07°39'S 77°47'W, and between these two points. There was also some suitable habitat further north that we did not visit. Higher in the Chusgón Valley, to the south, we

**Table 1.** Geographical coordinates and altitude for the localities shown in Fig. 4.

Map No.	Locality coordinates (UTM)	Locality coordinates (Deg)	Altitude (m)
1	18M 0194309 9141510	07°45'27.1S 77°46'16.8W	3,268
2	18M 0202288 9131150	07°51'05.7S 77°41'58.7W	3,092
3	18M 0202054 9132402	07°50'25.0S 77°42'06.1W	3,242
4	18M 0201922 9132620	07°50'17.8S 77°42'10.3W	3,264
5	18M 0201413 9133070	07°50'03.1S 77°42'26.9W	3,098
6	18M 0201010 9132972	07°50'06.2S 77°42'40.0W	3,012
7	18M 0194903 9143436	07°44'24.6S 77°45'57.0W	3,335
8	18M 0914990 9144006	07°44'06.0S 77°45'54.0W	3,213
9	18M 0197307 9148796	07°41'30.7S 77°44'37.5W	2,908
10	18M 0194328 9150230	07°40'43.4S 77°46'14.3W	3,065
11	18M 0193196 9150122	07°40'46.7S 77°46'51.2W	3,253
12	18M 0193128 9150342	07°40'39.6S 77°46'53.4W	3,283
13	18M 0191956 9151194	07°40'11.6S 77°47'31.4W	3,409
14	18M 0191693 9151162	07°40'12.6S 77°47'40.0W	3,384
15	18M 0191506 9151634	07°39'57.2S 77°47'46.0W	3,342
16	18M 0197332 9141144	07°45'39.6S 77°44'38.3W	3,409
17	18M 0194435 9138510	07°47'04.7S 77°46'13.3W	3,395
18	18M 0193771 9141304	07°45'33.7S 77°46'34.4W	3,263
19	18M 0199059 9116998	07°58'45.4S 77°43'47.1W	3,310
20	18M 0199516 9129170	07°52'09.6S 77°43'29.6W	3,345
21	18M 0195295 9139476	07°46'33.4S 77°45'45.0W	2,992
22	18M 0195290 9139466	07°46'33.8S 77°45'45.2W	2,996
23	18M 0212580 9137193	07°47'51.3S 77°36'21.8W	2,970
24	18M 0185342 9141755	07°45'17.2S 77°51'09.1W	3,150
25	18M 0181278 9137584	07°47'31.9S 77°53'22.6W	3,050

4



2



3



5

Figure 2. The mistletoe (*Tristerix* aff. *longibracteatus* [Desr.] Barlow & Wiens [Loranthaceae]) used by Purple-backed Sunbeam *Aglaeactis aliciae* (Fernando Angulo Pratolongo)

Figure 3. Flower of *uñica* (*Oreocallis grandiflora* [Lam.] R. Br. [Proteaceae]) (Fernando Angulo Pratolongo)

Figure 4. Distribution of Purple-backed Sunbeam *Aglaeactis aliciae*: numbered green points relate to those localities where sunbeams were observed in 2006. Yellow points show two sites where Purple-backed Sunbeam was not found in 2006 despite the presence of suitable habitat at an appropriate altitude. The purple-shaded area represents the probable range of the species, assuming an altitudinal range of 2,900–3,500 m; parts of the area shaded in grey, within the same altitudinal limits, may also harbour the species. Geographical coordinates for points 1–25 are presented in Table 1.

Figure 5. Purple-backed Sunbeam *Aglaeactis aliciae* (Roger Ahlman)

explored areas at suitable altitude along one of the roads from El Molino to Huamachuco, passing through Chugay, Yanasara and Sausacocha. This part of the valley supported very little natural vegetation, but we found two areas with *uñico*, at c.3,050–3,150 m. Despite two hours intensive searching these areas and briefly at groups of flowering *Eucalyptus*, we did not find Purple-backed Sunbeam, but Shining Sunbeam occurred at high density.

Finally, we crossed the río Marañón itself, at Chagual (c.1,200 m), and attempted to reach an area with *Alnus* trees of the same species as at Soquián, c.12 km away. We accessed appropriate altitude for Purple-backed Sunbeam above the villages of San Fernando and Vista Florida, where there was a very large area of flowering *uñico* at c.2,930–3,240 m. Shining Sunbeam was common here. After four man-hours searching this habitat, FAP filmed a Purple-backed Sunbeam in the *uñico*, at c.2,970 m (07°46'S 77°45'W), confirming for the first time that the species occurs on both sides of the Marañón. We did not reach the area of *Alnus* that we had observed from across the Marañón, but subsequently discovered that it was more or less contiguous with the *uñico* we had searched, having been concealed by a ridge.

### Feeding ecology

Prior to our field work, Purple-backed Sunbeam had been reported feeding at mistletoes that parasitise *Alnus*<sup>1</sup> and other trees. In July near El Molino, Begazo *et al.*<sup>2</sup> observed Purple-backed Sunbeams feeding at and defending shrubs that resembled *Nicotiana* sp., and once a sunbeam chased a Violet-throated Starfrontlet *Coeligena violifer* from an arboreal bromeliad flower, though these authors<sup>2</sup> did not specify that it was actually feeding at the bromeliad. The species has also been noted feeding and roosting in *Eucalyptus* at the same locality<sup>3</sup>. During our surveys, *uñico* and mistletoes (in *Alnus*) were both flowering and the easiest foodplants at which to find Purple-backed Sunbeams.

We found the species at almost every patch of *uñico* we visited within the range described above. *Uñico* is locally distributed, usually grows in small patches of scattered individuals (only occasionally in larger, dense patches) and is more common than patches of *Alnus*. We observed *uñico* as low as 2,685 m, in a deep valley below Aricapampa, but never found it above c.3,420 m. We gained the impression that *uñico* could to some extent tolerate burning or at least regenerate afterwards, as we observed it in some areas that had been converted to pasture.

In contrast, *Alnus* did not survive or appear to regenerate in areas burnt for pasture. The largest patch of *A. acuminata* we saw was estimated at less than 10 ha, and most patches were considerably

smaller. Within these patches, mistletoes were sometimes common, but not all remnant patches of *Alnus* contained mistletoes. Mistletoes were clearly important to the sunbeams, because the species was observed defending flowering mistletoes in several places, chasing not only other sunbeams, but also Black-throated Flowerpiercers *Diglossa brunneiventris*.

We identified three other flowering plants utilised by the sunbeams, all of them smaller shrubs or tall herbs. Two species had relatively large yellowish-green flowers (*Siphocampylus weberbaueri* A. Zahlbruckner [Campanulaceae] and a *Nicotiana* sp. [Solanaceae]), whilst the third was a low, dense shrub found at higher elevations with small red flowers (*Clinopodium obovatum* [Ruiz & Pav.] Govaerts [Lamiaceae]). The sunbeams visited these intermittently where they occurred with flowering *uñico*, but at two localities they were used by sunbeams in an area where we found no *Alnus* (hence no mistletoe) or *uñico*. At one of these the birds fed at 3–4 m-tall plants of *Nicotiana*, and at the other on the low bushy shrubs of *Clinopodium*. Almost no *Eucalyptus* was flowering within the range of Purple-backed Sunbeam during our survey, but we did find the species feeding at a eucalypt that was in full blossom. There was no *Alnus* or *uñico* near this particular eucalypt, which was just above the town of El Molino.

Purple-backed Sunbeam was observed feeding at patches of flowering *uñico* at 11 sites, compared with only three sites where it used flowering mistletoes within *Alnus*. At one site, the birds used both mistletoes and *uñico*, whilst at three sites they fed on the flowers of *uñico* and at the flowering shrubs or herbs mentioned above. We only found sunbeams at three localities with neither flowering mistletoes nor *uñico* (including at the eucalypt mentioned above). Our observations suggest that, at least during the period of our survey, *uñico* is the most important nectar source for the species.

Though Purple-backed Sunbeam has not previously been reported feeding on insects, we observed the species flycatching from perches on several occasions, but the vast majority of our feeding observations were at nectar sources.

### Discussion

Many of the birds we observed appeared to lack the brighter purple tones on the back, perhaps suggesting that we saw a significant number of juveniles or immatures. Specimen data (accessed via the BirdLife International files) reveal that juveniles have been collected on 20 February and 19 March (Baron<sup>1</sup>), and 20 June (by M. A. Carriker). Hence, the breeding season may have already finished by the time of our survey, and the distribution of the birds we observed, as well as the habitat used, may not be indicative of its breeding range.

The range of Purple-backed Sunbeam is apparently very limited. Outside the core area we located (namely the one site on the east bank of the Marañón and in the southernmost part of the Chusgón Valley that we searched), Shining Sunbeam was common. That the latter was common and Purple-backed Sunbeam apparently rare or absent in these areas suggests that, for unknown reasons, Shining Sunbeam starts to replace Purple-backed Sunbeam there. Both areas are at appropriate altitudes for Purple-backed Sunbeam, and both held much flowering *uñico*. It is conceivable that the rarity of Purple-backed Sunbeam at these sites may be influenced by the availability of other food resources at different seasons. Purple-backed Sunbeam may simply visit such areas when *uñico* is flowering or perhaps our observations indicate post-breeding dispersal into areas where the species is not resident.

### Threat status

It had been suggested that the range of this sunbeam is tiny, perhaps just 1 km<sup>2</sup>, though El Molino and Succha, the most distant of the historical sites, are separated by 17.8 km. However, we found the species widespread and locally common within its reported historical range, and elsewhere. The distance between the northern- and southernmost points where we found it is 35.5 km. Based on this, and assuming a continuous distribution between the points where we found the sunbeam, as well as assuming an altitudinal distribution of c.2,900–3,500 m, we estimate the species' range to be c.178.12 km<sup>2</sup> (Fig. 4: purple-shaded area). Within this distribution, sunbeams could be confidently located at patches of flowering *uñico* wherever they were available, as well as in *Alnus* patches with flowering mistletoes. We conclude, therefore, that Purple-backed Sunbeam is not Critically Endangered and that its threat status demands re-evaluation. Within the Chusgón Valley, there is an additional area of 155.47 km<sup>2</sup> (Fig. 4: grey-shaded area) within which the species could potentially occur.

The primary threat to the species' habitat appears to be from human-induced fires to provide grazing pasture, as well as grazing itself. Grazing may prevent regeneration of native plants, whilst cattle may be introducing exotic species to the remaining forest patches. We also observed some clearance of alder trees, presumably for fuel or building materials, but this appeared to be much less of a threat than burning.

There is no doubt that *Alnus* is gradually disappearing from areas inhabited by Purple-backed Sunbeam, that remaining patches are increasingly isolated and that all are relatively small. However, our survey reveals that such habitat is not the only one used by the species. At the time of our survey,

*uñico* appeared more important and at two sites visited we found Purple-backed Sunbeams in areas with flowering shrubs and herbs, but no obvious *uñico* or *Alnus*. Nevertheless, the area, extent and quality of habitat are likely to be declining, and hence also the Area of Occupancy and the number of mature individuals.

As burning for grazing is generally small-scale and localised, the species' known range can be interpreted to comprise many (>10) locations as defined for the purposes of the IUCN Red List. Although there is probably dispersal between patches of habitat, these can be considered to be severely fragmented, especially if the species is dependent on alder woodland when nesting. Hence, Purple-backed Sunbeam appears to qualify as Endangered under criterion B1a+b(ii,iii,v). Further information on the breeding requirements and degree of movement between habitat patches may lead to a further reduction in the estimated extinction risk of this species.

As discussed above, where sunbeams breed or what food resources they utilise when mistletoes and *uñico* are either rare or unavailable, are both unknown: according to local people, both plants flower seasonally. Since nothing is known concerning the species' breeding requirements, it is impossible to ignore the possibility that *Alnus* may be important for nesting. Further data are also required on the flowering phenology of the plant species that we found to be important in its diet, and to establish which flowers are important at times of year when mistletoes and *uñico* are not flowering or rarely so. Habitat changes within the range of this hummingbird, particularly in relation to the loss of *uñico* or *Alnus*, also require further investigation. Without such knowledge, our assessment of its conservation status must remain preliminary.

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