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Letter

Golden-spectacled Warbler systematics

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Two papers on the systematics of the Golden-spectacled Warbler *Seicercus burkii* complex were published almost simultaneously in autumn 1999 (Alström & Olsson 1999, Martens *et al.* 1999). Both propose that what was previously considered to be one species, *S. burkii*, is in fact a complex of sibling species, and both describe a new species from central China! At a glance, the two papers might appear very similar. However, two different new species are described, in some cases different names are applied to the same populations, and in one case the same name is applied to different populations. Also some conclusions differ. This letter is intended to highlight and clarify the differences in opinion and conclusions.

The paper by Alström and Olsson is based on fieldwork at nine different localities throughout the range of the 'Golden-spectacled Warbler' during 14 different visits over 12 years, and a study of more than 700 specimens, including all traceable types. In contrast, the paper by Martens *et al.* is based on a study of specimens and tape recordings collected during one visit to each of two localities in central China in 1997 and 1998 and their own tape recordings and specimens from Nepal; in all, 196 specimens were examined. The study by Martens *et al.*, unlike the one by Alström and Olsson, also included an analysis of mitochondrial DNA sequences. Unlike Alström and Olsson, Martens *et al.* apparently did not examine any type specimens, which is an important reason for the lack of agreement in nomenclature between these two papers (and, surprisingly, they did not consider any of the four names listed as synonyms by Watson *et al.* 1986: *Cryptolopha auricapilla* Swainson, 1837; *Acanthiza arrogans* Sundevall, 1838; *Muscicapa bilineata* Lesson, 1839; and *Cryptolopha birmanica* Berezowski & Bianchi, 1891).

NOMENCLATURE AND TAXONOMY

Alström and Olsson recognized five species: *S. burkii*, *S. whistleri* (with subspecies *whistleri* and *nemoralis*), *S. valentini* (with subspecies *valentini* and *latouchei*), *S. tephrocephalus* and *S. soror* (sp. nov.). Martens *et al.* listed nine species: *S. burkii*, *S. whistleri*, *S.* (spec.?) *nemoralis*, *S. valentini*, *S. 'latouchei'*, *S.* (spec.?) *tephrocephalus*, *S. distinctus*, *S. omeiensis* (sp. nov.) and *Seicercus* spec. (the latter from Emei Shan in central China based on vocalizations alone), although pointing out that: 'In the cases of *tephrocephalus* and *nemoralis*, when more is known about them, these taxa may be reclassified as subspecies'. Below we compare the nomenclature and taxonomy in the two papers. A summary is presented in Table 1 and – for all the taxa where Martens *et al.* had molecular data – in Figure 1.

S. burkii (Burton, 1836)

This is the only taxon for which there appears to be complete agreement between the two papers.

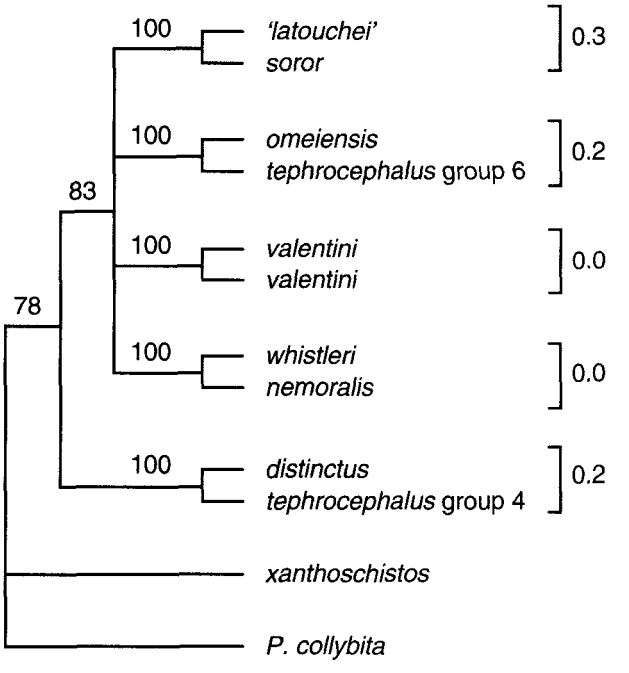

Figure 1. Tree comparing molecular data sets between taxa as named in Martens *et al.* (1999) and in Alström and Olsson (1999). Our DNA samples (unpubl. data) are in all but one case from the same localities as those of Martens *et al.*, i.e. Emei Shan (*soror*, *tephrocephalus* 'group 6', *valentini*) and Nepal (*nemoralis*); however, *tephrocephalus* 'group 4' is from northern Vietnam, as we lack material from this taxon from Taibai Shan. Our sequences were cut down (from 1038 base pairs) to the same length as in Figure 16 in Martens *et al.* (616 base pairs) and aligned with the sequences in Martens *et al.* using the software MegAlign 3.11 in the DNASTAR package (DNASTAR Inc. 1993–96), using the Clustal V algorithm. The two data sets were then analysed together using parsimony in the program PAUP*, version 4 (Swofford 1998). The numbers above the branches indicate bootstrap support (10 000 replicates/10 random additions) and those following the names are percentage genetic divergence.

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Table 1. Comparison of nomenclature used by Alström and Olsson and by Martens *et al.*

Alström and Olsson	Martens *et al.*
S. burkii	*S. burkii*
S. w. whistleri[a]	part of *S. whistleri*[a]
S. whistleri nemoralis[a]	part of *S. whistleri* + *S.* (spec.?) *nemoralis*[a]
S. w. whistleri + part of *S. whistleri nemoralis*[a]	*S. whistleri*[a]
S. v. valentini	*S. valentini*
S. valentini latouchei	–
S. soror (sp. nov.)	*S. 'latouchei'*
S. tephrocephalus 'group 4'	*S. distinctus*
S. tephrocephalus 'group 5'	*S. distinctus*
S. tephrocephalus 'group 6'	*S. omeiensis* (sp. nov.)
?[a]	*S.* (spec.?) *tephrocephalus*[a]
(*S. affinis intermedius*)[b]	*S.* spec.[b]

[a]See main text for details. [b]Not included by Alström and Olsson (see main text).

S. whistleri whistleri Ticehurst, 1925 *sensu* Alström and Olsson

Based on examination of specimens from throughout the Himalayas, Alström and Olsson recognized *whistleri* as subspecifically distinct, its distribution agreeing with Ticehurst's (1925) original description (northwestern India). See *S. whistleri*, below.

S. whistleri Ticehurst, 1925 *sensu* Martens *et al.*

Martens *et al.* treated all Himalayan birds as *S. whistleri*, without stating whether or not they had compared the northwestern populations (*whistleri sensu stricto*) with more easterly ones. Their circumscription of this taxon equals *S. whistleri whistleri* and *part* of *S. whistleri nemoralis sensu* Alström and Olsson. See *S. whistleri nemoralis* and *S.* (spec.?) *nemoralis*, below.

S. whistleri nemoralis Koelz, 1954 *sensu* Alström and Olsson

Alström and Olsson treated *nemoralis* as a subspecies of *S. whistleri*, and included both the central and east Himalayan and west Burmese populations of *S. whistleri* under this name. See *S.* (spec.?) *nemoralis*, below.

S. (spec.?) *nemoralis* Koelz, 1954 *sensu* Martens *et al.*

Martens *et al.* restricted *nemoralis* to the type area Lushai and Naga hills (Mizoram and Nagaland, respectively, northeastern India), as well as western Burma. Consequently, this refers only to part of the population of *S. whistleri nemoralis sensu* Alström and Olsson, and the main disagreement between the two papers in this respect regards the treatment of the populations of the central and eastern Himalayas. Morphologically, *nemoralis sensu* Martens *et al.* differs only marginally on average from *nemoralis sensu* Alström and Olsson from the eastern Himalayas (see below under Morphology). We have studied songs of only two individuals of *nemoralis sensu* Martens *et al.*, one obtained after publication of Alström and Olsson (tape-recorded by Krys Kazmierczak on Blue Mountain, Mizoram, northeastern India). These are indistinguishable from songs of *nemoralis sensu* Alström and Olsson from the Himalayas.

Accordingly, based on morphology and vocalizations, we find no support for the proposition by Martens *et al.* that *nemoralis* from western Burma and adjacent parts of India is specifically different from the Himalayan populations of *S. whistleri*, and we find it surprising that Martens *et al.* suggested this based exclusively on minor plumage differences.

S. valentini valentini (Hartert, 1907) *sensu* Alström and Olsson

Based on a study of specimens, Alström and Olsson recognized two subspecies of *S. valentini*: *valentini* and *latouchei* (see below).

S. valentini (Hartert, 1907) *sensu* Martens *et al.*

Martens *et al.* apparently only examined specimens (n = 11) from a tiny part of this species' range (see Distribution) and therefore noted no geographical variation. Their circumscription of this taxon equals *S. valentini valentini sensu* Alström and Olsson (see above), although with a smaller range (see Distribution).

S. valentini latouchei Bangs, 1929 *sensu* Alström and Olsson

Alström and Olsson recognized *latouchei* as a valid taxon and treated it as a subspecies of *S. valentini*. The population they referred to, from eastern China, is not the one referred to by this name by Martens *et al.* (see below).

S. 'latouchei' Bangs, 1929 *sensu* Martens *et al.*

Martens *et al.* misapplied this name to the species that Alström and Olsson described as *S. soror*. This is evident from a comparison of morphology, vocalizations, DNA sequences (Fig. 1) and altitudinal distribution.

S. soror Alström and Olsson, 1999

See above, under *S. 'latouchei'*.

S. tephrocephalus (Anderson, 1871) *sensu* Alström and Olsson

Alström and Olsson pointed out that *tephrocephalus* consisted of three morphologically slightly different populations, of which the two that had been studied in the field ('group 4', from southern China, northeastern Burma and northern Vietnam and 'group 6', from Sichuan, China) also had different songs. They concluded that 'group 6' as well as the population in western Burma and adjacent parts of India ('group 5') were unnamed.

Since the type of *tephrocephalus* appears to have been irretrievably lost, Alström and Olsson designated a neotype (referring to *tephrocephalus* 'group 4' *sensu* Alström & Olsson). They chose a specimen for which the label stated that it had a nest with eggs, ensuring that the specimen represented the local breeding population. Michael Walters (*in litt.*) later informed us that the eggs are in the Natural History Museum, Tring (No. 1961.1.825), while the nest is not to be found.

S. (spec.?) *tephrocephalus* (Anderson, 1871) *sensu* Martens *et al.*

It is not clear to what this refers, since the description is very brief and partly contradictory (only 13 specimens were examined). For example, in their key to the species they state that the two outer pairs of rectrices have 'prominent white marks', while the illustration (Plate II) almost completely lacks white on the penultimate tail-feathers. The type locality of *tephrocephalus* is Bhamo in *northeastern* Burma. Remarkably, Martens *et al.* did not include the type locality of *tephrocephalus* within the range they give for this taxon, which they restricted to Mount Victoria, Chin Hills, *western* Burma.

S. distinctus (La Touche, 1922) *sensu* Martens *et al.*

As is evident from morphology, vocalizations and DNA (Fig. 1), Martens *et al.* applied this name collectively to the two forms separated as *tephrocephalus* 'group 4' and 'group 5' *sensu* Alström and Olsson. As was pointed out by Alström and Olsson, it is, however, a junior synonym of *tephrocephalus* 'group 4'. See under *omeiensis* below for comments.

S. omeiensis Martens, Eck, Päckert and Sun, 1999

This is the same as *tephrocephalus* 'group 6' *sensu* Alström and Olsson, as is evident from a comparison of morphology, vocalizations, DNA sequences (Fig. 1) and altitudinal distribution. Since Martens *et al.* collected both this taxon and *tephrocephalus* 'group 4' *sensu* Alström and Olsson (*'distinctus' sensu* Martens *et al.*) on Taibai Shan in the breeding season, it seems clear that they should be treated as separate species, and this is supported by the molecular data (further corroborated by our sample from Vietnam; Fig. 1).

Seicercus spec.

The unidentified species that Martens *et al.* reported from Emei Shan, Sichuan, China, based on vocalizations alone was not treated by Alström and Olsson, since it refers to a population that morphologically and vocally matches *Seicercus affinis intermedius* (Figs 2 & 3, Table 2). This taxon was previously known only from northwestern

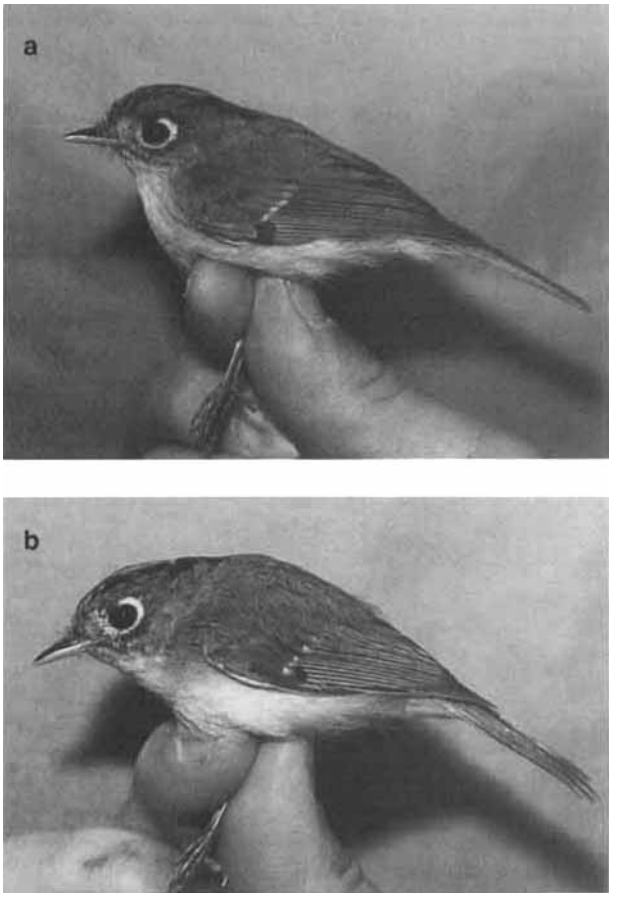

Figure 2. *Seicercus affinis intermedius* Emei Shan, Sichuan, China, early May 1992 (a) and Wuyi Shan, Fujian, China, early May 1993 (b). Note in particular the broken eye-ring above the eye that distinguishes this taxon from all the taxa in the *Seicercus burkii* complex. Photos by Urban Olsson.

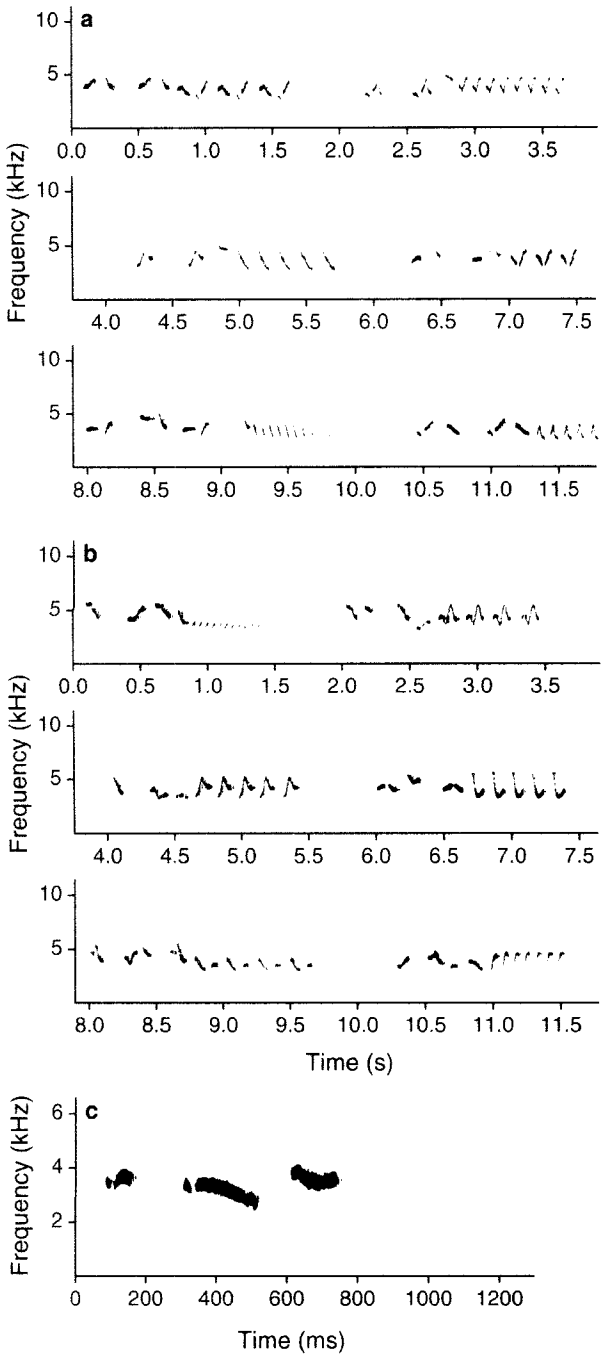

Figure 3. Sonagrams of *Seicercus affinis intermedius* from Emei Shan, Sichuan, China, early May 1992 (a: song, six strophes, same individual as in Fig. 2a; c: call) and Wuyi Shan, Fujian, China, early May 1993 (b: song, six strophes). The pauses between the strophes have been artificially shortened. Tape recordings by Per Alström.

Fujian and southeastern Yunnan provinces, China (Cheng 1987). It was first observed by us in 1987 on Emei Shan, where we have found it on all subsequent visits, mainly in the same general area where Martens *et al.* recorded it (see below).

MORPHOLOGY

The two studies come to different conclusions regarding the appearance of one of the most important morphological characters, the head pattern. Martens *et al.* state that the median crown-stripe is pure green in *S. burkii* and *S. whistleri*, and pure grey in *S. valentini*, *S. omeiensis*, *S. distinctus* and *S. 'latouchei'*. In *S.* (spec.?) *tephrocephalus* it is described as 'grey, mixed with a few green feathers'. With respect to *S.* (spec.?) *nemoralis* the key contradicts the description: 'grey, mixed with a few green feathers' according to the key, and 'greenish, mixed with grey' according to the description. In our experience, *contra* Martens *et al.*, the median crown-stripe almost invariably (except in juveniles, see below) shows some pale greyish admixed in both *S. burkii* and *S. whistleri* (especially in the central and eastern part of the range of the latter, *nemoralis sensu* Alström & Olsson, which sometimes may appear to have more grey than green). Also, again *contra* Martens *et al.*, the median crown-stripe nearly always shows some pale greenish in *valentini* and *soror* (*'latouchei' sensu* Martens *et al.*), and sometimes also in *omeiensis* and *tephrocephalus* (*'distinctus' sensu* Martens *et al.*); the forehead is often all greenish in *valentini* and *soror*, sometimes also in *omeiensis* and occasionally in *tephrocephalus* (*'distinctus' sensu* Martens *et al.*).

In addition to the crown, discussed above, Martens *et al.* suggested that *S.* (spec.?) *nemoralis* (mainly Burmese specimens examined?) differed strongly from *S. whistleri* (mainly Nepalese specimens studied?) in having a 'strong orange wash' to the underparts. We agree that *nemoralis* from the type area (including the holotype) and from western Burma are generally more warm brownish-tinged ('orange-tinged') on the breast and flanks than birds from the Himalayas. However, we have examined birds from as far west as Nepal that approach topotypical *nemoralis*, as well as topotypical *nemoralis* lacking warm brownish, and we consider the variation to be clinal rather than clear-cut.

We disagree with Martens *et al.* that *valentini* and *omeiensis* are indistinguishable by plumage. In our experience, the median crown-stripe (including forehead) is on average more pure grey, and the lateral crown-stripes are on average blacker throughout, and are more clear-cut and reach further towards the base of the bill in *omeiensis* than in *valentini*. Moreover, the upperparts average more yellowish-green and the underparts more saturated yellow in the former than in the latter.

In the key, Martens *et al.* give the wing length in males as 59–65 mm (number not given) in *valentini* as opposed to 55–59 mm (n = 4) in *omeiensis*, although stressing that single specimens of these two species cannot be reliably distinguished morphologically. The measurements in Alström and Olsson show considerably more overlap, rendering wing length of very limited use in identification (57.5–64.5 mm, mean 61.0, n = 42 in *valentini* and 53.5–61.5 mm, mean 58.3, n = 18 in *omeiensis*; in retrospect, four of the latter birds *may* have been

Table 2. Comparison of songs of *Seicercus* spec. *sensu* Martens *et al.* from Emei Shan, Sichuan, China with *S. affinis intermedius* from Emei Shan and Wuyi Shan, Fujian, China. The two latter are based on tape recordings by P.A.

	Seicercus spec. (Martens *et al.*) Emei $n = 3$	*S. a. intermedius* (mean 8.5 strophes/ind.) Emei $n = 2$	*S. a. intermedius* (mean 6.25 strophes/ind.) Wuyi $n = 4$[a]
Mean top frequency (kHz)	5.04	4.99	5.49
Mean bottom frequency (kHz)	3.04	2.84	3.15
Mean mid-frequency (kHz)	4.04	3.91	4.32
Mean frequency range (kHz)	2.00	2.15	2.34
Mean duration strophes (s)	1.38	1.48	1.35

[a]One of morph '*intermedius*' and three of morph '*cognitus*'.

tephrocephalus; if only the 14 individuals that we caught on Emei Shan are included, the values for *omeiensis* are 55.0–61.5 mm, mean 59.1).

Martens *et al.* state that '*distinctus*' (= *tephrocephalus* groups 4 and 5 *sensu* Alström & Olsson) is 'thinner-billed' than *valentini*. It is not evident whether they refer to the bill-width or bill-depth (or both), and they give no measurements to support this statement. In contrast, according to the measurements in Alström and Olsson, the form referred to as '*distinctus*' by Martens *et al.* (*tephrocephalus* 'group 4' *sensu* Alström & Olsson) ($n = 12$ males, 5 females) has on average relatively wider bill than *valentini* ($n = 38$ males, 10 females). Moreover, in the former the bill is also proportionately longer, and thus overall larger, than in the latter ($n = 16$ males, 6 females and 41 males, 10 females, respectively).

In our opinion, the differences in primary projection between *S. omeiensis* and *S. 'latouchei'* (*S. soror sensu* Alström & Olsson) indicated on Plate I in Martens *et al.* are exaggerated. We are sceptical about the use of measuring primary projection (presumably wing-tip index *sensu* Martens *et al.*, although they do not explain their terminology) on museum specimens since, in our experience, this may depend heavily on the way the specimens were prepared.

Martens *et al.* pointed out that juvenile '*distinctus*' (*tephrocephalus sensu* Alström & Olsson) has a greenish median crown-stripe without grey. We have found this to be the case also in juveniles of *S. v. valentini* and *S. w. nemoralis* (we have not studied juveniles of any other taxa).

VOCALIZATIONS

The two papers largely agree with respect to vocalizations (although it is not possible fully to comprehend Figure 8 in Martens *et al.* since they do not explain the terminology used). One difference concerns the call of *omeiensis* (= *tephrocephalus* 'group 6' *sensu* Alström & Olsson). The sonagrams of this species in Martens *et al.* (from Taibai Shan) clearly differ from those in Alström and Olsson (from Emei Shan). The latter are closely similar to the calls of '*distinctus*' (= *tephrocephalus* 'group 4' *sensu* Alström & Olsson) from Taibai Shan shown in Martens *et al.* (and, as stated by Alström & Olsson, also similar to unpublished sonagrams of this taxon from northern Vietnam). Since Alström and Olsson only have recordings of two individuals of *omeiensis*, and Martens *et al.* possibly only one, more research is needed on the call of this species.

DISTRIBUTION

Martens *et al.* gave the distribution of *S. valentini* as Shaanxi and Sichuan provinces in central China, whereas Alström and Olsson also included five other Chinese provinces as well as northern Vietnam in the range of this species.

On Taibai Shan, Martens *et al.* noted '*distinctus*' (= *tephrocephalus* 'group 4' *sensu* Alström & Olsson) at 1300 m, '*latouchei*' (= *soror sensu* Alström & Olsson) at 1450 and 1500 m and *omeiensis* (= *tephrocephalus* 'group 6' *sensu* Alström & Olsson) at 1450, 1950 and 2100 m and remarked that: 'The vertical segregation seems to be sharp'. However, Alström and Olsson found *soror* as low as 600 m there, so it seems that *tephrocephalus* ('*distinctus*') and *soror* are not altitudinally segregated.

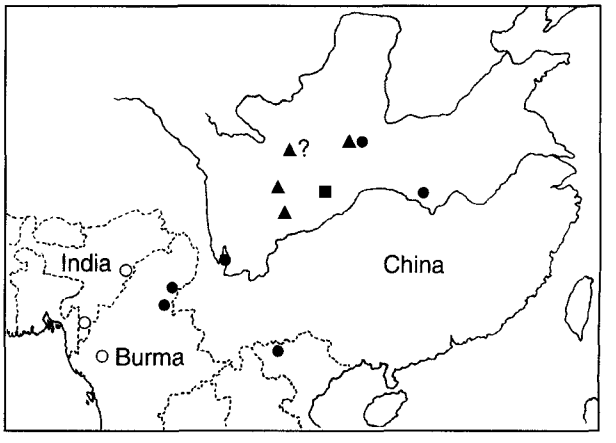

Figure 4. Map of breeding distributions of *S. tephrocephalus* 'group 4' *sensu* Alström & Olsson (●), 'group 5' *sensu* Alström & Olsson (○) and *S. omeiensis* (▲).

According to Martens *et al.*, *S.* spec. (= *S. affinis intermedius*) is 'strictly vicariant with' *S. 'latouchei'* (= *S. soror sensu* Alström & Olsson) and *S. omeiensis* on Emei Shan. This is incorrect. We have observed *intermedius* at *c.* 1000 m (once) and regularly between *c.* 1200 m and 1300/1400 m, at the lowest altitude together with *soror*, and higher up overlapping with both *soror* and *omeiensis*.

Martens *et al.* have examined specimens treated as *tephrocephalus* from Mount Victoria at 1400 m and 1830 m (four specimens) and *'distinctus'* from the same locality at 2000 and 2600 m (two specimens). From this they concluded that 'it is clear that the taxa on Mount Victoria are vertically separated'. Two of their *tephrocephalus* specimens were from early and late March, respectively, while the two others were from mid-April. Disregarding the sample size, there is no indication that they actually bred there; they could even have been wintering birds from, for example, China. Alström and Olsson reported *tephrocephalus* 'group 5' (= *'distinctus' sensu* Martens *et al.*) from Mount Victoria between 1400 and 2500 m, although the two birds below 2100 m were from mid- to late March and accordingly were not necessarily on their breeding grounds.

During a visit to Tomi (Bome district; *c.* 29.6°N, 95.4°E; altitude 1000–1500 m), southeastern Xizang, China in late April 1987, we recorded songs and calls of at least two individuals of *S. burkii* (British Library National Sound Archive Nos 61648, 61651, 61656, 61657, 61659, 61660, 61672, 61677). Although we have no proof that these birds were breeding there, this seems likely since they were territorial. These data were not included in Alström and Olsson (1999). This is a considerable range extension of *burkii*, and the first record from China.

CONCLUSION

In our opinion, with the present knowledge, six species should be recognized:

S. burkii (Burton, 1836)
S. whistleri Ticehurst, 1925
(with subspecies *whistleri* Ticehurst, 1925 and *nemoralis* Koelz, 1954)
S. tephrocephalus (Anderson, 1871)
S. omeiensis Martens, Eck, Päckert and Sun, 1999
S. valentini (Hartert, 1907)
(with subspecies *valentini* (Hartert, 1907) and *latouchei* (Bangs, 1929))
S. soror Alström and Olsson, 1999

Their known breeding ranges are shown in Figure 8 in Alström and Olsson (1999) (although see comment on *burkii* above) and, for *S. tephrocephalus* and *S. omeiensis*, in Figure 4 here. It should again be emphasized that some of these species are sympatric: *S. burkii* and *S. whistleri whistleri* (*sensu* Alström & Olsson) in the western Himalayas; *S. burkii* and *S. whistleri nemoralis* (*sensu* Alström & Olsson) in the central and eastern Himalayas; *S. whistleri nemoralis* (*sensu* Alström & Olsson) and *S. tephrocephalus* ('group 5' *sensu* Alström & Olsson) in western Burma and adjacent parts of India; *S. v. valentini* (*sensu* Alström & Olsson), *S. omeiensis*, *S. tephrocephalus* ('group 4' *sensu* Alström & Olsson) and *S. soror* in central China; *S. valentini latouchei* (*sensu* Alström & Olsson) and *S. soror* in eastern China; and *S. v. valentini* (*sensu* Alström & Olsson) and *S. tephrocephalus* ('group 4' *sensu* Alström & Olsson) in northern Vietnam.

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