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The taxonomic status of *Acrocephalus agricola tangorum*

PER ALSTRÖM, URBAN OLSSON and PHILIP D. ROUND

Morphological and vocal characteristics of the Paddyfield Warbler *Acrocephalus a. agricola*, Black-browed Reed Warbler *A. bistrigiceps* and Blunt-winged Warbler *A. concinens* are compared with those of the the north-east Chinese taxon *tangorum*, the taxonomic status of which has been unclear. The results from playback experiments strongly suggest that, in spite of its morphological distinctness, *tangorum* is best retained as a race of *A. agricola*.

The north-east Chinese taxon *Acrocephalus tangorum* has been considered variously to be a distinct species (La Touche 1912, 1914, 1920, 1926), a subspecies of Paddyfield Warbler *A. agricola* (Vaurie 1959, Cheng 1987) and a subspecies of Black-browed Reed Warbler *A. bistrigiceps* (Williamson 1968, Watson *et al.* 1986). The aim of this paper is to show that *tangorum* is certainly not conspecific with *bistrigiceps* and to reaffirm that, on present knowledge, it should be considered conspecific with *agricola*. Comparisons are also made with the somewhat similar Blunt-winged Warbler *A. concinens*, which itself has sometimes been lumped with *agricola* (Hartert and Steinbacher 1932–1938, Cheng 1987).

This paper is based on field studies in Heilongjiang (Manchuria) in June 1987 and 1988 (P.A., U.O.), in Thailand during 1981-1985 (P.D.R.) and on studies of museum skins at the British Museum (Natural History), Institute of Zoology, Academia Sinica, Beijing and the National Reference Collection, Thailand Institute of Scientific and Technological Research, Bangkok, by all of the authors.

Wing and tail measurements are given to the nearest 0.5 mm; the wing length was taken as maximum chord and primaries numbered descendantly. Bill length was measured to the skull, and width at the base of the nostrils, to the nearest 0.1 mm. All measurements were made by the authors. Throughout, we have adopted the pinyin system for Chinese place-names.

RANGE

According to Cheng (1987) *tangorum* is only known from three sites in China: Hulun Nor in Inner Mongolia, and Dailing and Harbin in Heilongjiang. In addition, it has also been recorded nesting at Lake Khanka, U.S.S.R. (Shibnev and Gluschenko 1977, Stepanjan 1978, Gluschenko 1989).

Of the three Chinese sites, neither Dailing nor Harbin appear to have very much suitable habitat remaining and we doubt that significant numbers of *tangorum* remain. In fact, records from Dailing may be erroneous as the only

specimen from this locality in the collection of the Institute of Zoology, Beijing (specimen number 34210, collected 20 July 1956) proved, on examination by P.A. in June 1989, to be *A. bistrigiceps*. We have also visited suitable habitat some 150 km east of Hulun Nor without finding any *tangorum*. However, it is locally common at Zhalong, Qiqihar, Heilongjiang (47°05'N 124°00'E).

On migration, it has been recorded at Chaoyang, Liaoning province and Qinhuangdao, Hebei province (Cheng 1987). The form was first described from the latter place (La Touche 1912).

The only records outside of north-east China are from Thailand, during the period October to May, where *tangorum* is presumed to winter (Round in prep.).

A. bistrigiceps breeds from south-eastern Transbaikalia and north-east Mongolia, eastwards along the Amur River valley to Amurland, Ussuriland, Sakhalin and Japan, and southwards through Korea and north-east China as far south as northern Jiangxi. The species occurs widely on passage through Japan and eastern China and winters from West Bengal and eastern Assam, through Burma and Thailand to the Indochinese countries (Vaurie 1959, Ali and Ripley 1983, Watson *et al.* 1986, Cheng 1987).

Acrocephalus agricola breeds from north-east Bulgaria (Nadler and Ihle 1988) and the Danube delta (Paspaleva and Talpeanu 1980), around the northern shores of the Black Sea, in eastern Turkey (D. Zetterström, pers. comm.), and eastward through western Siberia and Kazakhstan to the Qaidam Basin in Qinghai and Orok Nor in Mongolia (101°00'E) (Vaurie 1959, Watson *et al.* 1986, Cheng 1987). It winters chiefly in northern India from Assam westwards to Iran although there are a few records also from north-east Burma and northern Thailand (King 1966 and *in litt.*; Round in prep.).

Vaurie (1959) recognised two races of *A. agricola* besides *tangorum*: the nominate *agricola*, recorded in winter from northern India and for which the breeding grounds are unknown, and *brevipennis* (= *capistrata*: Watson and Gray 1969) for the Black Sea and Central Asian populations. Williamson (1968), however, regarded *brevipennis* as a synonym of *agricola*, the former merely having been applied to worn-plumaged, greyer or more sandy birds and the latter to more freshly moulted, rusty-coloured birds. Watson *et al.* (1986) concurred in merging these two forms under *A. a. agricola*, an arrangement which we have also chosen to adopt. While Watson *et al.* apparently follow Gavrilenko (1954) in splitting off the western populations from the Black Sea coast and western Kazakhstan as *A. a. septimus*, this does not impinge upon our discussion, which is confined to nominate *agricola*.

A. concinens is represented by three disjunct populations: *A. c. haringtoni* from Afghanistan, northern Pakistan and Kashmir; *A. c. stevensi* from Assam, which winters in Burma, and the nominate race which breeds in east-central China and winters in south-east China and Thailand (Watson *et al.* 1986). We confine our comments to the last, which is the only form with which we are familiar.

As indicated by Stepanjan (1987) and by Cheng (1987) the breeding range of *A. bistrigiceps* apparently encloses that of *tangorum*. This fact alone should be sufficient to indicate their specific distinctness. We were able to confirm the sympatry of these two forms at Zhalong in 1987–1988, where each breeds alongside the other in a major reedswamp. The range of *agricola*, however, is disjunct from that of *tangorum*: the two forms are separated by at least 1,000 km (Figure 1).

BREEDING HABITAT

At Zhalong, while *tangorum* was confined to reedbeds, *bistrigiceps* was found mainly in the fringes of the reedbeds and in the scrub and bushes around the reedbed margins. At other localities in Heilongjiang, *bistrigiceps* has been found breeding in rather dry, bushy and scrubby habitat far from reeds, so that its habitat preference resembles that of Sedge Warbler *A. schoenobaenus*. *Agricola* and *concinens*, like *tangorum*, inhabit reedbeds.

MORPHOLOGY

i) *A. a. tangorum* and *A. bistrigiceps*

These two taxa are superficially rather similar and are easily confused. In fresh plumage, however, *tangorum* clearly has much brighter rufous upperparts than *bistrigiceps* while the underparts are more deeply suffused

Figure 1. Map to show breeding and wintering ranges of taxa under discussion.

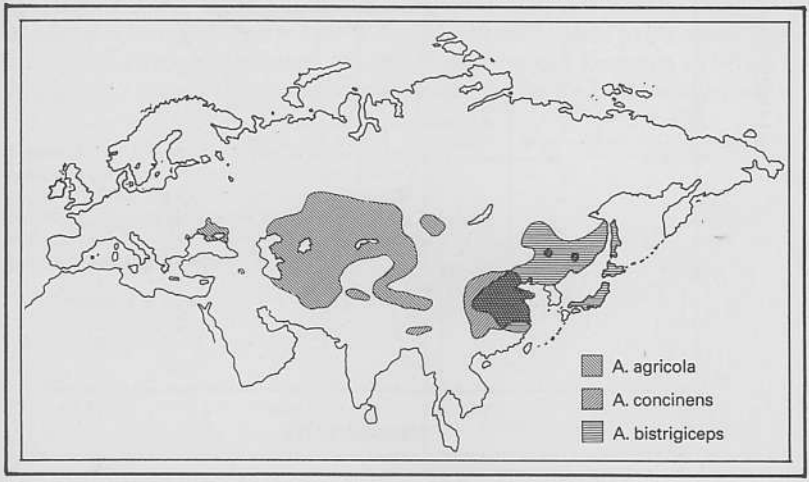
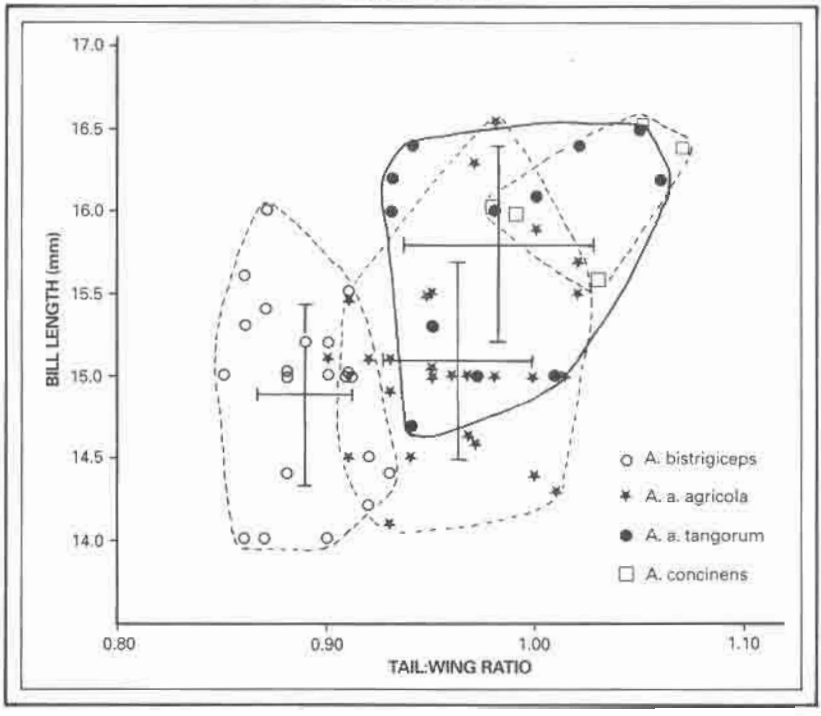


Table 1. Mean measurements and standard deviations (mm) of four Asian *Acrocephalus*.

	tangorum	*bistrigiceps*	*agricola*	*concinens*
Wing length	54.1 ± 1.8 (n=13)	54.7 ± 1.4 (n=22) NS	57.9 ± 2.1 (n=25)**	55.4 ± 1.5 (n=5) NS
Tail length	53.3 ± 2.7 (n=12)	48.6 ± 1.4 (n=22)**	55.7 ± 2.9 (n=25)*	56.7 ± 2.0 (n=5)*
Tail : wing ratio	0.98 ± 0.05 (n=12)	0.89 ± 0.02 (n=22)**	0.96 ± 0.04 (n=25) NS	1.02 ± 0.04 (n=5) NS
Bill length	15.8 ± 0.6 (n=13)	14.9 ± 0.6 (n=21)**	15.1 ± 0.6 (n=25)*	16.1 ± 0.4 (n=5) NS
Bill width	4.3 ± 0.2 (n=12)	3.7 ± 0.2 (n=19)**	3.7 ± 0.2 (n=24)**	4.1 ± 0.3 (n=5) NS

** Difference in medium value from *tangorum* highly significant (p less than 0.01);
* difference significant (p less than 0.05); NS = not significant. Mann-Whitney U – Wilcoxon Rank Sum W Test.

Figure 2. Graph of bill length against tail:wing ratio for taxa under discussion. The bars show the mean ± one standard deviation for the three taxa with large sample size.



with bright tawny rufous. In worn plumage, the upperparts take on a duller, more grey-brown appearance while the underparts become whiter, with a buff suffusion on the flanks and sides of breast so that the coloration more closely resembles *bistrigiceps*. The rufous tone of *tangorum* is retained longest on the rump, because this is usually covered by the wings when the bird is perched.

The supercilium of *tangorum*, though very prominent, is slightly shorter and less well marked behind the eye than in *bistrigiceps*. Both species share a black brow above the supercilium, though in *tangorum* this is slightly shorter behind the eye and narrower. In addition the central crown-feathers are slightly darker in *tangorum*, especially when worn, so that contrast with the dark brow is somewhat muted. In *bistrigiceps* the bolder, broader black brow contrasts very markedly with the paler centre to the crown. While the black brow is bolder and more obvious in worn-plumaged *tangorum* than in fresh-plumaged birds, it is always less distinct than in *bistrigiceps*. The dark loral stripe is also more prominent in *tangorum*, being rather broad and reaching to the base of the bill, whereas in *bistrigiceps* it is normally shorter and narrower and often restricted to a drawn-out spot in front of the eye.

The two forms show pronounced structural differences. Although there is no significant difference in wing length, *tangorum* has a markedly longer tail and hence larger tail:wing ratio than *bistrigiceps* (Table 1; Figure 2). In addition, the individual rectrices are slightly narrower than in the latter. *Tangorum* also shows a significantly longer and broader bill (Table 1; Figure 2). All the differences outlined above may, with care, be discerned in the field, given close views.

Both forms have a similar wing formula, the only consistent difference being in the length of the outermost (short) primary: this range from 1.5 mm shorter to 4.5 mm longer than the tips of the primary coverts in *tangorum* (average 2.5 mm longer; n = 13) compared with 3.0–6.5 mm longer in *bistrigiceps* (average 5.1; n = 12). Williamson (1968), while being aware of the structural differences between the two forms, treated *tangorum* as a race of *bistrigiceps*, stating that summer specimens were indistinguishable on

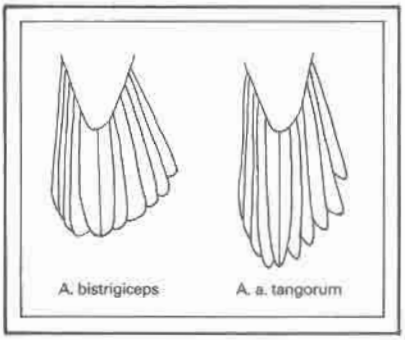


Figure 3. Sketch to show tail shape of *Acrocephalus bistrigiceps* (left) and *Acrocephalus agricola tangorum* (right). The tails are shown from above, the right half of the tail being fanned and the left half folded in both cases. Note the narrower, longer and more pointed rectrices of *tangorum*.

plumage. We can find no basis for this assertion, even though it derives from examination of the same British Museum skins which we studied. Apparently, however, Williamson examined 12 specimens which he believed to be *tangorum* (Williamson 1968: 68), whereas the museum only possesses 11 *tangorum*. Conceivably, his twelfth specimen may have been a *bistrigiceps* erroneously identified as *tangorum*. P. Colston (*in litt.*) has reported that a twelfth skin (BM No. 1898.9.1.1075), collected by H. Seebohm from Yubuto, Yezo, Japan (which had been correctly identified as *bistrigiceps* on the original label), had subsequently and erroneously been catalogued as *tangorum*. However, it is scarcely conceivable that Williamson overlooked this as he apparently refers to precisely the same specimen, a moulting female, in his account of *bistrigiceps* (Williamson 1968: 32).

ii) *A. a. tangorum* and *A. a. agricola*

The presence of a slight black brow in nominate *agricola* has been commented on (e.g. by Flumm and Lord 1978). This is a variable feature and is not always visible. It is usually clearly less distinct than in *tangorum*.

Freshly moulted birds are bright rufous brown on the upperparts and deep rufous-buff below. In both forms, this rufous phase is apparently short-lived. Worn-plumaged *agricola*, in mid to late winter, and in midsummer, usually fade to a rather pale, olive grey-brown on the upperparts and are mostly whitish below. Four specimens of *tangorum* in the British Museum collected by La Touche on migration at Qinhuangdao during 30 May to 2 June, together with those we observed at Zhalong in June, had worn to dark grey-brown on the upperparts. Although the sample of *tangorum* examined so far may be too small safely to encompass the possible range of variation in this form, the indications are that *tangorum* does not approach the bleached, sandy grey and white appearance of many worn *agricola*.

Tangorum has slightly, but significantly, shorter wings and tail than *agricola* (Table 1), but the overall proportions of the two forms, as expressed by tail:wing ratio, appear to be the same. On wing formula, the two forms also appear to be identical. *Tangorum* differs, however, in its slightly longer and stronger bill (Table 1; Figure 2).

iii) *A. a. tangorum* and *A. concinens*

A. concinens is also somewhat similar to *tangorum*, and shares a relatively long, strong bill (Table 1). However, *concinens* is not so strongly rufous on the upperparts nor so deeply rufous-buff on the underparts as any fresh-plumaged *tangorum*. The supercilium is much less distinct behind the eye, while in addition *concinens* never possesses any suggestion of a dark brow marking.

Concinens differs from *tangorum* and other races of *A. agricola* in its wing formula: the 10th (outermost) primary tends to be longer (1-8 mm longer than the primary coverts) while the 9th primary falls between the 3rd and 2nd

Plate 1. *Acrocephalus agricola agricola*, Qaidam, Qinghai province, late May 1987. (U. Olsson)

Plate 2. *A. a. tangorum*, Zhalong, Heilongjiang province, mid June 1987. (U. Olsson)

Plate 3. *A. bistrigiceps*, Zhalong, Heilongjiang province, mid June 1987. (U. Olsson)

Plate 4. *A. concinens*, Beijing, Hebei province, early June 1990. (U. Olsson)

(between the 3rd and 5th in *tangorum* and *agricola*); and the notch on the inner web of the 8th usually falls clearly below the tips of the secondaries (usually equal to the tips of the secondaries in *tangorum*). The tail is more strongly graduated than in *tangorum* and, in the field, *concinens* looks markedly longer-tailed and shorter-winged.

VOCAL DIFFERENCES

P.A. taped the songs of *tangorum* and *bistrigiceps* at Zhalong in June 1987; *agricola* at Tselinograd, Kazakhstan, U.S.S.R. (51°10'N 71°30'E) in June 1986, and at Lianghu, Qaidam, Qinghai province of China (35°18'N 98°54'E) in May 1987. In addition, the song of *A. concinens* was taped at Beijing (39°95'N 116°25'E) in June 1987.

i) *A. a. tangorum* and *A. bistrigiceps*

The song of *tangorum* is clearly richer, more musical and more varied, and also slightly slower and less forced than the song of *bistrigiceps*, which is rather reminiscent of the song of *A. schoenobaenus* in having short repeated phrases and more dry rasping and churring notes. *A. bistrigiceps* frequently performs short song-flights, like *A. schoenobaenus*. We have never seen *tangorum* do this.

ii) *A. a. tangorum* and *A. a. agricola*

Both forms sing more or less continuously with rich warbling phrases and higher-pitched, squeakier notes. Any differences in song between them are slight and not easily described.

iii) *A. a. tangorum* and *A. concinens*

The song of *concinens* is distinctly different from that of *tangorum*. It is slower and the voice is more deep-throated, with the song being broken into short repeated phrases. There are some fairly deep churring notes so that, in quality and rhythm, it can sometimes sound almost reminiscent of a miniature Great Reed Warbler *A. arundinaceus*.

It is hoped to publish songs of all these taxa in the future (Alström in prep.).

PLAYBACK EXPERIMENTS

To test the reactions of *tangorum* to the song of *bistrigiceps* and *agricola*, P.A. and U.O. carried out playback experiments at Zhalong, during June 1988.

A speaker was placed in the territory of a singing male *tangorum*. The tape-recorder was operated and the speaker and the bird watched from a distance

of 25 m. Playback was not started until the bird could be seen clearly. The following was noted: (1) first approach, i.e. the moment the bird first made a move towards the speaker, and (2) the time spent within approximately 5 m of the speaker as well as the behaviour of the bird during the observation period. Songs of, in sequence, *agricola*, *tangorum* (obtained at the same site during the previous year) and *bistrigiceps* were played to two different males. To the first bird, songs of two different *agricola* were played, one from Qaidam and one from Kazakhstan; to the second bird, the recording from Kazakhstan was not played. Each recording was three minutes long and, in both cases, the whole sequence was played a second time, 15 minutes after the first sequence was completed. In both cases, a nearby male *bistrigiceps* was being watched more or less simultaneously.

Both *tangorum* reacted almost instantly towards the songs of *agricola* and *tangorum* by flying towards the source of the sound. Once this was located, each bird was seen vigorously searching for the intruder for the duration of the playback. There was no apparant difference in the intensity of the reaction to either of the songs of *agricola*, or to that of *tangorum*. For the individual first tested with *agricola* song from Qaidam and subsequently from Kazakhstan, the time spent near the speaker was longer in the second case (Table 2), probably because by then it had already learned the precise location of the song source.

Neither of the two *tangorum* responded to the song of *A. bistrigiceps*. The two nearby *bistrigiceps* showed no interest in the song of either *agricola* or *tangorum*, but immediately responded to the *bistrigiceps* song in the same manner as the *tangorum* had previously reacted to both *agricola* and *tangorum* songs.

DISCUSSION

The evidence for not treating *tangorum* as conspecific with *bistrigiceps*, in the form of their sympatry, their morphological, vocal and behavioural

Table 2. Reactions of *Acrocephalus agricola tangorum* to playback of species song and to songs of congeners.

Playback (3 minutes)	First approach time/time spent within approx. 5 m of speaker (seconds)	
	1	2
A. a. agricola (Qaidam)	2/96	4/170
A. a. agricola (Kazakhstan)	7/150	-
A. a. tangorum	6/155	6/169
A. a. bistrigiceps	0/0	0/0

differences, is now overwhelming. *A. concinens* also clearly differs, both morphologically and vocally, from *tangorum*. Although it is more difficult to judge the relationship of *tangorum* and *agricola* because of their allopatry, the vocal evidence suggests that the two forms are conspecific.

As demonstrated by Catchpole (1977, 1978), sympatric *Acrocephalus* species may occasionally show some aggressive response to the songs of each other. Interspecific territoriality would be selectively advantageous where two species might potentially compete for the same resources. Allopatric species, which would not usually meet or hear each other's songs under natural conditions, do not usually respond to each other's songs (Catchpole 1978). Although perhaps it would have been desirable to expose *tangorum* to the song of another allopatric, unrelated *Acrocephalus* as a control, the very intensity of its response to playback of the song of the allopatric *agricola*, combined with the perceived similarity of the songs of the two forms, indicate their very close affinity. While *tangorum* has diverged morphologically so that it shows fairly consistent differences in plumage and structure, because the song is apparently not very differentiated it should continue to be regarded as a subspecies of *A. agricola*.

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Per Alström, Ostindiegatan 10, S-414 52 Göteborg, Sweden.
Urban Olsson, Gamlestadstorget 22, S-415 03 Göteborg, Sweden.
Philip D. Round, Center for Conservation Biology, Faculty of Science, Mahidol University, Rama 6 Road, Bangkok 10400, Thailand.