

Plate I. Dorsal and lateral views of *Phylloscopus sichuanensis*, female, Wolong, Sichuan Province, China, 24 June 1990 (photographed by Urban Olsson).

A new species of *Phylloscopus* warbler from central China

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A new species of leaf warbler (Sylviidae: *Phylloscopus*) is described from the mountains of central China. Morphologically it is slightly, yet significantly, different from the partly sympatric *P. (proregulus) chloronotus*. However, both song and calls are very different, and playback tests elicited no response from either species to the other's song. There are also differences in habitat preference and breeding biology of the two species.

During three periods between mid April 1986 and early June 1989, a total of at least 17 individuals of a hitherto unknown species of *Phylloscopus* warbler were observed in China, all except one in Sichuan Province. Unfortunately no individual could be trapped (Alström *et al.* 1990).

Between 8 June and 26 June 1990, P.A. and U.O. found 20 singing males of the same species in Wolong Nature Reserve (30°50'N, 102°55'E). Two of these were paired with females, and their nests were found. Three individuals (one male and two females) were caught. They were examined, measured and photographed, and blood samples were taken before they were released. Collection of specimens is not permitted in Wolong Nature Reserve.

One specimen in the Zoological Institute, Academia Sinica, Beijing (originally labelled *P. proregulus chloronotus*), examined by all of the authors, is considered to belong to this new species, for which we propose the name:

Phylloscopus sichuanensis, sp. nov.,

Chinese Leaf Warbler,

sichuanensis referring to Sichuan Province, where the species was first seen by us.

HOLOTYPE

Zoological Institute, Academia Sinica, Beijing China no. 43548, collected at Xin Shui in Shanxi Province on 18 May 1962 at an elevation of 208 m a.s.l.

DESCRIPTION OF HOLOTYPE

Lateral crown-stripes rather dark olive brown-grey, slightly darker at rear. Median crown-stripe pale olive-grey; more distinct posteriorly than anteriorly. Prominent supercilium from nostril to in-line with rear end of ear-coverts; in front of and above eye pale buff with very faint dusky hue, behind eye whitish with barely perceptible trace of yellow. Distinct dark eye-stripe, approximately same colour as rear lateral crown-

stripes. Rest of ear-coverts pale buffish olive-grey, contrasting slightly with pale buffish-white crescent below eye (broken eye-ring). Nape greyish-olive, sides of neck paler and more grey-tinged.

Mantle, scapulars, back and upper tail-coverts greyish-olive. Rump yellowish-white, forming a distinct pale patch. Lesser coverts slightly more green-tinged than mantle. Median coverts sepia, the four outermost with pale olive-grey spots on tips, forming a short, narrow wing-bar. Greater coverts sepia, with greyish-olive edges, the 4th-9th (numbered descendantly) showing approximately 3.5 mm-broad whitish (with pale yellowish tinge) tips to outer webs, forming a distinct wing-bar. Alula and primary coverts sepia with greyish-olive edges, particularly on median alula feather. Primaries sepia, the inner c. 6 with distinct, narrow, greyish-olive outer edges (slightly more green-tinged than mantle), the next two with paler and less olive-tinged outer edges, and the outermost two with brownish outer edges, only marginally paler than the centres. Secondaries sepia with greyish-olive outer edges, slightly greener than mantle. Tertiaries sepia with greyish-olive outer edges, the shortest with a distinct whitish spot on the tip of the outer web, reaching approximately halfway up the web; central feather with a small whitish spot on the outer web; longest feather with narrow greyish-olive edge but apparently without white marking (tertiaries worn, so pattern difficult to judge). Remiges with whitish edges to inner webs, broadest basally and reaching tips on remiges lacking notch and reaching to notch on the others (see wing-formula, below). Underwing-coverts yellowish-white, 'axillaries' slightly more yellow. Rectrices sepia with greyish-olive outer edges, widest basally; both webs and tips edged greyish-olive on central pair. Indistinct, narrow (c. 0.5 mm) greyish-white edges to inner webs of outer four pairs of rectrices.

Underside whitish with trace of pale yellow, especially on throat, breast, flanks and undertail-coverts. Flanks and sides of breast with a very faint olive-grey tinge, and a small, indistinct olive-grey patch on the sides of the breast and a barely perceptible pale olive-grey, narrow band at the junction of throat and breast.

Bill dark with pale inner c. half of lower mandible. Tarsus, toes and claws dark brownish-grey, soles paler (for bare parts colours in live birds, see below).

Measurements (in mm): wing (maximum length; Svensson 1984) 53.5; tail 40.0; bill-length (to skull) 12.4; tarsus 17.7; full length (according to label) 102; weight (according to label) 3.5 g.

Wing formula (P=primary; numbered descendantly): Wing point=P6; P7-0.5; P8-2.0; P9-9.5; P10 8 > primary coverts. Emarginations on outer webs of P9-5; notches on inner webs of P9-6.

PARATYPES

Blood (in EDTA buffer) from three further individuals is deposited with the avian collections of the Zoological Museum, University of Copenhagen (ZMUC), together with colour photographs of each individual (copies of the photos were also deposited with the Zoological Institute, Academia Sinica, Beijing, China and the British Museum [Natural History], Tring, UK): Male (sexed by song), trapped by P.A. and Lars Ceder on 13 June 1990 in Wolong Nature Reserve, Sichuan Province, China. Altitude c. 2500 m. ZMUC catalogue number PA 11-13.06.90. Female (sexed by incubation patch), trapped by P.A. and U.O. on 24 June 1990 in Wolong Nature Reserve, Sichuan Province, China. Altitude c. 2500 m. ZMUC catalogue number PA 11-24.06.90. See Plate 1.

Female (sexed by incubation patch), trapped by P.A. and U.O. on 25 June 1990 in Wolong Nature Reserve, Sichuan Province, China. Altitude c. 2500 m. ZMUC catalogue number PA 12-25.06.90. See Figure 1.



Figure 1. *Phylloscopus sichuanensis*, female. Wolong, Sichuan Province, China, 25 June 1990 (photograph by Urban Olsson).

PARATYPIC VARIATION

Very slight plumage variation. PA 11-24.06.90 has slightly paler and more well defined median crown-stripe than the others. Bare parts noted on live individuals: ZMUC no PA 11-13.06.90: Bill dark sepia with brownish-yellow basal c. half of lower mandible. Gape yellow. Iris dark brown. Orbital ring dark grey. Tarsi, toes and claws dark brown-grey. Soles dusky buff. ZMUC no. PA 11-24.06.90: Like previous individual, but tarsus grey-brown, and gape pale pinkish-grey. ZMUC no. PA 12-25.06.90: Gape pale yellow and tarsus paler than on previous individuals, with a pale fleshy tinge.

Measurements (mm)

Male. ZMUC no. PA 11-13.06.90. wing 57.0; tail 41.0; bill-length 11.3; bill-depth 3.6; tarsus 16.2; hind claw 5.3; primary projection 13.0.

Female. ZMUC no. PA 11-24.06.90. wing 52.5; tail 37.0; bill-length 11.0; bill-depth 3.4; tarsus 15.6; hind-claw 5.0; primary projection 8.0.

Female. ZMUC no. PA 12-25.06.90. wing 50.5; tail not measured because of several missing feathers; bill-length 11.4; bill-depth 3.2; tarsus 15.7; hind claw 4.5; primary projection 9.0.

MORPHOLOGICAL CHARACTERISTICS

We have examined all relevant forms of *Phylloscopus* mentioned by Ticehurst (1938), Williamson (1967), Watson *et al.* (1986), Sibley & Monroe (1990) and Howard & Moore (1991), both in the field and in museum collections (see Appendix).

P. sichuanensis is very similar to the partly sympatric *P. (proregulus) chloronotus* (hereafter referred to as *P. chloronotus*; cf. Alström & Olsson 1990) and shares the main features of *P. chloronotus*: small size; distinct head pattern, with dark lateral crown-stripes and pale median crown-stripe; distinct pale yellowish rump; contrastingly dark-centred greater coverts with broad pale tips, forming a prominent wing-bar (a second, narrow wing-bar is formed by pale tips to the median coverts); and pale spots on the tips of the outer webs of the shortest and central tertials. However, *P. sichuanensis* differs from *P. chloronotus* in the following respects:

1 In the field, *P. sichuanensis* generally appears to be marginally larger and more elongated than *P. chloronotus*, with proportionately slightly longer bill and, perhaps as a result of this, a slightly less rounded head. However, the five specimens of *P. sichuanensis* that have been measured make up too small a sample to confirm the perceived differences in size statistically.

2 The head patterns differ significantly. In *P. sichuanensis* the sides of the crown are slightly paler than in *P. chloronotus*, and the median crown-stripe is usually more indistinct

anteriorly than in *P. chloronotus*. In some *P. sichuanensis* the median crown-stripe is very faint except on the rear crown, where a contrasting pale spot is formed and, seen head-on, the crown often looks unmarked. Also the dark eye-stripe is slightly paler in *P. sichuanensis* than in *P. chloronotus*. The dark eye-stripe of *P. sichuanensis* is more or less straight-ended, whereas *P. chloronotus* generally shows a rather distinct 'hook' at the rear end. *P. sichuanensis* lacks the contrasting pale spot on the rear ear-coverts frequently shown by *P. chloronotus*. Moreover, the sides of the neck are often noticeably paler in *P. sichuanensis*, the colour sometimes even seeming to merge with the rear of the supercilium.

3 None of the *P. sichuanensis* examined showed a distinct dark shade at the bases of the secondaries, unlike most *P. chloronotus*. Moreover, the centres to the greater coverts tend to be paler with less distinct green edges in *P. sichuanensis* than in *P. chloronotus*.

We have previously stated that the lower mandible shows more pale in *P. sichuanensis* than in *P. chloronotus* (Alström *et al.* 1990). However, this is not true, since *P. chloronotus* often shows a largely pale lower mandible.

The wing formula does not appear to differ significantly between *P. sichuanensis* and *P. chloronotus*.

P. sichuanensis might be confused with the sympatric *P.*

inornatus mandellii if the yellow rump and the more distinct pale median crown-stripe cannot be seen.

P. sichuanensis also resembles *P. subviridis* from Afghanistan and the westernmost Himalayas, and the partly sympatric *P. pulcher*. However, *P. subviridis* lacks a yellow rump and in *P. pulcher* the three outer pairs of rectrices are largely white and the wing-bars are more buff-coloured.

VOCALIZATIONS

The song is a monotonous, dry *tsiridi-tsiridi-tsiridi-tsiridi-tsiridi*, often lasting a minute or more (Fig. 2). It is remarkably similar to the song of *Prinia criniger*, and is very different from the song of those *Phylloscopus* species which resemble *sichuanensis* morphologically (see Appendix). In fact, it is apparently distinctly different from the song of all other *Phylloscopus* species in Eurasia. The song of the morphologically very similar, partly sympatric, *P. chloronotus* is described in detail by Martens (1980) and Alström & Olsson (1990). The song of *P. sichuanensis* is usually delivered from the top of a tall tree, often a spruce *Picea* or fir *Abies*.

The call is a varied, irregular series of loud, clear, scolding whistles, e.g. *tueet-tueet-tueet tueet-tueet tueet-tueet-tueet-*

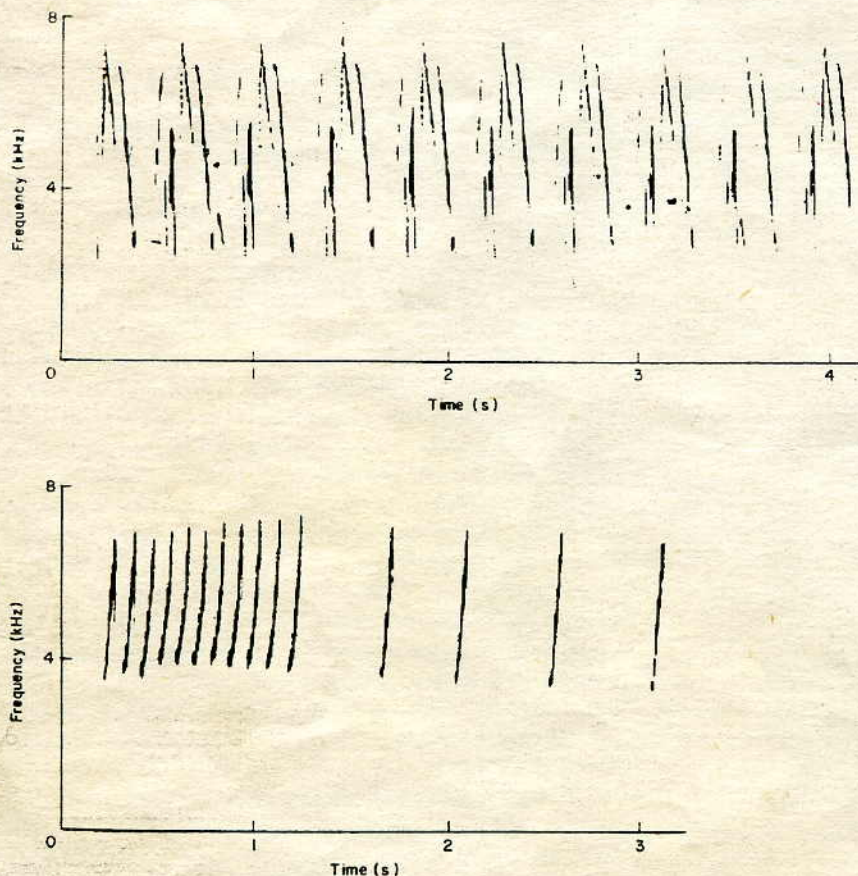


Figure 2. Part of continuous song (above) and call (below) of *Phylloscopus sichuanensis*, Jiuzhaiguo, Sichuan Province, China, June 1989. Tape recorded by Per Alström. Sonagram made by Paul Duck, British Library of Wildlife Sounds. Band width 300 Hz.



Figure 4. Breeding site of *Phylloscopus sichuanensis*, Wolong, Sichuan Province, China, 24 June 1990. Nest (number 1) situated in tuft of dead grass in bottom/centre (photograph by Urban Olsson).

noted) on 11 June, was on a slope with young deciduous secondary growth and knee-high grass, ferns and herbs (Fig. 4). On return to the site on 24 June there were at least four young in the nest (Fig. 5). The second nest, on a steep bank overgrown by grass, mosses, herbs and ferns by a trail on a mountain side, was found on 25 June and revisited the following day. It contained four eggs (Fig. 6).

The placing of the nest thus appears to differ from that of *P. chloronotus*. Three nests of *P. chloronotus* that we have



Figure 5. Nest (number 1) with young of *Phylloscopus sichuanensis*, Wolong, Sichuan Province, China, 24 June 1990 (photograph by Urban Olsson).



Figure 6. Nest (number 2) with eggs of *Phylloscopus sichuanensis*, Wolong, Sichuan Province, China, 25 June 1990 (photograph by Urban Olsson).

found (two on Emei Shan and one in Wolong) were all in mossy trees, c. 2, 3 and 4 m, respectively, above the ground. Ali & Ripley (1983) state that the nest of *P. chloronotus* (*simlaensis*) is usually placed in the outer branches of a conifer 2–15 m, but mostly 3–6 m, above the ground.

The nests of *P. sichuanensis* were spherical with side entrances and built mainly of grass and plant stems, lined with fine grass. The eggs were white with small dark rufous spots, mainly in a zone around the larger end (Fig. 6). One egg was measured: 13.5 × 10.6 mm.

At both nests only the female was seen incubating the eggs, but the time we spent watching the nests was not long. Both the sexes fed the young at the first nest. On 25 June the first nest was watched between 16.20 h and 17.20 h, during which time the young were fed 30 times. Each visit lasted on average c. 6 seconds, except for three longer spells, when one of the parents remained in the nest for 5, 1 and 2 min, respectively.

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APPENDIX

Other specimens examined in the genus *Phylloscopus*

Number of individuals/specimens examined in the field and in museum collections are indicated. 100+ = between 100 and a few thousand live individuals or museum specimens. Specimens examined mainly in British Museum (Natural History), Tring, U.K.; American Museum of Natural History, New York, USA; and Zoological Institute, Academia Sinica, Beijing, China. Songs and calls of the same forms heard by us in the field (F) or on tape recordings (T).

	Field	Museum	Song	Call
<i>P. pulcher kangrae</i> Ticehurst	1	30	—	—
<i>P. p. pulcher</i> Blyth	100+	100+	F	F
<i>P. maculipennis virens</i> Ticehurst	—	13	—	—
<i>P. m. maculipennis</i> (Blyth)	c. 50	100+	F	F
<i>P. proregulus</i> (Pallas)	100+	100+	F	F
<i>P. chloronotus chloronotus</i> (Gray & Gray)	100+	100+	F	F
' <i>P. c. kansuensis</i> ' Meise ¹		2		
' <i>P. c. newtoni</i> ' Gätke ²		1		
' <i>P. c. forresti</i> ' Rothschild ²		4 ³		
' <i>P. c. yunnanensis</i> ' La Touche ⁴		2 ⁴		
<i>P. c. simlaensis</i> Ticehurst	50+	100+	F	F
<i>P. subviridis</i> (Brooks)	c. 30	40+	T	F
<i>P. inornatus inornatus</i> (Blyth)	100+	100+	F	F
<i>P. i. humei</i> (Brooks)	100+	100+	F	F
<i>P. i. mandellii</i> (Brooks)	100+	60+	F	F

¹ considered synonymous with *chloronotus* by Alström & Olsson (1990)

² generally considered synonymous with *chloronotus* (e.g. Watson et al. 1986)

³ including type

⁴ La Touche's 'co-types' (AMNH no. 450048; Mus. Comp. Zool. no. 129351) examined by P.A., type in Mus. Comp. Zool. examined by Dr R. A. Paynter, Jr.