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Species limits in the Brown Boobook *Ninox scutulata* complex

by Ben King

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Most of the currently recognized subspecies of Brown Boobook or Brown Hawk-owl *Ninox scutulata* were originally described as separate species, but subsequent authors have followed Peters (1940) in maintaining them as members of a single species. Indeed, most of these taxa are quite similar morphologically. However, like Oba (1988), but *contra* König *et al.* (1999), I found that the territorial songs of some of the races differ so markedly as to call their conspecificity into question. Given that voice is the primary means of communication for nocturnal birds, selective pressure for intraspecific retention of stereotyped songs is likely to be strong, and nocturnal birds with different songs are therefore likely to represent different species.

The aim of this paper is to examine the taxonomy of this group of owls in relation to the form of their songs. Tape recordings were obtained of the territorial songs of each of the 11 subspecies of *Ninox scutulata* recognised by König *et al.* (1999). The sources of these recordings are given in the Acknowledgements. Sonograms were made using Canary 12.4, the Cornell Bioacustics Workstation of the Bioacustics Research Program at the Cornell Laboratory of Ornithology.

Voice

Comparison of these vocalizations showed three distinct songs, one common to a southern group comprising eight resident subspecies: *N. s. hirsuta* (Temminck) 1824, Sri Lanka and S. India; *N. s. lugubris* (Tickell) 1833, Pakistan, N. India, Nepal; *N. s. obscura* Hume 1873, Andaman and Nicobar Islands; *N. s. burmanica* Hume, 1876, Assam, S. China, SE Asia; *N. s. scutulata* (Raffles) 1822, Malaya, Sumatra; *N. s. borneensis* (Bonaparte) 1850, Borneo; *N. s. javanensis* Stresemann 1928, Java; *N. s. palawanensis* Ripley and Rabor 1962, Palawan.

The second song type was given by the two northern subspecies: *N. s. japonica* (Temminck and Schlegel) 1844, breeds in Ussuriland, Korea and the main Japanese Islands to Central Sichuan (Cheng, 1987) and Fujian in China, winters in SE Asia, Philippines and Indonesia (except Irian Jaya); and *N. s. totogo* Momiyama 1931, resident (Brazil, 1991) Ryu Kyu Islands and Taiwan.

The third song type was given by *N. s. randi*, Deignan 1951, of the Philippines (except Palawan).

The song of the southern group (Fig. 1) is a hollow mellow double note *whoo-wup, c.* 0.4-0.5 sec. in duration, with a rising inflection and accent on the second syllable. The frequency of the first note is 0.4-0.7 KHz, while the second is mostly 0.5-0.9 KHz, with no audible gap between the two notes. The double note is uttered in a continuous series with about 0.6-0.9 sec. between notes (Fig. 2).

By contrast the song of the northern group (Fig. 1) consists of two (sometimes three) mellow, hollow *whoop* notes 0.1-0.25 sec. in duration on the same frequency (0.5-0.85 KHz), separated by a gap of 0.25-0.5 sec., expressed as a couplet (occasionally triplet). The couplets are uttered in a continuous series with about 0.4-0.9 sec. between couplets (Fig. 2).

The song of *N. s. randi* (Fig. 1) is a hollow, mellow couplet similar to that of *N. s. japonica*, but the two notes are lower pitched (0.3-0.6 KHz), each note falling somewhat in pitch (rather that appearing slightly arched), and are more closely spaced (0.2-0.3 sec. apart). The couplets are uttered in a continuous series with about 0.3-0.6 sec. between couplets (Fig. 2).

Fig. 3 is a wave form sonogram showing sound energy emanating from a central axis. The two notes of the double note of southern *Ninox scutulata* (represented here by *burmanica* and *hirsuta*) are clearly shown, as are the two widely separated single notes of the couplets of *N. s. japonica*, *N. s. totogo* and *N. s. randi*.

Morphometrics

The birds with a song that defines them as the northern group differ from the southern group by their proportionately shorter tail (Table 1) and by their more pointed wing (Table 2). A scatter plot of wing and tail measurements of the specimens measured in this study (Fig. 4) shows that while subspecies that comprise the southern group tend to have a similar wing/tail ratio, migratory Japanese birds and Philippine *N. s. randi* are separable on this basis.

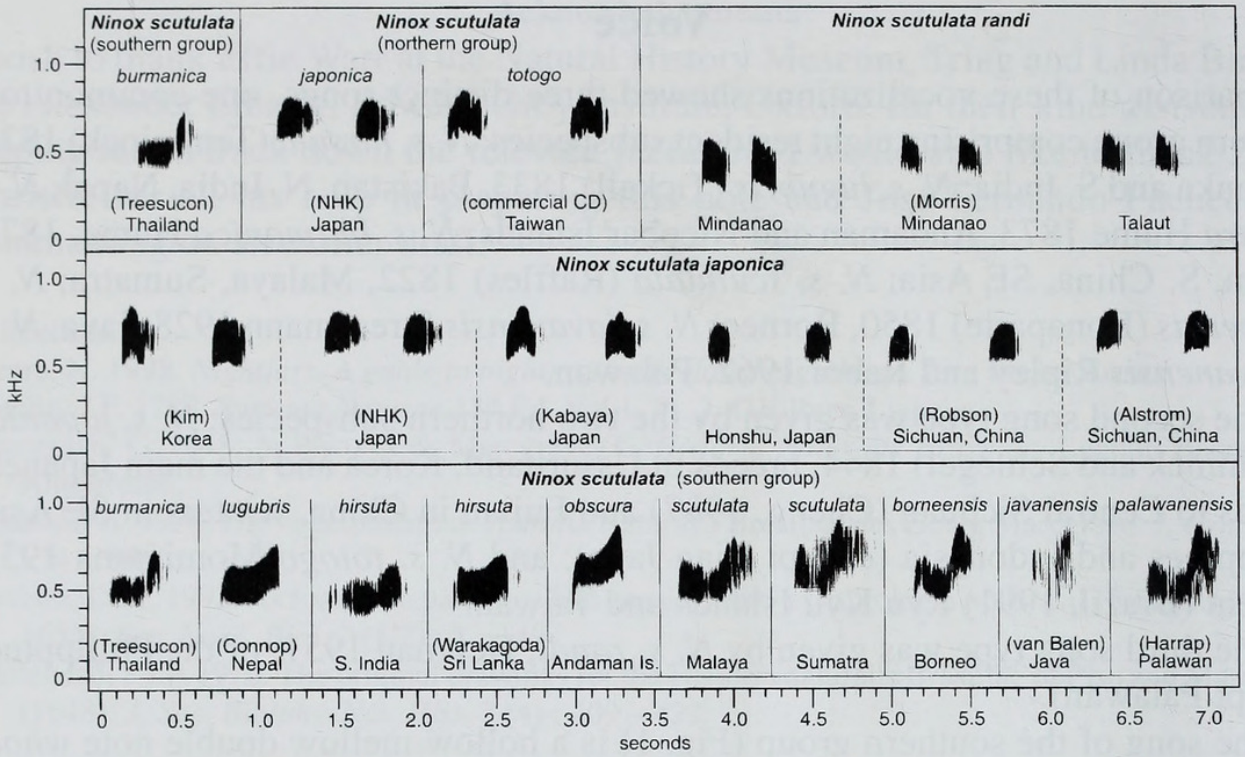

Figure 1. Territorial songs of the eleven forms of the *Ninox scutulata* complex. The top row allows comparison of the songs of the three song types found in the complex. The southern group (see text – here represented by *N. s. burmanica*) has a double note, the second note higher in pitch. The songs of the northern pair (*N. s. japonica* and *N. s. totogo*) and *N. s. randi* are couplets, *randi* differing by giving lower-pitched notes which are downwardly inflected (rather than in a shallow arch) and by having a shorter interval between notes. *N. s. japonica* has a shorter interval between notes than *N. s. totogo*. Row two shows calls of *N. s. japonica* from various parts of its range showing their consistency. The bottom row shows samples of all eight subspecies of the southern group, showing their consistency.

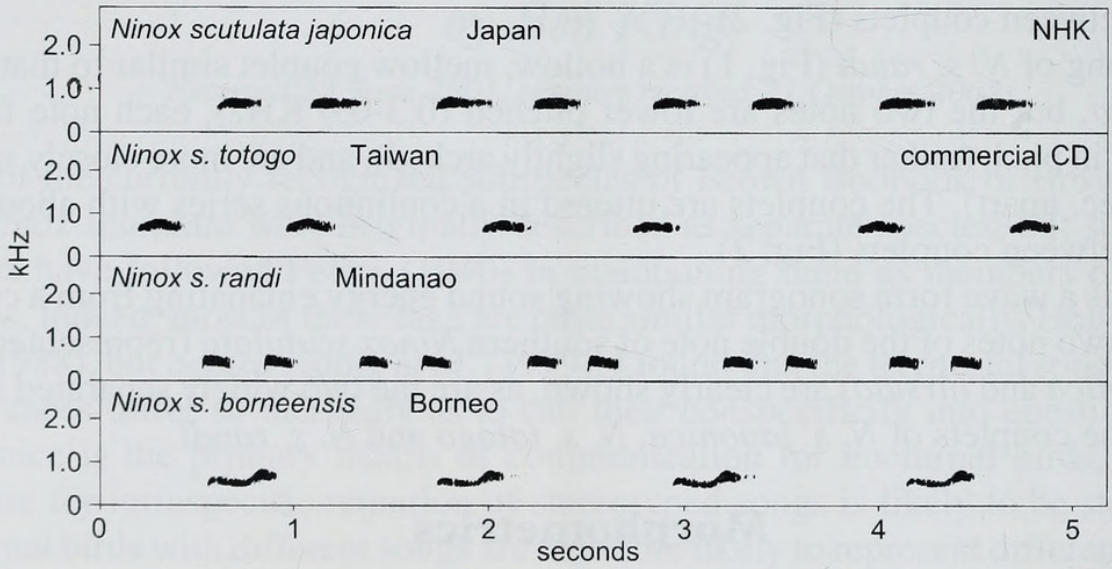

Figure 2. Territorial songs of the *Ninox scutulata* complex, showing how the couplets of *N. s japonica*, *N. s. totogo* and *N. s. randi*, and the double notes of the southern group (see text – here represented by *N. s. borneensis*), are phrased into a continuous series. The couplets of *N. s. totogo* are farther apart than those of *N. s. japonica* while those of *randi* are closer. Similarly, the two notes of the couplets of *N. j. totogo* are farther apart than those of *N. s. japonica*, while closer in *N. s. randi*. The notes of *N. s. randi* fall in pitch, as opposed to the slightly arched notes of *N. s. japonica*. The two notes of the southern group are coalesced into a double note, with the second note higher-pitched. The time scale is stretched a little over 2x that of Fig. 1.

TABLE 1

Comparison of length of culmen, wing and tail, and wing/tail ratios of the subspecies of the *Ninox scutulata* complex. Note the higher wing/tail ratio of *N. s. japonica*, *N. s. totogo* and *N. s. randi* compared to the eight southern races of *N. scutulata*, and the large size of *N. s. randi*. Measurements for *N. s. javanensis* from Stresemann (1928) and *N. s. palawanensis* from Ripley & Rabor (1962). S.d. = standard deviation.

	culmen (from skull) mean (range), s.d.	wing (flattened) mean (range), s.d.	tail mean (range), s.d.	wing/tail ratio mean (range)
N. s. japonica	23.8(21.1-26.1)	220.8(214-226.8)	115.8(107.5-122.6)	1.91 (1.75-2.03)
11 specimens	1.5	4.6	4.0	
N. s. totogo	24.8(24.3-25.2)	210.4(203.7-222.8)	115.3(111.3-120.2)	1.83 (1.73-1.99)
7 specimens	0.3	6.7	3.2	
N. s. randi	26.8 (24.6-29.1)	229.1(225.0-234.0)	122.2(118.0-125.0)	1.88 (1.85-1.91)
5 specimens	1.9	3.2	2.8	
N. s. burmanica	24.4(23.1-26.0)	218.1(201.6-226.5)	129.5(117.0-136.0)	1.68 (1.63-1.72)
10 specimens	1.0	7.5	5.7	
N. s. lugubris	24.2 (22.4-25.8)	218.3(212.0-223.7)	128.0(123.0-130.1)	1.70 (1.68-1.73)
4 specimens	1.4	4.8	3.3	
N. s. hirsuta	22.9 (19.7-24.5)	196.7(189.8-201.1)	111.8(108.7-114.9)	1.75 (1.71-1.82)
6 specimens	1.7	4.6	2.2	
N. s. obscura	24.2(22.7-25.8)	209.0(205.2-211.1)	117.3(110.4-124.2)	1.78 (1.69-1.86)
4 specimens	1.3	2.6	5.8	
N. s. scutulata	23.8(20.7-25.2)	195.7(182.4-213.3)	109.5(100.3-115.0)	1.78 (1.69-1.87)
11 specimens	1.4	7.2	4.5	
N. s. borneensis	23.1(21.9-24.4)	181.7(175.1-189.0)	101.1(95.1-109.3)	1.79 (1.69-1.91)
9 specimens	0.8	5.0	4.3	
N. s. javanensis	___	178-183	___	___
N. s. palawanensis	23.5	195	108	___

Resident *N. s. randi* of the Philippines is a large bird with a wing/tail ratio similar to *N. s. japonica*, but with a rounded wing like the southern group. *N. s. randi* is much larger than *N. s. palawanensis*, of Palawan.

In the field, in its wintering range, non-vocalizing *N. s. japonica* is probably indistinguishable from resident forms of the southern group with which it overlaps and from *N. s. randi*. In the hand, *japonica* can be distinguished from the subspecies

TABLE 2

Comparison of wing formula of *Ninox s. randi, N. s. japonica* and *N. s. totogo*, and six of the eight remaining subspecies of *Ninox scutulata* (specimens of *N. s. javanensis* and *N. s. palawanensis* were unavailable for comparison). Note the more pointed wings of *N. s. japonica* and *N. s. totogo* than both *N. s. randi* and the other *N. scutulata* ssp. The wings of resident *N. s. totogo* are nearly as pointed as migratory *N. s. japonica.*

	Longest primary	Second longest primary—mean distance from tip (range)	Third longest primary—mean distance from tip (range)	Fourth longest primary—mean distance from tip (range)	Fifth longest primary—mean distance from tip (range)
N. s. randi	8=7	7=8	6	9	5
3 specimens		1.2 (0.0-1.8)	8 (6.1-10.0)	19.5(15.5-22.2)	33.3(32.3-34.9)
N. s. totogo	8 (7 once)	7 (8 once)	9 (6 twice)	6 (9 twice)	5
6 specimens		1.6 (0.6-3.0)	12.9 (8.6-17.2)	17.7(15.3-19.3)	42.3(34.2-47.1)
N. s. japonica	8 (7 once)	7 (8 once)	9 (6 four times)	6(9 four times)	5
11 specimens		3.9 (0.6-9.9)	15.6(13.2-20.6)	19.6(15.4-22.8)	46.1(40.6-50.5)
N. s. burmanica	8 (7 twice)	7 (8 twice)	6 (9 once)	9 (6 once)	5
7 specimens		2.2 (0.0-8.1)	6.9 (2.6-11.0)	20.0(13.7-26.8)	30.4(25.3-46.2)
N. s. lugubris	8 (7 once)	7 (8 once)	6	9	5
3 specimens		2.0 (0.5-4.2)	6.9 (5.0-9.5)	19.2(14.6-22.0)	28.9(27.7-30.4)
N. s. hirsuta	7 (8 once)	8 (6 twice, 7 once)	6 (8 twice)	9 (5 twice)	5(9 twice)
5 specimens		1.9 (1.3-2.9)	6.3 (4.6-8.0)	16.6(12.5-20.0)	24.4(20.7-28.4)
N. s. obscura	7	8	6	9	5
3 specimens		1.8 (0.3-3.2)	6.4(5.6-7.7)	14.5(13.0-15.9)	28.9(26.2-32.7)
N. s. scutulata	7 (8 once)	8 (6 twice, 7 once)	6 (8 twice)	9 (5 twice)	5 (9 twice)
10 specimens		1.6 (0.5-2.4)	5.3(2.7-11.2)	16.7(11.2-22.3)	23.3(15.7-41.1)
N. s. borneensis	7 (8 twice)	8 (6 twice,7 twice)	6 (8 twice)	9 (5 thrice)	5 (9 thrice)
8 specimens		1.5 (0.3-3.3)	3.5(2.2-6.1)	14.2(11.4-17.1)	19.5(15.2-28.6)

in the southern group by its higher wing/tail ratio and more pointed wing; and from *N. s. randi* by its somewhat shorter culmen and more pointed wing.

Discussion

The territorial song of the two northern subspecies is clearly and consistently distinct (Figs. 1, 2 and 3) from those of all the southern resident subspecies of *N. scutulata.* I therefore propose that the northern forms should be regarded as a different species,

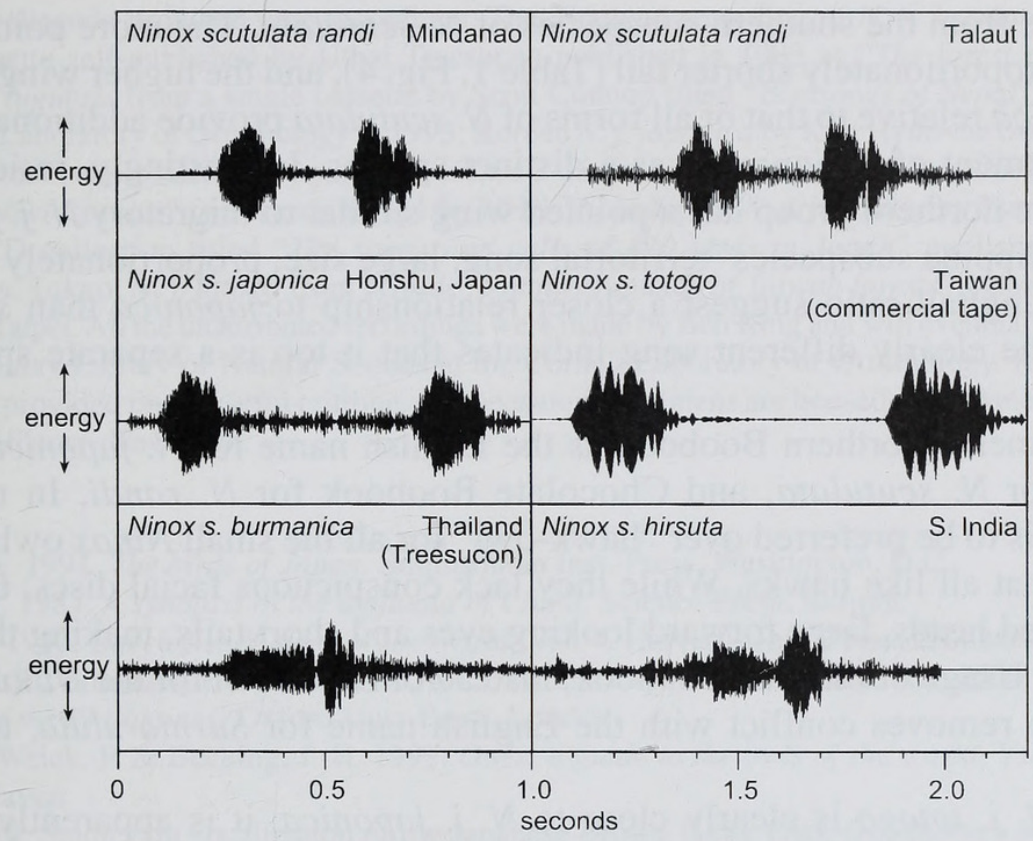

Figure 3. Wave form sonograms showing the bursts of energy associated with the two-noted territorial songs of the *Ninox scutulata* complex, clearly indicating the two widely spaced single notes of *N. s. japonica*, *N. s. totogo* and *N. s. randi*, and the two closely spaced notes of the double note of the southern subspecies of *N. scutulata* (here represented by *N. s. burmanica* and *N. s. hirsuta*).

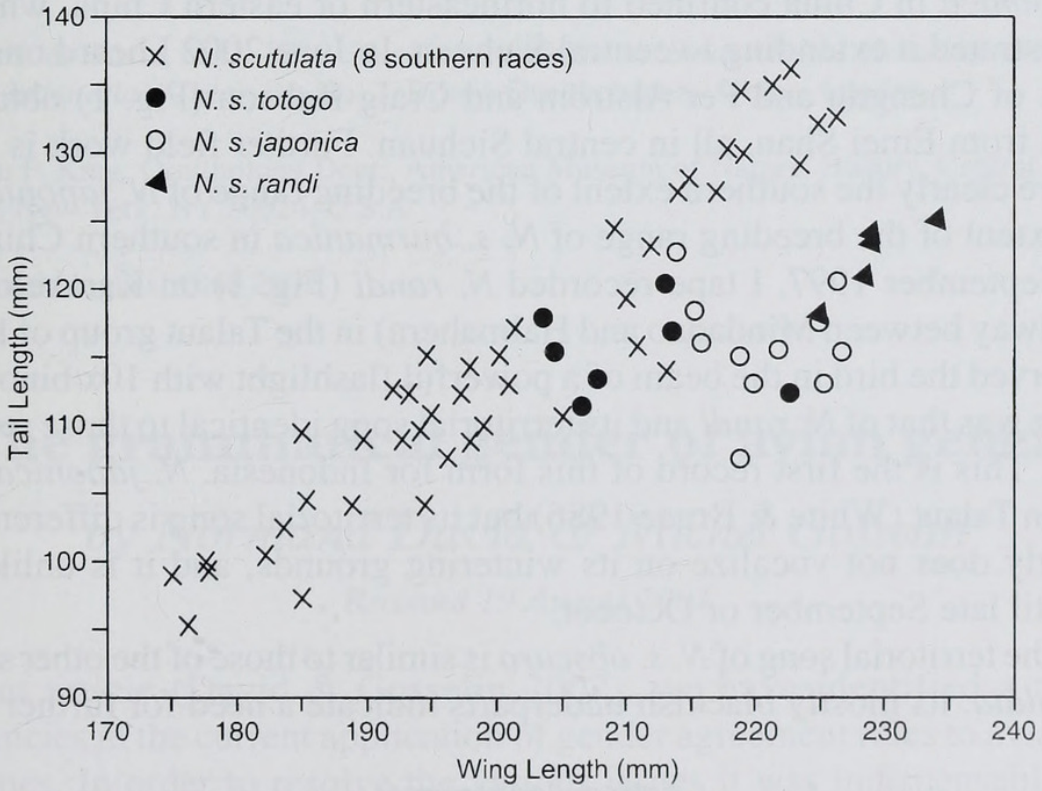

Figure 4. Scatter plot of wing length against tail length of the eight subspecies (herein combined) of the southern group of *N. scutulata* compared to those of *N. s. japonica, N. s. totogo* and *N. s. randi*. The southern group of *N. scutulata* shows a clear linear pattern of wing/tail proportion throughout its range, while *randi* and most *N. s. japonica* cluster outside the southern group, and most *N. s. totogo* cluster within it.

N. japonica, from the southern subspecies of *N. scutulata*. The more pointed wing (Table 2), proportionately shorter tail (Table 1, Fig. 4), and the higher wing/tail ratio of *N. japonica* relative to that of all forms of *N. scutulata* provide additional support for the treatment of *N. japonica* as a distinct species. Interestingly, resident *N. j. totogo* of the northern group has a pointed wing similar to migratory *N. j. japonica.*

The Philippine subspecies' territorial song, large size, proportionately short tail and high wing/tail ratio suggest a closer relationship to *japonica* than *scutulata.* However, the clearly different song indicates that it too is a separate species, *N. randi.*

I recommend Northern Boobook as the English name for *N. japonica,* Brown Boobook for *N. scutulata*, and Chocolate Boobook for *N. randi.* In my view, "boobook" is to be preferred over "hawk-owl" for all the small *Ninox* owls, as they do not look at all like hawks. While they lack conspicuous facial discs, they have large rounded heads, large forward looking eyes and short tails, making them owl-like indeed. Usage of the term boobook, instead of hawk-owl for the *Ninox* owls so named, also removes conflict with the English name for *Surnia ulula,* the Hawk Owl.

While *N. j. totogo* is clearly close to *N. j. japonica*, it is apparently resident (rather than migratory), the notes in its territorial couplet are more widely spaced and its measurements are somewhat different. These differences suggest the possibility that it may be specifically distinct but further study is required.

Peters (1940), Vaurie (1965) and König *et al.* (1999) showed the breeding range of *N. j. japonica* in China confined to northeastern or eastern China, while Cheng (1987) illustrated it extending to central Sichuan. In June 2002 I heard one *c.* 50 km north-west of Chengdu and Per Alström and Craig Robson (Fig. 1) obtained tape recordings from Emei Shan, all in central Sichuan. Further field work is needed to define more clearly the southern extent of the breeding range of *N. japonica* and the northern extent of the breeding range of *N. s. burmanica* in southern China.

On 2 September 1997, I tape-recorded *N. randi* (Fig. 1) on Karakelong Island (about midway between Mindanao and Halmahera) in the Talaut group of Indonesia. I also observed the bird in the beam of a powerful flashlight with 10x binoculars. Its appearance was that of *N. randi* and its territorial song identical to those recorded on Mindanao. This is the first record of this form for Indonesia. *N. japonica* has been recorded on Talaut (White & Bruce 1986) but its territorial song is different (Fig. 1), it apparently does not vocalize on its wintering grounds, and it is unlikely to be present until late September or October.

While the territorial song of *N. s. obscura* is similar to those of the other subspecies of *N. scutulata*, its mostly blackish underparts indicate a need for further study.

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Deepal Warakagoda provided tape recordings. The Thailand recording of *N. s. burmanica* was taken from a cassette self-published by Uthai Treesucon published in 1983 as "*The forest night sounds*"; Nepal *N. s. lugubris* from a single cassette by Scott Connop titled "*Birdsongs of Nepal*", published by the Cornell Laboratory of Ornithology in 1993; Korean *N. j. japonica* by Kim Hyun-tae from his website: <soback.kornet.net1~pintail>; *N. j. japonica* from a 3-cassette collection titled "*Japanese birds in sound, 100 well-known species*" published in 1971 by NHK TV in Japan; *N .j. japonica* by Tsuruhiko Kabaya from a 6-CD collection titled "*The songs and calls of 420 birds in Japan*" published in 2001 by Shogakukan, Tokyo; *N. j. totogo* from "*Guide to natural sounds of Taiwan forests*", published by Wind Records in Taipei. All the unattributed recordings were made by Ben King and will eventually be deposited at the Macaulay Library of Natural Sounds at the Cornell Laboratory of Ornithology. Referee Pamela Rasmussen provided much useful critique. All measured specimens are housed at the American Museum of Natural History, New York.

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The grammatical gender of avian genera

by Normand David & Michel Gosselin

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In a recent article (David & Gosselin 2002), we have identified a number of inconsistencies in the current application of gender agreement rules to avian species-group names. In order to resolve the various issues it was indispensable for us to know the correct grammatical gender of most avian genera. It became obvious, at that point, that some of the inconsistencies that existed at the species level had their equivalent at the genus level.