THE TAXONOMY, DISTRIBUTION, AND STATUS OF PHILIPPINE WILD PIGS

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ABSTRACT. Recent taxonomic reviews have revealed that there are three species and at least two subspecies of wild pigs in the Philippines, of which two species and one subspecies are endemic. This is a larger number of endemic suid taxa than any other country, with the exception of Indonesia. Unfortunately, however, the generally extreme levels of deforestation on most islands on which they occur, coupled with intense hunting pressure, inadequate legal protection, and the poor enforcement of existing legislation even within protected areas, have resulted in the systematic decline of all Philippine populations of these animals. These factors are especially apparent in the Visayan region, where the endemic warty pig, *S. cebifrons*, is probably the second most endangered of the world's suids. This species is now extinct or close to extinction in five (Masbate, Guimaras, Cebu, Siquijor and Bohol) of the seven islands in which it is known or believed to have occurred, and now survives only in a few small, isolated areas of Negros and Panay, where all remaining populations are declining as a result of continued habitat destruction and intense hunting pressure. By comparison, the other two species of Philippine pigs -- *S. philippensis* of Luzon, Samar, Leyte, Mindanao and associated smaller islands, and *S. barbatus* Muller of Balabac, Palawan, the Calamian Islands (*S. b. ahoenobarbus*) and Tawi-tawi and Sibutu (*S. b. barbatus*) remain rather more widely distributed throughout their ranges at the present time.

TAXONOMY AND DISTRIBUTION OF THE WILD PIGS

Following Sanborn (1952), the wild pigs of the Philippines have generally been attributed to two more widely distributed species, the bearded pig, *Sus barbatus*, and the Sulawesi warty or crested pig, *S. celebensis*. Thus, the wild pigs of the western Philippine islands of Balabac, Palawan, and the Calamian Group, which form part of the Sunda Shelf, are most closely related to the bearded pigs of Borneo, Sumatra, and the Malaysian Peninsula, while those of the west-central Visayas Islands and eastern Philippines (Luzon, Mindanao, and associated islands), which form part of the Wallacean Region, were lumped with the Sulawesi pig.

In a major review of the genus *Sus,* Groves (1981) confirmed the close relatedness of the west Philippine pigs with *S. barbatus*, though he recognized that these were sufficiently distinct to warrant separation as an endemic subspecies, i.e., *S. b. ahoenobarbus*. However, Groves also showed that the affinity of the central and eastern Philippine pigs with *S. celebensis* was largely superficial, and that these

populations were also more closely allied to *S. barbatus*, a view later endorsed by Mudar, 1986). Groves (1981) also suggested that the central and eastern Philippines populations were not only distinct from those of the western Philippines, but that these were also distinct from each other. He therefore, provisionally referred the pigs of these two regions to two separate subspecies of *S. barbatus*, i. e., *S. b. cebifrons* from the central Visayan region islands of Cebu and (probably) Negros, and *S. b. philippensis* from the eastern Philippine islands of Luzon, Mindanao and Jolo. Even so, Groves stressed that these were tentative assignations because the shortage of museum specimens particularly from the Visayan region (where only two skulls were available for examination from Cebu, only one from Negros and none from the other Visayan islands of Guimaras, Panay, and Masbate) and the complete absence of any comparative cytogenetic data, precluded a definitive assessment of the systematic relationships of these populations.

To a large extent this situation still obtains, though there have been some important developments in our understanding of the systematic relationships and genetic diversity of the Philippine suids in recent years. These developments include the acquisition of a series of skulls and mandibles from Negros (*cebifrons*) and Samar (*philippenensis*) which, together with the first photographs revealing the external characters of the Visayan animals, have not only led Groves (1991 and in litt.) to reaffirm his (1981) assertion that the central and eastern Philippine pigs are more closely allied to *barbatus* than to *celebensis*, but also to suggest that these are sufficiently different from *barbatus* and from each other to warrant separation as distinct species; i. e., *Sus cebifrons* and *S. philippensis*, respectively. Both of these taxa are currently regarded as monotypic, but Groves and Grubb (in press) acknowledge that *S. philippensis* appears to be regionally variable in some characters and may ultimately prove polytypic.

The first studies of karyotypes and banding patterns of Philippine wildpigs also yielded important new information. In 1992, blood samples were collected from seven individuals of known origin (including two F_1 captive-bred hybrids), representing five islands -- Palawan, Culion, Mindoro, Luzon and Mindanao-- and the results compared with those from similar studies of other species of *Sus* which have also been undertaken in recent years. The diploid chromosome number of the domestic pig and Asian and South-East Asian populations of the Eurasian wild pig (*Sus scrofa*) is invariably 38. The same number has been found for *S. barbatus*, *S. celebensis*, *S. verrucosus* (the Javan warty pig), and *S. salvanius* (the pygmy hog). The preliminary results from the Philippine pigs are therefore of considerable interest. Of the seven-pig sample, three pigs (a boar from Luzon and two sows from Mindanao) had 2n=36, with a centric fusion between chromosomes 13 and 16 in the homozygous condition, and two pigs (both sows, one each from Culion and Mindoro) showed 2n=38 chromosomes, with chromosomes 13 and 16 separately present. This type of translocation is new, both to the domestic pig and to the wild species of *Sus* karyo-

types so far. The remaining two (hybrid) pigs (one from each of the latter sows but both sired by the Luzon boar), each showed 2n=37, with the same centric fusion of chromosomes 13 and 16 in the heterozygous condition (for details see: Bosma *et al.*, in press).

These results strongly support Groves' (1991) suggestion that *Sus philippensis* is a valid speciesm endemic to Luzon, Mindanao and associated islands. They also refute the assertions of earlier workers that the Philippine wild pigs east of Wallace's Line should be attributed to *S. celebensis*, which also has 2n=38 chromosomes. Owing to the absence of comparative museum specimens, the systematic relationships of the wild pigs from Mindoro have not been studied before, but these results indicate that the Mindoro population is closely allied with the bearded pig of Palawan and associated islands (including Culion), i.e., *S. b. ahoenobarbus*, rather than *S. philippensis* from neighboring Luzon. This conclusion, which is also borne out by the animal's external morphology, is interesting in that most of the non-endemic mammal fauna of Mindoro is allied to the neighboring, larger island of Luzon, although Palawan faunal elements are present in smaller numbers (S. Goodwin, pers. comm.).

In any event, the recognition of at least three taxa of wild pigs means that the Philippines has a larger number of endemic suids than other country with the exception of Indonesia, which has at least five species and eight subspecies, of which three species and five subspecies are endemic. The inclusion of pigs from Jolo in the Sulu Archipelago with *S. philippensis* in Groves' (1981) review is some further interest in this context, since it implies the westward colonization of these islands by wild pigs from Mindanao, rather than eastwards from the Bornean mainland (Sabah). However, there is no doubt that typical bearded pigs *S. barbatus* ssp., also occur in the south-westernmost islands of Sibutu and Tawi-tawi of the Sulu chain. Indeed, there are numerous, apparently reliable, accounts of wild pigs crossing the channel between Sabah and Sibutu, where they have sometimes been killed by fishermen. On one occasion, a large number of swimming animals are reputed to have been used for target practice by a U. S. Navy battleship, which encountered them while on patrol (R. Hilado, pers. comm.). It therefore seems likely that a fourth non-endemic taxon of wild pig, the Bornean *S.b. barbatus*, should be added to the Philippine list, and that the Sulu Archipelago has been colonized by immigrant groups of these animals from the southwest, Sabah, as well as the northeast, Mindanao.

PRESENT DISTRIBUTION AND CONSERVATION STATUS

Wild pigs are known or reported from all of the larger, and many of the smaller, offshore islands in the Philippines. As previously indicated, their distribution may be broadly divided into the major biogeographical regions west (Sundaic) and east (Wallacean) of Wallace's Line, each of these being divided into two sub-re-

gions, i. e., Palawan (including Balabac and the Calamianes Group) and Tawi-tawi and Sibutu, and the west-central Visayas Islands, comprising Negros, Cebu, Masbate, Panay and Guimaras, and the larger, eastern islands of Luzon, Samar, Leyte, Mindanao and associated smaller islands. Wild pigs are known to occur or to have occurred until recently, on all of these islands and many of the smaller, offshore islands and island groups (e. g., Mindoro, Sibuyan, Siquijor and the Sulu Archipelago), though the affinities of some of these populations are not yet known (Table 1).

As indicated in Table 1, recent data on the wild pig populations on many islands, particularly the smaller islands, are lacking, and their present status can only be inferred from the extent of remaining forest over their known ranges. Thus, *Sus b. ahoenobarbus* is probably the most threatened subspecies of *S. barbatus* (Caldecott *et al.*, in press) because it has by far the smallest range and because the smaller, insular populations on the islands of Balabac and the Calamian Islands (Oliver, in prep.) are unlikely to remain securely established. This subspecies is thought to be still relatively widely distributed on Palawan, where it may even be locally common in some areas, but it is intensively hunted (McGowan, 1987 and pers. comm.) and the surviving forests on Palawan are being rapidly depleted by uncontrolled logging and agricultural enroachment (Quinnell and Balmford, 1988).

By comparison, *Sus philippensis* has almost certainly been extirpated over a much greater proportion of its former range than *S. b. ahoenobarbus*, but this range is also considerably larger and includes some still relatively extensive tracts of forest on the larger islands of Luzon, Samar, Leyte and Mindanao. On all of these islands, the species is reported to remain quite widely distributed wherever significant amounts of forest remain. Far less forest remains on Mindoro, though wild pigs are said to be locally common in some areas (Rabor, 1986: Cox, unpubl.), on Catanduanes (Heaney *et al.*, 1991), and on Biliran (see below) where, by 1985, the species was reported to declined to the point that viable populations were unlikely to survive for much longer. The species is known from Jolo and it is presumed to occur, or to have occurred formerly, on Basilan and on some of the other smaller islands in the Mindanao and Luzon faunal regions, but recent data from these areas are lacking.

The distribution and status of wild pigs on Samar, Leyte and Biliran were investigated during a field survey in the central Philippines in 1985. This was primarily intended to assess the status and future management needs of *Sus cebifrons* and the Philippine spotted deer (*Cervus alfredi* Sclater), which were assumed to occur on these islands (Cox, 1985, 1987a). However, although Samar, Leyte, and Biliran comprise the eastern part of the Visayas geopolitical region, they actually represent a northward extension of the Mindanao Faunal Region, as defined by Heaney (1986) on the basis of the 120 m bathymetric line (Fig. 1). Thus, although Cox's survey revealed that Samar and to a lesser extent, Leyte continued to support the largest

populations of wild pigs in the Visayan Islands, these populations are undoubtedly *S. philippensis*, rather than *S. cebifrons*, as was assumed at the time.

Conversely, the recognition that *Sus cebifrons* is confined to the west-central Visayan Islands of Cebu, Negros, Guimaras, Panay and Masbate, profoundly influences any assessment of its conservation status. This taxon is undoubtedly more gravely threatened than previously supposed, or indicated by its current designation on the IUCN Red List of Threatened Animals (IUCN, 1990), where it was listed as "vulnerable" on the assumption that the aforementioned Samar, Leyte and Biliran populations belonged to this taxon. As it is, the species is certainly "Endangered" according to the terms of these status categories, and perhaps more so than other wild suid with the exception of the pygmy hog, *S. salvanius* (Oliver, 1991).

The reasons for this are based on Cox's (1985, 1987a) revelations that these animals are extinct on Guimaras and Cebu, and absent or extinct on Siquijor, all of which islands have been virtually deforested. A similar situation obtains on Masbate, which was not visited during the 1985 survey, and on Bohol, where the last surviving population of wild pigs is thought to be close to extinction in the Raja Sikatuna National Park (A. Alcala, pers. comm.; D. Kho, pers. comm.). However, it is known whether the pigs on Bohol are allied to *S. cebifrons* or *S. philippensis*, since this island is closest to Cebu but it forms part of the Mindanao Faunal Region. In either event, potentially viable populations of *S. cebifrons* are confined to the last remaining area of forest in west Panay, and the few small, fragments of remaining forest on Negros. This range is essentially identical to that of the critically endangered Philippine spotted deer, *Cervus alfredi* (Cox, 1985, 1987a; Oliver *et al.*, this vol.) and, in common with the latter species, all of the few remaining pig populations are declining as a result of continued habitat loss, hunting pressure and other forms of disturbance.

The survival prospects of these pigs are therefore intimately linked with the efforts now being made to conserve the spotted deer, which has been adopted as a "flagship" species for conservation action in the Negros-Panay Faunal Region. To this end, a new (40,000-ha) national park, the Panay Mountains National Park, has been proposed for the Mt. Madja-as/Mt. Baloy area of west Panay, to protect the single largest and most important tract of forest remaining in the region and, hence, the largest and most important surviving populations of these and diverse other Visayan endemic species. A preliminary management plan has been drafted and submitted to the relevant authorities (Cox, 1987b) and it is hoped that this park will be officially gazetted in the near future (W. Dee, pers. comm.).

On Negros, wild pigs are known to occur in the Northern Negros Reserve Forest (i.e., Mt. Silay and the Mangdalangan Mountains) and Mt. Canlaon National Park in the north (L. Cayayan, pers. comm.), and in scattered forest in the south, in-

cluding the environs of Mt. Talinis and Lake Balinsasayao, near Dumaguete City. However, in all of these areas wild pigs are still subject to intense hunting pressure as well as the continued attrition of their remaining habitat through illegal logging activities. However, precise data on the extent of these threats are lacking owing to the remoteness of most of these areas and or the presence of the New People's Army both of which factors effectively negate their regulation or control.

This situation is excerbated by the attitudes of local people towards these animals. Wild pigs are most frequently encountered when they are hunted in the forest fragments or when they emerge from the shelter of those fragments to forage for vegetable or fallen fruits in neighboring cultivation areas or "kaingin". In some areas farmers build bamboo fences to protect their crops or even go to the trouble of surrounding whole clearings with sharpened staves planted obliquely outwards to prevent the entry of wild pigs (Rabor, 1977). Nonetheless, the damage caused to agricultural smallholdings can be severe. For this reason, no special conservation measures have been introduced to protect these animals, which are generally regarded as pests, and therefore a legitimate target for control or reprisal. Some government officials from the former Bureau of Forest Development (BFD), who should certainly have known better, even suggested that wild pigs should be hunted down and killed wherever possible (Cox, 1987a).

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Table 1. Present known distribution and status of wild pigs (*Sus* spp.) in the Philippines.

Taxon	Status	Distribution
S. b. ahoenobarbus (endemic spp.)	Rare and declining	Balabac*, Palawan and Calamians (Busuanga, Calauit, Culion and Coron Is.)
S. b. barbatus (non-endemic spp.)	Locally rare but widespread in Borneo	Sibutu and Tawi-tawi
S. cebifrons (endemic spp.)	Endangered	Panay, Guimaras (extinct) Negros, Cebu (extinct) Masbate*
S. philippensis (endemic spp.)	Rare and declining	Luzon, Marinduque (extinct) Catanduanes,Samar,Leyte, Biliran,Mindanao,Basilan*, Jolo*, and other islands
Sus spp.	Rare and extinct	Mindoro (rare), Sibuyan (vulnerable), Bohol (endangered), Siquijor (extinct)

Key: * - no recent data. N. B. The suggested status categories adopted above broadly follow those of IUCN as defined in the IUCN Red List of Threatened Animals (IUCN, 1992).

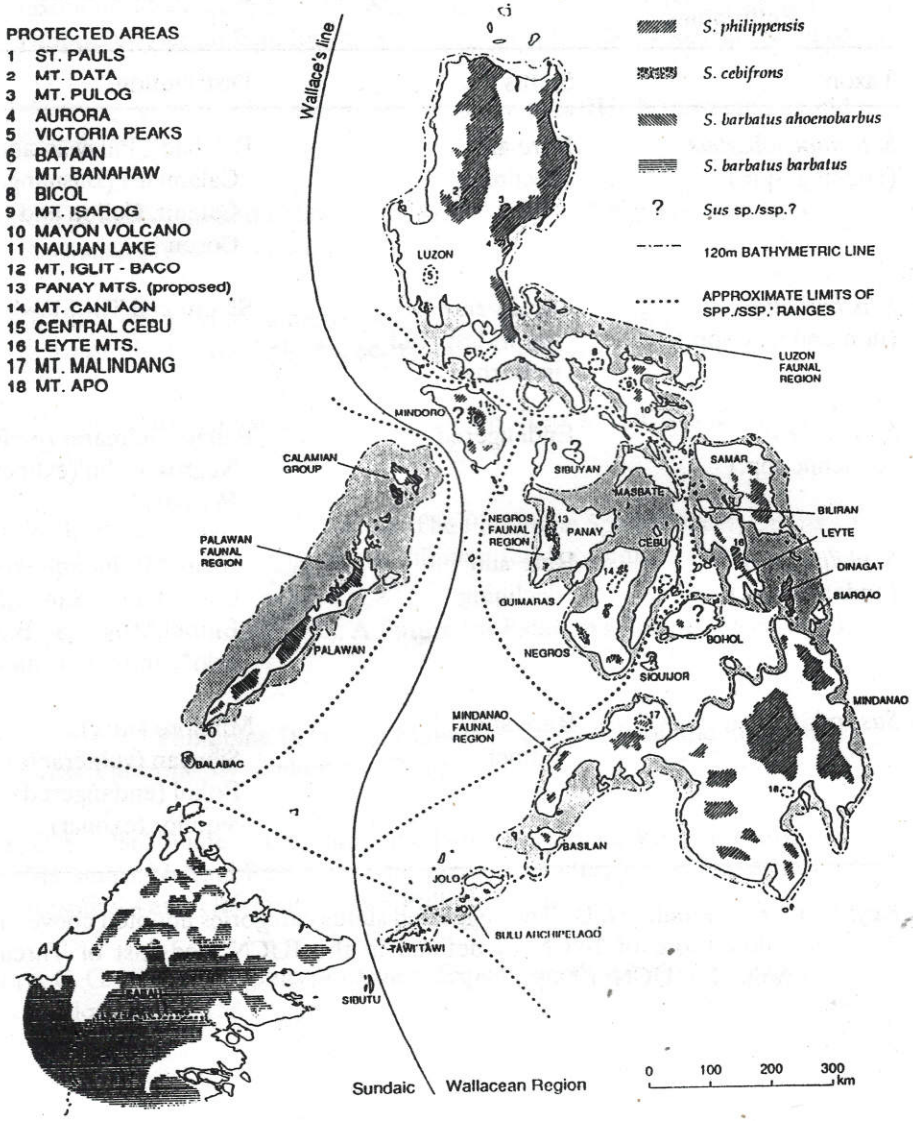

Figure 1. Presumed former and present known distribution of wild pigs in the Philippines (modified after Groves, 1981; Groves and Grubb, in press; Cox, 1985; Heaney, 1986; and Forest Management Bureau, 1988).