

THE TAXONOMY, DISTRIBUTION AND STATUS OF PHILIPPINE WILD PIGS

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Abstract: Recent studies 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. Within the country, the distribution of the native and endemic suids follows broadly predictable lines, with divisions equating to the major "faunal regions" of late Pleistocene islands. Thus the "warty" pigs east of Wallace's Line in Luzon and Mindanao (including Samar, Leyte and, probably, Bohol), *i.e.* *S. philippensis*, and those of the West-central Visayas Islands (Panay, Negros, Cebu and, probably, Masbate), *i.e.* *S. cebifrons*, are endemic at the species level; whereas those of Palawan and associated islands, *i.e.* *S. b. ahoenobarbus*, are closely related to the "bearded" pigs of the Sundaic Region (Borneo, Sumatra, Malaysian Peninsular, etc.) and are endemic only at the subspecies level. There is also evidence that the range of the nominate form of the bearded pig from Borneo, *i.e.* *S. b. barbatus*, extends to the small islands of Tawitawi and Sibutu in the Sulu Archipelago. If this is the case, these are the only non-endemic wild pig populations in the Philippines. 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 most protected areas, have resulted in the systematic decline of all Philippine populations of these animals. These factors are especially apparent in the (west) Visayan region, where the endemic warty pig, *S. cebifrons*, is already extinct or close to extinction on at least four (Masbate, Guimaras, Cebu and Sequijor) of the six islands in which it is known or believed to have occurred. It now survives only in a few small, isolated areas on Negros and Panay, where all remaining populations are declining as a result of continued habitat destruction and intense hunting pressure. These populations are also potentially seriously threatened by "genetic contamination" through interbreeding with free-ranging domestic and feral pigs (unpubl. data). By comparison, *S. philippensis* remains relatively widely distributed in most still-forested areas on the larger islands of Luzon, Samar, Leyte and Mindanao, where it occurs in all of the principal national parks. It probably also still occurs on a number of the smaller islands within these regions, but is certainly threatened or extinct on some others. Further studies are likely to reveal genetic differences between some of the principal populations of this species, which is currently (but probably incorrectly) regarded as monotypic.

Keywords: Wild pigs, Suidae, Bearded pig, Warty pig, *Sus barbatus*, *Sus celebensis*, *Sus philippensis*, Asia, Karyotype.

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1. Taxonomy and distribution

Following Sanborn (1952), the wild pigs of the Philippines have generally been attributed to two, more widely distributed species, namely: the bearded pig, *Sus barbatus*, and the Sulawesi warty pig, *S. celebensis*. Thus, the wild pigs of the west 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 Peninsular, whilst those of the central (Visayas Islands) and eastern (Luzon, Mindanao and associated islands) Philippines, 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*, but reaffirmed their separation as an (endemic) subspecies, *S. b. ahoenobarbus*. However, Groves also argued that the affinity of the central and eastern Philippine pigs with *S. celebensis* was purely superficial and that these populations were also more closely allied to *S. barbatus*; a view later endorsed by Mudar (1986). Groves (1981) also asserted that the central (Cebu and Negros) and eastern (Luzon, Mindoro, Mindanao and Jolo) Philippines populations were not only distinct from those of the western Philippines, but were also distinct from each other. These regional populations were therefore reassigned as two separated subspecies of *S. barbatus*, namely *S. b. cebifrons* and *S. b. philippensis*, respectively (Groves, 1981).

Even so, it was stressed that these were tentative assignments owing to the dearth of museum specimens from the Visayas 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 (*philippensis*) which, together with the first photographs revealing the external characters of the Visayan animals, not only led Groves (1991) to reaffirm his assertion that the central and eastern 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, namely *S. cebifrons* and *S. philippensis*, respectively (Groves, 1991; Oliver, 1991, 1992). A description of these small (*S. cebifrons*) to medium (*S. philippensis*) sized pigs is provided by Groves and Grubb (1993), who treat both species as monotypic, but 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 wild pigs have also yielded important new information. In 1992, blood samples were collected from seven individuals of known origin (including two F1 captive-bred hybrids), representing five islands - Palawan, Culion, Mindoro, Luzon and Mindanao - and the results were 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 pigmy hog). The preliminary results from the Philippine pigs are therefore of considerable interest. Of the seven pigs sampled, three pigs (a boar from Luzon and two sows from Mindanao) had $2n = 36$ chromosomes, 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* karyotyped so far. The remaining two (hybrid) pigs (one from each of the latter sows but both sired by the Luzon boar), each showed $2n = 37$ chromosomes, with the same centric fusion of chromosomes 13 and 16 in the heterozygous condition (for details see: de Haan *et al.*, in press).

These results strongly support Groves' suggestion that *philippensis* is a valid species, 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 has $2n=38$ chromosomes. However, new questions have been raised about the systematic relationships of the wild pigs from Mindoro, since 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 with *S. philippensis* from neighbouring Luzon. However, these results also contradict other evidence, based on cranio-morphological comparisons and the external appearance of most Mindoro wild pigs, which indicate their close affinity to *S. philippensis*.

In any event, the recognition of (at least) 3 taxa of wild pigs, means that the Philippines have a larger number of endemic suids than other country with the exception of Indonesia, which has (at least) 5 species and 8 subspecies, of which 3 species and 5 subspecies are endemic. The inclusion of pigs from Jolo in the Sulu Archipelago with *S. (b.) philippensis* (Groves, 1981) is also of interest in this context, since it implies the westward colonisation of these islands by wild pigs from Mindanao, rather than eastwards from the Bornean mainland (Sabah). However, there is increasing evidence that "typical" bearded pigs (*S. barbatus* spp.) also occur in the South-westernmost islands (Sibutu and Tawitawi) of the Sulu chain. There are numerous, apparently reliable, accounts of wild pigs crossing the channel between Sabah and Sibutu, where they have sometimes been killed by fishermen. An officer in the Philippine Navy reported seeing some of these animals whilst on a tour of duty in c. 1970, and a large number of swimming animals are reputed to have been used for target practi-

ce by a U.S. Navy battleship, which encountered them whilst 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 colonised by different populations/taxa of these animals from the South-west (Sabah) as well as the North-East (Mindanao) (Fig. 1).

2. 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 biogeographic regions west (Sundaic) and east (Wallacean) of Wallace's Line, each of these being further divided into two sub-regions, i.e.: Palawan (including

PROTECTED AREAS

- 1 St. Pauls
- 2 Mt. Data
- 3 Mt. Pulog
- 4 Aurora
- 5 Victoria Peaks
- 6 Bataan
- 7 Mt. Banahaw
- 8 Bicol
- 9 Mt. Isarog
- 10 Mayon Volcano
- 11 Naujan Lake
- 12 Mt. Iglit - Baco
- 13 Panay Mts. (proposed)
- 14 Mt. Canlaon
- 15 Central Cebu
- 16 Leyte Mts.
- 17 Mt. Malindang
- 18 Mt. Apo

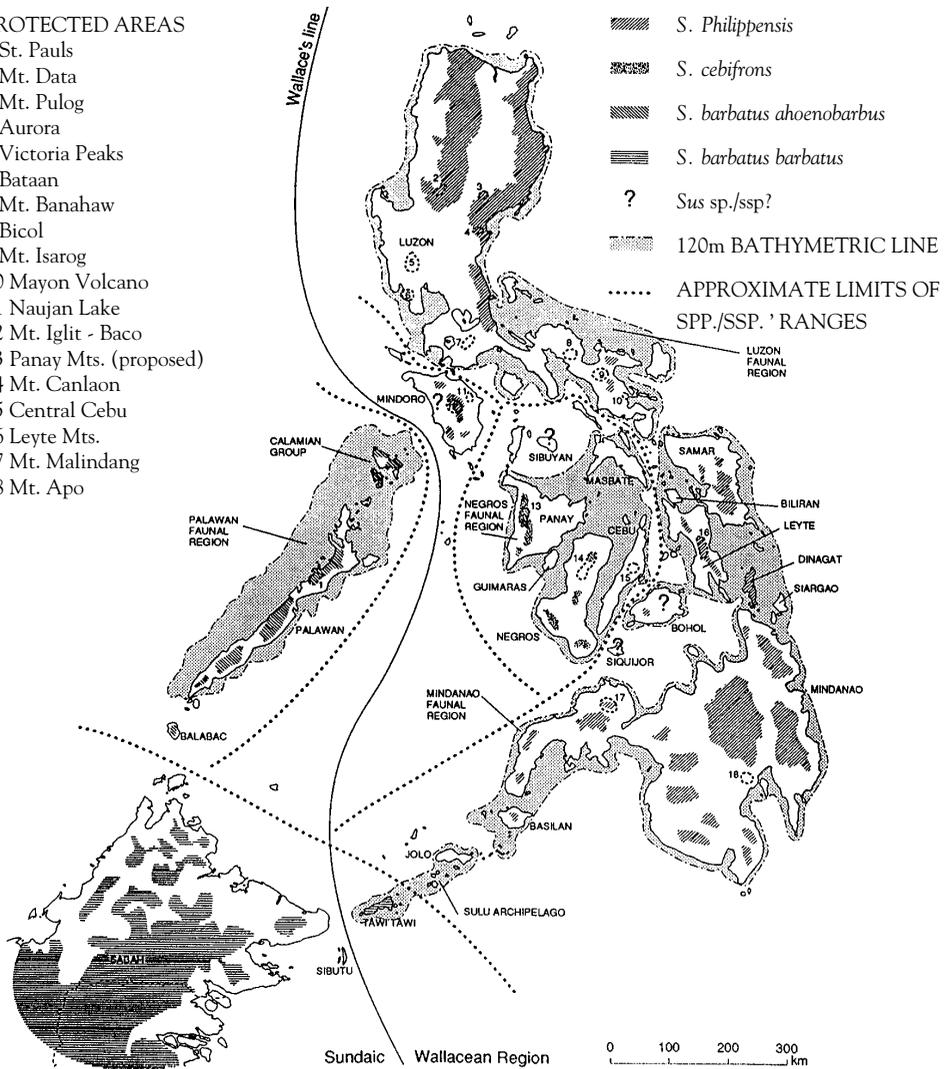


Figure 1 - Presumed former and present known distribution of wild pigs in the Philippines (modified after Groves, 1981; Cox, 1985; Heaney, 1986; Forest Management Bureau, 1988).

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

Taxon	Status	Distribution
<i>S. b. ahoenobarbus</i> (endemic ssp.)	Rare and declining	Balabac, Palawan and Calamians (Busuanga, Culion and Coron Is.)
<i>S. b. barbatus</i> (non-endemic ssp.)	Locally rare (but widespread in Borneo)	Sibutu and Tawitawi only?
<i>S. cebifrons</i> (endemic sp.)	Endangered to extinct	Panay, Guimaras (extinct) Negros, Cebu (extinct) and Masbate
<i>S. philippensis</i> (endemic sp.)	Rare and declining	Luzon, Catanduanes, Samar, Biliran, Leyte, Mindanao, Jolo* and ? other islands*
<i>Sus</i> spp./ssp. ?	Rare to extinct	Mindoro (rare), Sibuyan, (rare), Bohol (critical), Sequijor (extinct)

* = no recent data

Balabac and the Calamians Group) and Tawitawi 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 islands and island groups (e.g. Mindoro, Sibuyan, Sequijor and the Sulu Archipelago), though the affinities of some of these populations are not yet known (Tab. 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, *S. b. ahoenobarbus* is probably the most threatened subspecies of "typical" (or Sundaic) bearded pig (Caldecott *et al.*, 1993) and is "presumed" to be at greater risk than *S. philippensis*, because it has a relatively smaller range and because the isolated populations on the islands of Balabac (Oliver, in press) and the Calamians are unlikely to remain securely established. This subspecies is thought to be still relatively widely distributed on Palawan, where it may be locally common in some areas, but it is intensively hunted (McGowan, 1986 and pers. comm.) and the surviving forests on Palawan are being rapidly depleted by uncontrolled logging and agricultural encroachment (Quinnell & Balmford, 1988).

By comparison, *S. philippensis* has almost certainly been extirpated over a greater proportion of its former range than *S. b. ahoenobar-*

bus, 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 (Cox, 1985, 1987a; Rabor, 1986; L. Heaney, pers. comm.). By comparison, far less forest remains on Catanduanes (Heaney *et al.*, 1991) and Biliran where, by 1985, this species was reported to have declined to the point that viable populations were unlikely to survive for much longer (Cox, 1985, 1987a). *S. philippensis* is also reported 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 information from these areas is lacking. Wild pigs are reported to remain locally common in some still-forested areas of Mindoro (Rabor, 1986; Cox, unpubl.), though the identity of these animals, and those of Sibuyan, where pigs were reported for the first time in 1992 (S. Goodman, pers. comm.) are not yet known (Tab. 1).

The distribution and status of wild pigs on Samar, Leyte, Biliran and Bohol were collected during a field survey in the central Philippines in 1985. This was primarily intended to assess the status and future management needs of *S. cebifrons* and the Philippine spotted deer (*Cervus alfredi*), which were assumed to occur on these islands (Cox, 1985, 1987a). However, although all of these islands are included within the Visayas (geopolitical) Region, they are actually a northward extension of the

“Mindanao faunal region”, as defined by Heaney (1986) on the basis of the 120 m bathometric 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*, as Groves (1991) has confirmed, rather than *S. (b.) cebifrons*, as was assumed at the time (Cox, 1985, 1987a; Oliver, 1991; Oliver *et al.*, 1993).

Conversely, the recognition that *S. cebifrons* was confined to the west-central Visayan Islands of Cebu, Negros, Guimaras, Panay and (probably) Masbate (or “Negros-Panay faunal region”; Heaney, 1986), profoundly influences any assessment of its conservation status. This taxon is undoubtedly more gravely threatened than previously supposed, or indicated by its current “Vulnerable” designation in the *IUCN Red list of Threatened Animals* (IUCN, 1990). As it is, the species is certainly “Endangered” according to the terms of these status categories (Oliver, 1991; Oliver *et al.*, 1993).

The reasons for this are based on Cox’s (1985; 1987a) revelations that wild pigs are now extinct on the islands of Guimaras, Cebu and Sequijor, all of which have been virtually deforested (Cox, 1985; 1987a; D. Kho, pers. comm.). A similar situation obtains on Bohol, where the last remaining populations of wild pigs in the Rajaha Sikatuna National Park were said to be close to extinction by 1985 (Cox, 1985; 1987a; A. Alcalá, pers. comm.; D. Kho, pers. comm.) and on Masbate, where only two small populations were surviving by 1993, though both of these were subject to continued, intense hunting pressure (Oliver, in press). However, it is not known whether the Bohol or Masbate pigs are allied to *S. cebifrons* or *S. philippensis*. In either event, potentially viable populations of *S. cebifrons* are now confined to the western mountains of Panay, where their numbers are certainly declining, and to scattered fragments of surviving forest on Negros. This range is essentially identical to that of the critically threatened Philippine spotted deer (*Cervus alfredi*) and, in common with the latter species, all of the few surviving pig populations are subject to intense hunting pressure and the continued attrition and fragmentation of their remaining habitat.

The survival prospects of these pigs are therefore intimately linked with efforts now being made to conserve the spotted deer, which has been adopted as a “flagship” species for conser-

vation action in the west-central Visayas (Oliver *et al.*, 1991; Oliver, in press). To these ends, a new national park (>40,000 ha) has been proposed for the Mt. Madja-as/Mt. Baloy area of West Panay, in order to protect the single largest and more important tract of forest remaining in this region and, hence, the largest and most important surviving populations of these animals and diverse other Visayan endemic species. A preliminary management plan has been drafted in consultation with the relevant authorities (Cox, 1987b) and it is hoped that this park will be formally gazetted in the near future (W. Dee, pers. comm.). In addition, captive breeding projects have been initiated recently on Panay (at the West Visayas State University) and Negros (at Silliman University, Dumaguete City), under the aegis of formal agreements between the Department of Environment and Natural Resources (DENR), Government of the Philippines and the Zoological Society of San Diego, U.S.A..

On Negros, wild pigs are known to occur on Mt. Silay and the Mangdalangan Mts. (collectively comprising the Northern Negros Forest Reserve, c. 45,000 ha) and Mt. Canlaon National Park (24,600 ha; Tab. 2) in the north and in scattered forest fragments in the south, including the environs of Mt. Talinis/Mt. Guinsayawan/Lake Balinsasayao (c. 20,000 ha), near Dumaguete City. However, in all of these areas wild pigs are subject to intense hunting pressure as well as the continued attrition of their remaining habitat through illegal logging activities. In addition, the close proximity of outlying human settlements to most of the remaining forest fragments on Negros, poses a potentially severe risk of disease transmission and/or genetic contamination to wild pig populations through increased likelihood of their contact with free-ranging domesticates. The latter factor, in particular, has recently been revealed as a serious threat to the few remnant pig populations in the south of this island, where five of six wild-caught piglets collected in late 1992/early 1993 for the captive breeding project at Silliman University proved to be of hybrid origin (E. Alcalá, pers. comm.).

These problems and any future conservation efforts directed towards any of the Philippine wild pigs are exacerbated by the negative attitudes of most local people towards these animals. They are most frequently encountered when they are hunted in the forest fragments or when they emerge from the shelter of those fragments to forage in neighbouring cultivation

areas or “kaingins”. 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 ani-

mals, which are generally regarded as agricultural pests and, hence, a legitimate target for hunting activities. In the 1960’s, government officials distributed poison to farmers on Sibutu to destroy wild pigs (R. Hilado, pers. comm.), and some officers from the (former) Bureau of Forest Development (BFD) even suggested that wild pigs should be hunted down and killed wherever possible (Cox, 1987a).

Table 2: Existing and proposed national parks known or presumed to support populations of wild pigs.

Species/Area	Size (ha)	Location	Comment
<i>S. b. ahoenobarbus</i>			
St. Pauls	360	Palawan	Intact lowland rainforest; area soon to be extended to c. 50,000 ha.
Calauit Island	3,400	Calamians	Whole island declared a game reserve and sanctuary in 1976 to protect released hoofstock from Africa, but now threatened by human resettlements.
<i>S. cebifrons</i>			
Mt. Canlaon	24,557	Negros	Mostly relatively intact montane rainforest, but now isolated; wild pigs present, but hunted.
Panay Mts. (proposed)	40,000	Panay	Proposed to protect last area of remaining forest on this island; probably supports single largest pig population, but hunting is widespread.
Bulabog-Putian	850	Panay	Mostly deforested, wild pigs extinct in area.
Central Cebu	11,894	Cebu	Virtually deforested and heavily encroached; wild pigs extinct on island.
Sudlon	700	Cebu	Virtually deforested, wild pigs extinct on island.
<i>S. philippensis</i>			
Mt. Data		Luzon	Mostly pine forest; no recent information on pigs.
Bataan	23,853	Luzon	Monsoon forest; pigs (and hunting pressure) reported.
Quezon	535	Luzon	Remnant tract of lowland rain forest; pigs reported in 1978, but no recent information.
Mt. Isarog	10,112	Luzon	Wild pigs (and hunting pressure) reported in 1978; no recent information.
Leyte Mts.	c. 42,000	Leyte	Mostly montane and semi-evergreen forest, though some parts threatened by encroachment; prob. still supports a good pig population.
Mt. Apo	72,184	Mindanao	Formerly montane and lowland rain forest, but most of latter lost to encroachment; wild pigs definitely present.
Mt. Malindang	50,000	Mindanao	As Mt. Apo (above)
<i>Sus</i> sp./ssp ?			
Rajaha Sikatuna	9,000	Bohol	Wild pigs reported to be close to extinction.
Mt. Guitinguitin (proposed)	?	Sibuyan	Proposed to protect main watershed and most remnant forest; affinities of wild pigs are unknown (no museum specimens exist).
Mt. Iglit-Baco	75,445	Mindoro	Formerly mostly montane rain forest, but now largely disturbed or degraded; wild pigs said to be common in some places.

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