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Cover: Mixed media with fine liners, colour pencils, and watercolour background of an Indian funnel web spider. © Elakshi Mahika Molur.



Phenotypic variations in Mindoro Warty Pig *Sus oliveri* (Cetartiodactyla: Suidae)

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Four native wild pig species of the *Sus* genus have been identified in the Philippines. Very little information is available on the Mindoro Warty Pig *Sus oliveri*. Formerly, this species was treated as a subspecies of *S. philippensis* until it was recognized as distinct by Groves (1997) based on four skulls and one known skin collected from Mayapang, Rizal, Occidental Mindoro (Groves

2001). There are no recognized subspecies of *S. oliveri*, but it is closely related to two subspecies of *S. philippensis* (Groves 1997). Currently, *S. oliveri* is recognized as Vulnerable and Endangered by the IUCN Red List (Schütz 2016) and the Philippine Red List Committee through Department Administrative Order 2019-09, respectively.

According to Meijaard et al. (2011), the head skin

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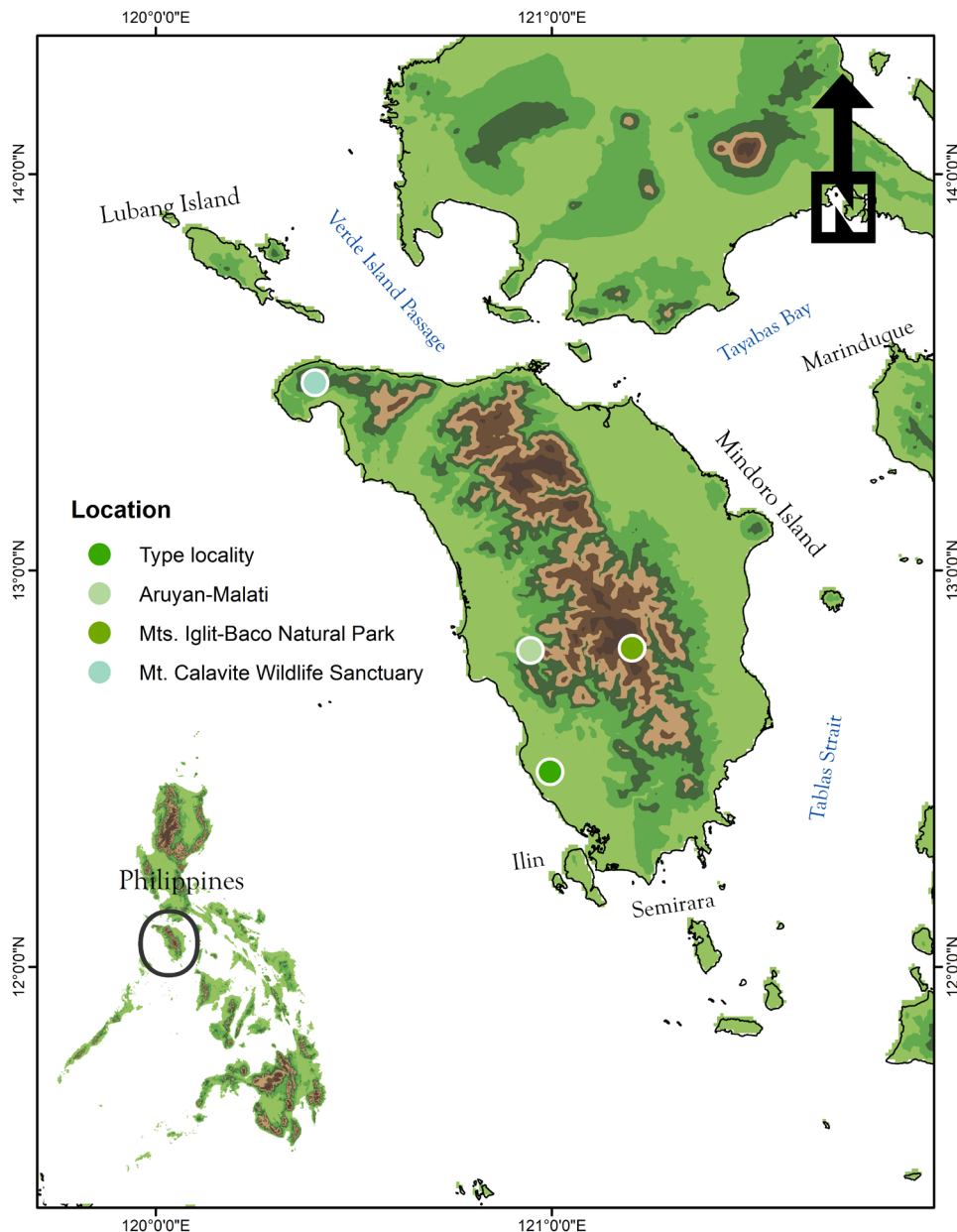


Figure 1. Map of Mindoro showing the area where the type locality and the camera trap photos of *Sus oliveri* were taken from.

of the holotype has sparse, dark brown or bristly black hair, usually longest along the spine and over the neck and back of the head, while the tusks and warts are conspicuous. Moreover, Groves (1997) described the species' head skin as having a black crown tuft mixed with straw-colored hairs, and no forward-directed components. The pre-ocular warts are well-developed with straw-colored gonial tufts. Recently, observations on camera trap photos of the Mindoro Warty Pig revealed a new phenotypic character between subpopulations of the species.

For this study, photos of *S. oliveri* were compiled from

all camera trap surveys conducted in Occidental Mindoro, particularly in Mts. Iglit-Baco Natural Park (MIBNP), Mt. Calavite Wildlife Sanctuary (MCWS), and Aruyan-Malati (Figure 1). MIBNP and MCWS are both declared protected areas in Mindoro while Aruyan-Malati was proposed as a critical habitat under the Philippine laws. Warty pig photos in MCWS and Aruyan-Malati has been gathered from camera trap surveys conducted by the authors from 2020 to 2022. Notably, a total of 53 camera traps were installed in a ~650 ha plot in MCWS from December 2021 to May 2022 totaling 2,095 camera days, with cameras positioned at altitudes ranging 648–1,477 m. A maximum



Image 1. A—Camera trap photos of male *Sus oliveri* in MCWS with clear snout band (© MATAPAT Project) | B—two females in MCWS with clear snout band (© MATAPAT Project) | C—male in Aruyan-Malati without snout band (© DAF) | D—female in Aruyan-Malati with faint snout band (© DAF) | E—group of *S. oliveri* in MIBNP with clear snout band (© WWF Philippines).

of 20 and a minimum of 15 camera traps were deployed in Aruyan-Malati, covering a total of 894.4 ha with 140 camera placements from November 2020 to May 2022, with cameras positioned at altitudes ranging 149–590 m. The warty pig photos from MIBNP were provided by the World Wild Fund for Nature Philippines (WWF) from their camera trapping survey from 2013 to 2018. Originally, these camera trap surveys were intended to assess the distribution of medium- to large-sized mammals in all sites, particularly the ‘Critically Endangered’ Tamaraw *Bubalus mindorensis*.

Forty-six warty pig photos were collected with the animal presence in MIBNP, while our camera trap surveys in MCWS and Aruyan-Malati recorded 15 independent

events (30 min intervals) in each site. For this study, only independent events where the facial appearance of the warty pig is observable were included. Five adult males, four adult females, two adult individuals of unknown sexes, and six juveniles were identified in MCWS. Two adult males and one adult female were identified in Aruyan-Malati. Meanwhile, eleven adults, two subadults, and four juveniles, all of the undetermined sexes, were identified in MIBNP. Based on photos, it has been observed that in both sexes, the faces of adult *S. oliveri* in MCWS and MIBNP (Image 1) are marked with a prominent whitish band in the snout. The white facial band is more conspicuous on adult individuals compared to subadults and juveniles. In contrast, this

white band is absent in the adult males (Image 1) and faint in the females of Aruyan-Malati (Image 1), which was also absent in the holotype description by Groves (1997). According to personal communications with the “amayan” (elders) and “punong balayan” (tribe leaders) of Iraya-Mangyan tribes in MCWS, there are two types of warty pigs in the protected area. As such, they call the warty pig without the white band “baboy-laon” or forest warty pig. These wild pigs are commonly found in the lower elevations of the protected area and are seldom caught in traps they put in their croplands and swidden agriculture areas. In addition, these warty pigs are very common in forested habitats with huge and longstanding trees. On the other hand, they call the warty pig with the white band “baboy-isiw” or Bamboo Warty Pig. This pig is found mostly in the higher elevations. They are less common and more elusive than “baboy-laon” as they inhabit the thick bamboo forests or forested areas in proximity to bamboo habitats.

Very little information is available on the true appearance of the Mindoro Warty Pig since only one head skin was used in describing the species. Compared to all the native *Sus* species in the Philippines, the warty pig in Visayas *S. cebifrons* is the only wild pig with a well-marked whitish band in the snout. Wherein, this white band covers the bridge on the nose and continues to follow the jawline until the angle of the jaw. Although this band is generally less pronounced in females than males, their white stripe is one of the primary distinguishing characteristic that separates this species from other wild pigs in the Philippines (Species Husbandry Guidelines 2003, unpublished). Thus, it is interesting to note that our observations on some *S. oliveri* individuals from camera trap photos found that this species also has a well-marked facial band. Unlike the white stripe in *S. cebifrons*, the white band of *S. oliveri* extends only from the bridge of the snout up to the end of the mouth and does not continue to cover the angle of the jaw. Moreover, it is also important to note that the holotype descriptions by Groves (1997) appear to be similar to the warty pig of Aruyan-Malati (low elevation) but the warty pigs photographed in MIBNP and MCWS (medium to high elevation) resemble more that of *S. cebifrons*.

The study has observed two distinct forms of *S. oliveri*, one variation matches the original holotypic descriptions while the other shows a prominent white snout-band. This difference can occur between the lowland and highland populations of the animals within Occidental Mindoro, as qualitative information through occasional interviews with local communities indicates,

but further research is needed to verify this aspect. These different highland and lowland forms have been verified by the local communities but further research is needed to determine their degree of distinctiveness. In the case of MCWS, this difference likely indicates some kind of isolation between the two morphologies, either physical, behavioral, or reproductive. Although insights from indigenous people affirm that the two forms of *S. oliveri* are morphologically and ecologically distinct from each other, it is difficult to conclude the origin of these differences. Whether they are separate species, they have different adaptations to their environment, or some of their subpopulations are experiencing intense hybridization is currently unknown. The possibility of hybridization between *S. oliveri* and *S. scrofa* may also be considered, particularly in the lowlands and community forests where interbreeding between the two species is likely to occur (Oliver et al. 1995), and such may be the case in the warty pigs of Aruyan-Malati as they are both from lowland areas. Therefore, investigation of genotypes between the two distinct forms should be done to identify the origin of such phenotypic differences. Such efforts should also investigate the rate of introgression with *S. scrofa* to determine the genetic integrity of the species. This also calls for genetic studies to investigate the relationship of *S. oliveri* with other Philippine *Sus* species in order to construct a comprehensive evolutionary history. Overall, the above-mentioned recommendations will aid decision-makers in appropriately assessing the status of *S. oliveri* and formulating appropriate conservation strategies for the species.

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