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Wildlife Conservation Society- Galle.  
Project Founded by Nation Trust Bank.



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# A new colour morph of Southern purple faced leaf langur (*Semnopithecus vetulus vetulus*) from the rain forests of southwestern Sri Lanka

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## Abstract

The primate research team of the Wildlife Conservation Society Galle (WCSG) has carried out research on Southern Purple Face Leaf Langur. Twenty-six troops from rain forests and home gardens around Galle and Matara Districts have been observed during this study. While recording observations, the team found 30 individuals with unusual white colour morph in 14 troops. The new colour morph was named as the Galanthus colour morph. Galanthus colour morph was mainly observed among troops mainly from rain forest and rain forest associated habitats. Determination of genetic or taxonomic differences among the sub-species of these monkeys requires molecular and morphological studies.

## Introduction

The Purple faced leaf Langur was previously considered to be in the genus *Trachypithecus*. Molecular analysis of Karanth *et al.* (2008) determined that the Purple faced leaf Langur belongs to the genus *Semnopithecus* and the genus *Trachypithecus* represents the Southeast Asian Leaf Langurs. Sri Lanka's Purple faced Leaf Langurs *Semnopithecus vetulus* are endemic to the island and represented by four subspecies from four different geographical zones:

- Southern purple faced leaf langur *Semnopithecus vetulus vetulus* (Erxleben, 1777)
- Mountain purple faced leaf langur *Semnopithecus vetulus monticola* (Kelaart, 1850)
- Western purple faced leaf langur *Semnopithecus vetulus nestor* (Bennett, 1833)
- Northern purple faced leaf langur *Semnopithecus vetulus philbricki* (Phillips, 1927)

The sub-species taxonomy of Purple faced leaf Langur is confusing, and has never been subjected to a rigorous molecular analysis. This is reflected by frequent changes in generic names of these Langurs (Brandon-Jones, 1984, 1993, 1999; Corbet and Hill, 1992; Groves, 2001a, Pocock, 1935, Hill 1939, Phillips, 1935, 1980). To solve this problem, Karanth *et al.* (2008) sequenced and analyzed the mitochondrial cytochrome b gene and two nuclear DNA-encoded genes, lysozyme and protamine P1, from a variety of colobine (leaf monkey) species. All three markers support the clustering of Nilgiri and Purple-faced Langur with Hanuman Langur, while Leaf Langurs of Southeast Asian (*Trachypithecus*) form a distinct clade. Their phylogenetic studies reveal both Purple faced leaf Langur and Hanuman Langur classified under genus *Semnopithecus*. Genetic studies within the recognized subspecies and geographical variations in both Hanuman and Leaf Langurs will help to distinguish their taxonomy.

## ***Semnopithecus vetulus vetulus* (Erxleben, 1777)**

**Size:** Size moderately large, head and body about 494- 542 mm; tail length range 691- 734mm, weight 5.5-9kg. Head small and rounded, with short, narrow neck; ears comparatively small, rounded and flattish but standing out prominently from the head (Phillip, 1935).

**Colour:** Generally, body and limbs black, sometimes with reddish-brown tint, and mid-dorsal area slightly frosted white; lower back and sacral region with triangular silver-white rump-patch, sharply defined margins and extending slightly down the tail and laterally onto the thighs as far down as the knees in some individuals. Whiskers white or off-white, frequently brownish at the tips; throat pure white and hairs about the mouth also white; under-parts black; tail silvery-white on two or three inches adjacent to the sacral patch, the remainder mole-grey, sometimes becoming reddish-brown towards the tip. Naked parts of the face, hands, feet pure black, eyes with golden brown iris (Phillip, 1935).

Among the National Museum primate specimen collection a pale coloured specimen was found having catalog number (4G 20.11.1923), collected by W.W Philips from Matara District, showing that there was colour diversity among the Southern Purple faced Leaf Langur even in early 1900's.



**Top** : A lighter Coloured specimen *Semnopithecus vetulus vetulus* deposited in National Museum By W. W. A. Philips catalog number (4G, 20/11/1923)

**Bottom** : A normal colour form specimen of *Semnopithecus vetulus vetulus* deposited in National Museum by W. W. A. Philips catalog number (4F, 02/12/1923)

**General Habits:** Southern purple-faced leaf Langurs inhabits both thick jungles and wooded home gardens. Observations made by the research team found the number of individuals in forest troops is lower than the number of individuals found in home gardens. The number of individuals per troop may vary from four to eighteen.

They live in the treetops, rarely descending to the ground to retrieve fallen fruit or in order to pass to another group of trees beyond their leaping range. Their tails are carried hanging down, not over their backs as in the Grey Langur. Each troop appears to have its own favorite range from which it rarely wanders (Phillips, 1935).

**Distribution:** It has been recorded south of Kalu River to Ranna by Phillips (1935). Its upper inland limits are restricted to nearly 1,000m from sea level. It has been recorded at Akurassa, Kekunadura, Welihena, Dandeniya, Wattahena, Polgahaivalakande, Krindi Mahayayakele, Kalubowitigana, Deniyaya, Diyadawa, Dediya, Kanumulderiya, Matara, Weligama, Pitabeddara, and Gongala (Matara Dist); Wakwella, Rumassala, Baddegama, Unawatuna, Galle Fort, Richmond Hill, Udugama, Yakkalamulla, Galle, Hiyare, Alpitiya, Ambalangoda, Hikkaduwa, Pitigala, Sinharaja, Kanneiya, Kottawa, Lankagama, and Habraduwa, (Galle district); Masmullah, Matugama, and Anasigalla (Kalutara district); Bambarabotuwa, Delgoda, Delwala, Denihena, Weddagala, Walankanda, Kudawa, Rakwana, Morahela, Hadapan Ella, Suriyakande, Ratnapura, Kribatgala, and Samanala Wewa (Ratnapura district) (Philips 1935; WCSG 2010).

## **Southern Purple faced leaf Langur (*Semnopithecus vetulus vetulus*) Galanthus colour morph**



**Left** : *Semnopithecus vetulus vetulus* Black colour morph

**Right** : *Semnopithecus vetulus vetulus* Galanthus Colour morph

From 2007 the primate research team of the Wildlife Conservation Society Galle (WCSG) has carried out research on distribution, feeding ecology and behavior of Southern Purple Face Leaf Langur. This included tracking and recording distribution using GPS locations, feeding behavior, food selection and social interactions of Southern Purple-faced Leaf Langur troops. Twenty-six troops from rain forests and home gardens around Galle and Matara Districts have been observed during this study. While recording observations, the team found 30+ individuals with unusual white colour morph in 14 troops. During the research all troops were give a troop number (e.g. T7) and all individuals were given an ID consistent with the troop number including a unique number to identify each individual within the troop (e.g. T5I7 is the seventh individual of fifth troop). There is no evidence to suggest full albinism of Galanthus (Etymology: Named for Its white body colour, Galanthus = Snow white) forms due to following reasons:

- All white individuals had black naked parts of the face.
- None of the white individuals had red eyes.
- All of the white individuals had beige to ashy brown crown hair.
- T4 troop had a white coloured alpha male.



Face of T3I1 showing the black naked part of the face and the eyes

Individuals with Galanthus colour morph were observed among 14 troops mainly from rain forest and rain forest associated habitats. The maximum ratio of individuals of the Galanthus morph to the normal morph was 4:6 (Troop ID: T4). This includes adults, juveniles and infants of both sexes. The alpha male of the troop T4 was a Galanthus male. The following observations show combinations of mother and infant observed by the research team.

<b>Mother</b>	<b>Infant</b>	<b>Troop ID</b>
Galanthus	Galanthus	T3 and T5
Galanthus	Black	T2
Black	Galanthus	T13
Black	Black	T1,T2,T3,T4,T5,T6,T7,T9,T11,T12, T13,T15,T16,T18,T19,T21,T25,T26

### **Galanthus colour morph**

Body and limbs white, sometimes with ashy patches, whiskers white or off-white, throat pure white and hairs about the mouth also white; under-parts pinkish to yellowish white, tail white. Naked parts of the face and ears black, hands and feet pinkish yellow with black patches. Eyes with golden brown iris and beige to ashy brown crown hair.



Sub adult T617



Mother T1117 and infant T1118



Alpha male T411



Adult Female T413



Mother T3I1 and Infant T3I2



Mother T5I1 and Infant T5I2



Galanthus Mother T8I7 and black Infant T8I8



Adult Male T2I3



Adult Female T414



T614

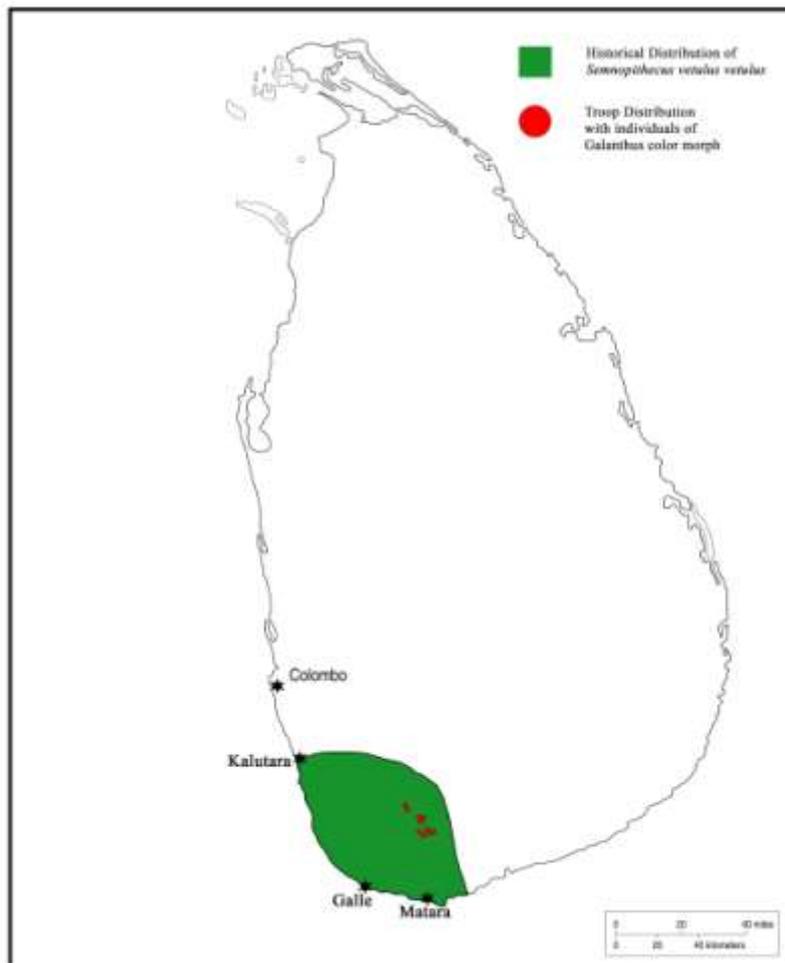


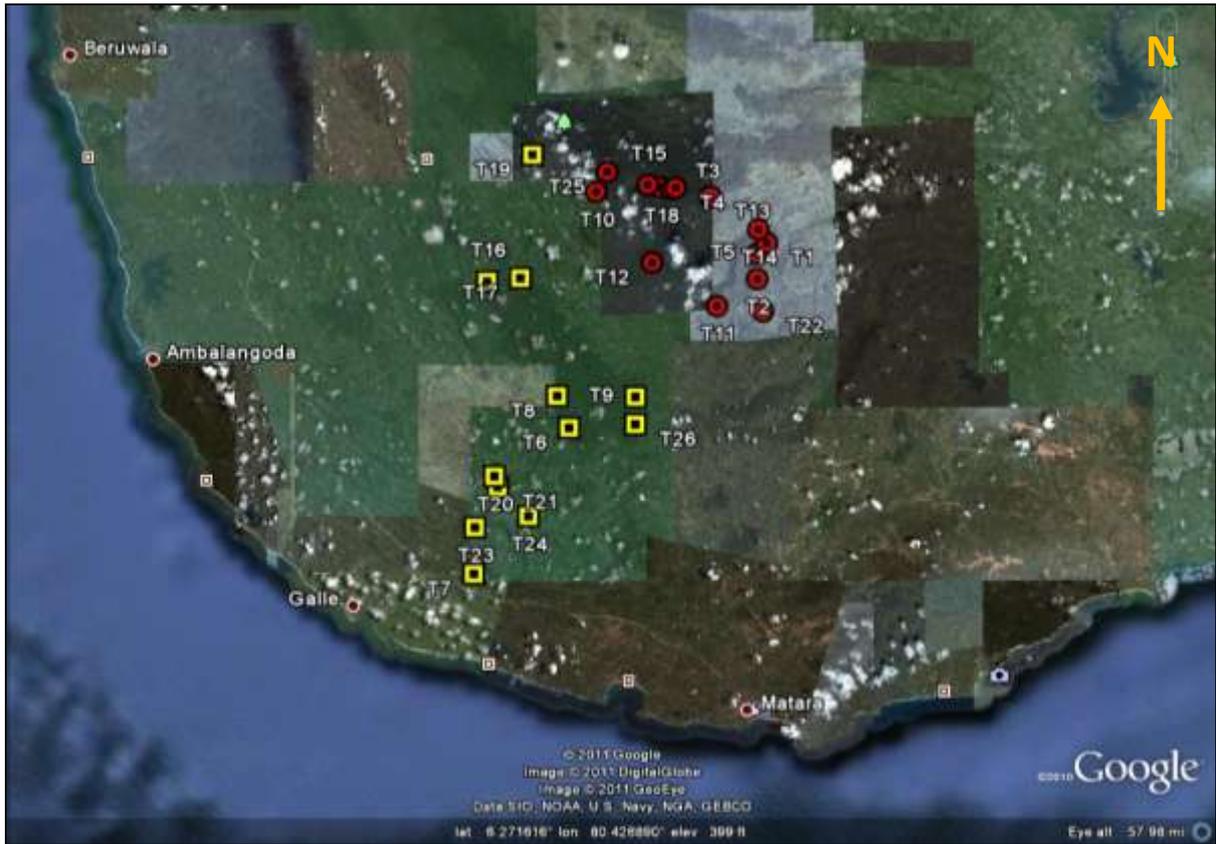
T215



Typical Habitat of *Semnopithecus vetulus vetulus* Galanthus Colour morph

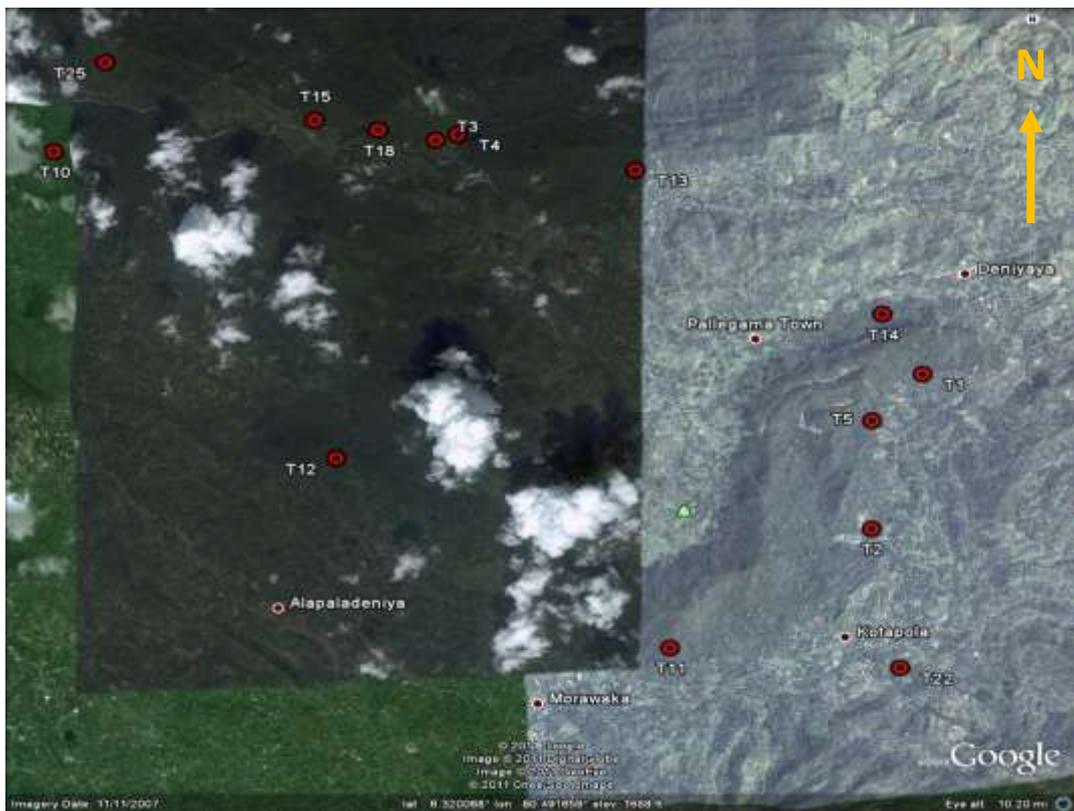
***Distribution of troops having the Galanthus colour morph***





 Troops with Galanthus colour morph

 Troops without Galanthus colour morph



The number of individuals with a white coloured coat is extraordinary. This can be an indication of the difference of the rain forest troops and the surrounding non-rainforest troops of Purple-faced Leaf Langurs. Determination of genetic or taxonomic differences among the sub-species of these Langurs requires molecular and morphological studies which the primate research team of WCSG is hoping to carry out in the future.

### **Conservation Issues**

Globally a third to half of all primate species are endangered because of habitat destruction and overexploitation (Mulu 2010). Developments in agriculture and irrigational strategies, along with an increase in human settlements, have caused damage to areas of Sri Lankan rainforest for decades (Erdelen 1988). Consequently, much of the rainforest is fragmented and troops that inhabit home ranges bordering human districts inevitably exploit agricultural land for food sources. Conflict in Southern areas may alter perceptions of the purple-faced leaf langur, currently considered as a pest in the more populated Western province, where it is the most common primate (Dela 2007; Rudran 2007) *Semnopithecus vetulus vetulus* inhabit the same space with humans in peri-urban and rural areas. They struggle to survive on stolen garden fruits and tree leaves in and surrounding homes. Many trees are removed as villages enlarge gardens and larger cultivated areas are expanded. This leaves many open areas that have to be crossed over, and the Langurs in that area are highly vulnerable. They then have to travel on the ground or on telephone and electrical wires, both options are often deadly; they are killed by dogs, traffic accident and electrocution.



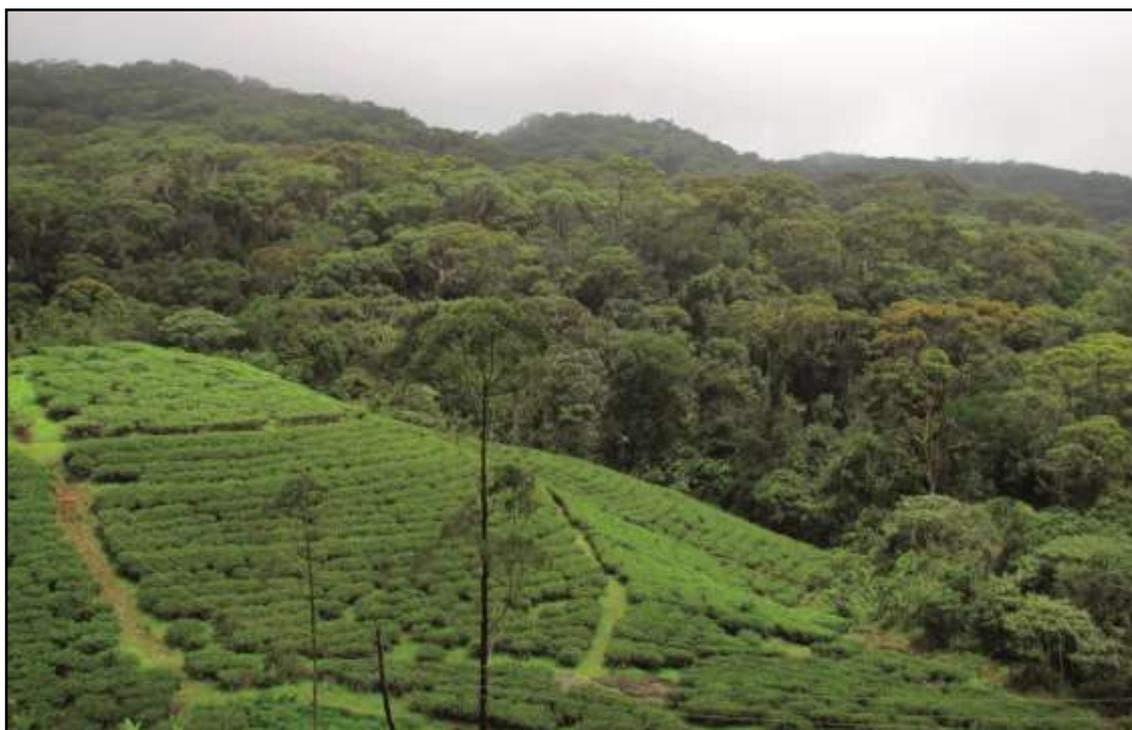
Purple faced leaf Langur using telephone cables to cross the road.



An electrocuted Purple faced leaf Langur.

However, most Sri Lankans are often tolerant owing to religious and cultural beliefs, which respect other forms of life, leaving habitat loss as the most fundamental threat. Although habitat loss is manageable, when whole forests are removed, the species in that habitat will not survive. Fragmentation occurs when forested areas are divided for plantations, roads, industry or urban expansion. Some individuals will be lost and some will survive in smaller areas but separate from their relatives.

Individuals with Galanthus colour morph were mainly observed among the troops inside rain forest and rain forest associated habitats. Most of these rain forests are adjoining to commercial lowland tea plantations and tea small holders, therefore a major issue related to the Galanthus colour morph is encroachment of rain forest by tea cultivations.



Encroachment of rain forest by tea cultivations

## **Conservation Measures**

Although the Purple faced leaf Langur is protected by Sri Lankan law and categorized as Endangered by IUCN ( IUCN Red list 2011) it faces a uncertain future if national policies are not actively implemented to ensure the species is protected. Policies and institutions need to ensure protection by fines, research, co-operation with urban planning and strict borders to reserves with surveillance. Forests, wildlife, environment, agriculture, and urban planning all fall into different ministries that rarely cross reference issues of preservation and protection of flora and fauna. Qualitative and quantitative data on existing species is needed for the whole island.

Systematic DNA testing is needed to determine subspecies and form accurate maps of locations and where groups are isolated and gene pools are narrowed. Individual numbers, breeding records, and mortality rate will help determine how stable the populations are and where the greatest efforts are needed to ensure preservation. Workshops and regional cooperation will help highlight issues to the general public and create awareness.

The striking white color morph will also hopefully provide an iconic image for the reinforcement of the current conservational strategies employed, heightening awareness of the vast number of endemics on the island. Village schools need programs to highlight the dangers of removing forests and importance of biodiversity. Sri Lanka has very high biodiversity within the global picture and this is something people need to be proud of in order to protect and keep their rank as one of the most special places on earth.

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