

## STUDIES ON THE PRESENT STATUS OF ENDANGERED NILGIRI TAHR (*HEMITRAGUS HYLOCRIUS*) IN MUKURTHI NATIONAL PARK, NILGIRIS, TAMILNADU, INDIA

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### ABSTRACT

The Nilgiri tahr is found mainly in the Nilgiris, Anaimalai's and then southwards at elevations of 4000-8000 feet (Prater, 1965). Nilgiri tahr (*Hemitragus hylocrius*) belongs to the family Bovidae. Uncontrolled hunting and conversion of habitat to plantations and human related pressure have resulted in the decline of the population (Schaller, 1977). This study was undertaken to determine the present population status, structure and distribution of the Nilgiri tahr in the Nilgiris. Each sector was enumerated on to successive days. Population pattern was studied by foot survey. A census was carried out with forest Department. In addition overall population of Nilgiri tahr within the park is decline due to biotic, abiotic and manmade activities. Grouping pattern of Nilgiri tahr primarily based on seasonal influence and individual fitness. It indicated that more Nilgiri tahr in north sector of the park but historically the south sector contains high density. The estimates suggest that predator accounts for almost all mortality experienced by Nilgiri tahr.

**Keywords:** *Hemitragus hylocrius*, Nilgiri tahr, Mukurthi National Park.

### 1. INTRODUCTION

Nilgiri tahr (*Hemitragus hylocrius*) belongs to the family Bovidae and subfamily Caprinae. The Nilgiri tahr in the same tribe as aoudad, bharal, goats and sheep. The Nilgiri tahr was first named *Kemas hylocrius* by Ogilby in 1838 (Lydekker, 1913). Warryatto is the rendition of the local Tamil name of the Nilgiri tahr "Varrai addu". In 1959, Blyth included the Nilgiri tahr in the genus *Hemitragus*, naming it *Hemitragus hylocrius* (Lydekker, 1913) the name that persists to date.

The Nilgiri tahr is found mainly in the Nilgiris, Anaimalai's and then southwards at elevations of 4000-8000 feet (Prater, 1965). The present range is restricted along a narrow stretch of 400km between Nilgiri hills in the north and Ashambu hills in the south (1130°N'-8°20'N). It habitat has been reduced to less than one tenth of the local range of the species in the past (Schaller, 1977). The Nilgiri Wildlife Association conducted the first census of the tahr in 1963. The tahr actually seen and counted amounted to 292. Finally in 1997 had a census and recorded only 147. Uncontrolled hunting and conversion of habitat to plantations and human related pressure have resulted in the decline of the population (Schaller, 1977; Davidar, 1978).

### 2. MATERIALS AND METHODS

Endangered Nilgiri tahr (*Hemitragus hylocrius*) is endemic to the Western Ghats

Mountains. Studies on population status of Nilgiri tahr at Mukurthi National Park, Nilgiris, Tamilnadu was conducted for the period of 2007 - 2008. The endangered Nilgiri tahr (*Hemitragus hylocrius*) is endemic to the Western Ghats Mountains in Tamilnadu and Kerala Anaimalai's Conservation unit, Eravikulam National Park and Nilgiri hills at Mukurthi National park consisting viable population of tahr.

#### 2.1. Historical abundance and distribution

To determine the historical abundance and distribution of Nilgiri tahr (*Hemitragus hylocrius*) in the Western Ghats of the Nilgiri plateau, we reviewed published papers, reports of surveys and hunters accounts. In addition we interviewed naturalists, hunters and shikaris (game watchers) who frequented this area since 1960's.

#### 2.2. Present abundance and distribution

To determine the present status of Nilgiri tahr (*Hemitragus hylocrius*) in the Mukurthi National park we conducted foot survey, oral interviews, census and total counts. When we sighted tahr we classified them into sex and age classes based on body size, pelage colour and horn size. We used the six classes described by Schaller, 1971, with modifications and details from Rice, 1984. However, while computing the mortality rate for the young age class we estimated the number of young by assuming that 90% of the adult female gave birth each year

(Schaller, 1977; Rice, 1988). We used this estimate as to record individual birth during this study and probably overlooked many very young tahr.

#### 2.2.1. Foot survey

We used foot survey primarily to obtain the best estimate of the population size. For the foot survey we divided the 78km<sup>2</sup> park into 5 sectors. The first sector included Pandiar top, Nilgiri peak and Devabetta. The second sector included Peechakal Bettu, Peechal Bettu, Chinna Mukurthi and Mukurthi Peak. The third sector included Western catchment III (WC III), Western catchment II (WC II) and Chattiparai. The fourth sector included Western catchment I (WC I) and Bangitapal. The fifth sector included Nadugani, Sispara and Kinkergundi. We attempted to visit each sector once every two months however.

The study was conducted in Mukurthi National Park and we used 'recky walks' method at 0.8 km h<sup>-1</sup> on both pre-existing and new routes, with a pedometer used to record distance walked. During 33 and 42 days of walks in the study area the average distance covered per day were 8.2 km and 7.5 km respectively. The total distances walked during day time were 264 km and 336 km in Mukurthi National park. Additional information on the presence and absence of mammal's species was gathered from forest staff, local inhabitants, foot prints, faecal deposits, calls, kills, foraging and roosting signs.

#### 2.2.2. Oral interviews

During the study Tamil Nadu forest department personnel and other frequent visitors to the park, such as fuel wood extraction laborers, tourist guides and naturalist to report all sighting of tahr.

#### 2.2.3. Census

A census covered all parts of the park simultaneously and we divided the park and its surrounding area in to 16 sectors. Crews of three or four members, including forest department employees who has familiar with the area surveyed each sector. All participants of the census were trained to use compass and map to identify mammals and were taught the census method.

#### 2.2.4. Total count

We replicated Davidar's, 1976 method in order to compare the result with him. We divided the park into five sectors, identical to the sectors used in the foot surveys, each sectors was searched simultaneously by two groups of observers. Each

group consisted of three observers. Survey effort time period on each sector was similar to the time spent by Davidar in each sector. The total count involved six observers who had served technicians on this study and had previous experience searching for tahr. We recorded all tahr sightings during the survey period. We eliminated sightings where we suspected a possibility of double counting.

### 3. RESULTS AND DISCUSSION

#### 3.1. Hunters record

Totally 164 Nilgiri tahrs (*Hemitragus hylocrius*) hunted by game watchers and 4.9 average Nilgiri tahrs per year was hunted. Maximum 11 tahrs were hunted in the year 1907, 1931 followed by 10 Nilgiri tahr (*Hemitragus hylocrius*) shot in the year 1911, 1932. License holders can hunt one Saddleback Nilgiri tahr (*Hemitragus hylocrius*).

#### 3.2. Census counts

The census was carried out with forest Department and using the outer bound method (Robson and Whitlock, 1964). We estimated that the park and its surrounding areas contains between 374 at first trip and 553 in second trip.

#### 3.3. Total counts

Total counts were conducted from 2007 to 2008. Myself and other researcher spent a total of 584.7 observer-hour spent and sighted 301 tahrs in 2007. During the year 2008, we spent of 618.93 and sighted off 337 tahrs. The maximum tahr was observed in Western catchment sector in 2007 sighted of 85 individuals and in 2008 highest observed in Nadugani sector of 92 Nilgiri tahr (*Hemitragus hylocrius*).

#### 3.4. Foot survey

Based on the sector wise percentage of 24.1% in the sector I, 23.3% in the sector II, 27.5% in the sector III, 23% in the sector IV and 2.3% in the sector V. Every hundred females 14% Saddleback, 12.66% Dark Brown Male, 22.66% Light Brown Male in 2007 was recorded. Based on the sector wise percentage of 21.8% in the sector I, 17.2% in the sector II, 26.7% in the sector III, 31% in the sector IV, 3% in the sector V. Every hundred females 12.57% Saddleback, 9.43% Dark Brown Male, 20.75% Light Brown Male in 2008.

#### 3.5. Kids record

Totally 357 Nilgiri tahr sighted in the year 2007 and group sighted 36 tahrs at Mukurthi and least sighted in the Madipumalai only 3 Nilgiri tahr (*Hemitragus hylocrius*). Maximum kids recorded in

Chinna Mukurthi 10 kids in a group and maximum 22 kids seen in the month of November followed by December 16 kids in the year 2007 and minimum 2 kids seen in the month of October. Maximum kids recorded in Karaiguhai 9 kids in a group and maximum 31 kids seen in the month of November followed by February 24 kids in the year 2008.

#### 4. CONCLUSION

In the present study, we observed the foot surveys conducted in 2007 and 2008 we estimated the population size as 358, 422 individuals respectively. We spent 2010 hours in 2007, 1980 hours in 2008 conducting these surveys and to obtain detailed group composition counts. Because we repeatedly obtained the same sex and age composition of each groups in the various areas, we feel that we had seen 80% of animals. Based on our results compared with Davidar's 1976 estimated of 450 Nilgiri tahr. In addition overall population of Nilgiri tahr within the park is decline due to biotic, abiotic and manmade activities. Grouping pattern of Nilgiri tahr primarily based on seasonal influence and individual fitness. We found that more Nilgiri tahr in the north sector of the park but historically the south sector contains high density. The age specific mortality high in yearling of Nilgiri tahr in Mukurthi National park. The present study suggested that predator accounts for almost all mortality experienced by Nilgiri tahr. We found that abiotic factors influence the birth season of Nilgiri tahr. We found the food habits the Nilgiri tahrs are primarily grazers and grass constitute about 70% of

their diet. Nilgiri tahrs are generally avoided of anthropogenic areas.

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**Table 1. The population status of Nilgiri tahr (*Hemitragus hylocrius*) in the Mukurthi National Park for the period of 2007.**

| Location                | N. tahr Population | 6+ Years (SB) | 5-6 Years (DBM) | 2-4 Years (LBM) | 2+ Years (AF) | 1-2 Years (Y) | 0-1 Years (K) | UI |
|-------------------------|--------------------|---------------|-----------------|-----------------|---------------|---------------|---------------|----|
| Catchment trekking shed | 24                 | 1             | 1               | 4               | 13            | 1             | 4             | -  |
| Catchment No.2          | 27                 | 2             | 1               | 4               | 12            | 4             | 3             | 1  |
| Mukurthi Peak           | 14                 | 1             | -               | 1               | 6             | 3             | 2             | 1  |
| Varagapallam West       | 13                 | 1             | 1               | 1               | 6             | 1             | 3             | 0  |
| Nilgiri Peak-base       | 33                 | 2             | 1               | 5               | 11            | 6             | 6             | 2  |
| Devabetta               | 14                 | -             | -               | 1               | 5             | 2             | 6             | -  |
| Chinna Mukurthi         | 21                 | -             | 2               | 1               | 13            | 2             | 3             | -  |
| Catchment-view point    | 32                 | 2             | 1               | 3               | 16            | 2             | 6             | 2  |
| Karadiguhai             | 45                 | 2             | 1               | 5               | 18            | 4             | 9             | 6  |
| Madipumalai             | 10                 | 2             | -               | -               | -             | -             | -             | 8  |
| Chettiparai             | 30                 | 1             | 1               | -               | 10            | 3             | 7             | 8  |
| Nadugani East           | 53                 | 2             | 1               | 2               | 10            | 3             | 12            | 23 |
| Terace Estate*          | 27                 | 1             | -               | -               | -             | -             | -             | 26 |
| Pandiar top*            | 18                 | 1             | 1               | 2               | 9             | 2             | 3             | -  |
| Naduganimattam*         | 23                 | 1             | 1               | -               | 4             | 4             | 6             | 7  |
| Pechakal Bettu*         | 38                 | -             | 1               | 2               | 16            | 12            | 7             | -  |

\*Represents Nilgiri Tahr (*Hemitragus hylocrius*) sighted outside the National park boundary  
SB-Saddleback, DBM-Dark brown male, LBM-Light brown male, AF-Adult female, Y-Yearling, K-Kids, UI-Unclassified.

**Table 2. The Population status of Nilgiri tahr (*Hemitragus hylocrius*) in the Mukurthi National Park for the period of 2008.**

| Location                | N. tahr Population | 6+ Years (SB) | 5-6 Years (DBM) | 2-4 Years (LBM) | 2+ Years (AF) | 1-2 Years (Y) | 0-1 Years (K) | UI |
|-------------------------|--------------------|---------------|-----------------|-----------------|---------------|---------------|---------------|----|
| Nilgiri Peak-base       | 26                 | 1             | 2               | 4               | 12            | 2             | 4             | 1  |
| Mukurthi Peak           | 23                 | 2             | 1               | 5               | 11            | 3             | 1             | -  |
| Devabetta               | 12                 | 1             | 1               | 2               | 6             | 1             | -             | 1  |
| Chinna Mukurthi         | 36                 | -             | 3               | 4               | 14            | 5             | 10            | -  |
| Pichal Bettu            | 5                  | -             | -               | 1               | 2             | -             | 2             | -  |
| Catchment View point    | 24                 | 2             | 1               | 3               | 13            | 2             | 3             | -  |
| Catchment Trekking shed | 23                 | 1             | 1               | 3               | 9             | 3             | 4             | 2  |
| Catchment No.2          | 24                 | 2             | 1               | 2               | 10            | 2             | 6             | 1  |
| Chettiparai             | 30                 | 1             | 1               | 1               | 12            | 3             | 7             | 5  |
| Madipumalai             | 3                  | 2             | 1               | -               | -             | -             | -             | -  |
| Naduganimattam          | 16                 | 1             | 1               | -               | 4             | 4             | 6             | -  |
| Nadugani East           | 30                 | 2             | 1               | 2               | 10            | 3             | 12            | -  |
| Karadiguhai             | 30                 | 2             | 2               | 3               | 12            | 3             | 4             | 4  |
| Terrace Estate*         | 20                 | 2             | 1               | -               | 8             | -             | 4             | 5  |
| Pandiar top*            | 18                 | 1             | 1               | 2               | 9             | 2             | 3             | -  |
| Pecchakal Bettu*        | 31                 | -             | 1               | 2               | 16            | 12            | -             | -  |
| Varagapallam West*      | 7                  | 1             | -               | -               | 4             | 1             | 1             | -  |

\*Represents Nilgiri tahr (*Hemitragus hylocrius*) sighted outside the National park boundary  
SB-Saddleback, DBM-Dark brown male, LBM-Light brown male, AF-Adult female, Y-Yearling, K-Kids, UI-Unclassified.

**Table 3. Nilgiri tahr (*Hemitragus hylocrius*) Nilgiri tahr age and sex classification in Mukurthi National Park during 2007 to 2008.**

| Season | Animals encountered | Individuals classified | 6+ years (SB) | 5-6 years (DBM) | 2-4 years (LBM) | 2+ years (AF) | 1-2 years (Y) | 0-1 years (K) | Classified percentage |
|--------|---------------------|------------------------|---------------|-----------------|-----------------|---------------|---------------|---------------|-----------------------|
| Winter | 358                 | 338                    | 21            | 19              | 34              | 152           | 46            | 66            | 94%                   |
| Summer | 422                 | 393                    | 21            | 15              | 32              | 176           | 63            | 86            | 93%                   |

SB-Saddleback, DBM-Dark brown male, LBM-Light brown male, AF-Adult female, Y-Yearling, K-Kids, UI-Unclassified.

**Table 4. Nilgiri tahr (*Hemitragus hylocrius*) Nilgiri tahr population structure towards 100 females in Mukurthi National Park during 2007 to 2008.**

| Season | Animals encountered | Individuals classified | 2+ years (AF) | 6+ years (SB) | 5-6 years (DBM) | 2-4 years (LBM) | 1-2 years (Y) | 0-1 years (YO) |
|--------|---------------------|------------------------|---------------|---------------|-----------------|-----------------|---------------|----------------|
| Winter | 358                 | 338                    | 100           | 13.8          | 12.5            | 22.37           | 30.26         | 43.42          |
| Summer | 422                 | 393                    | 100           | 11.9          | 8.52            | 18.18           | 35.8          | 48.86          |

SB-Saddleback, DBM-Dark brown male, LBM-Light brown male, AF-Adult female, Y-Yearling, K-Kids, UI-Unclassified.

**Table 5. Showing sector wise population status Nilgiri tahr (*Hemitragus hylocrius*) in Mukurthi National Park during the period 2007-2008.**

| Sector | Area  | Animals encountered | Individuals classified | 6+ years (SB) | 5-6 years (DBM) | 2-4 years (LBM) | 2+ years (AF) | 1-2 years (Y) | 0-1 years (K) |
|--------|-------|---------------------|------------------------|---------------|-----------------|-----------------|---------------|---------------|---------------|
| I      | 4.5   | 76                  | 70                     | 5             | 5               | 8               | 35            | 3             | 9             |
| II     | 5.3   | 95                  | 95                     | 2             | 5               | 12              | 43            | 11            | 8             |
| III    | 11.95 | 101                 | 92                     | 6             | 4               | 9               | 44            | 6             | 14            |
| IV     | 31.75 | 79                  | 74                     | 7             | 5               | 5               | 26            | 6             | 14            |
| V      | 24.96 | 7                   | 7                      | 1             |                 |                 | 4             | 1             | 1             |
| 2007   | 78.46 | 358                 | 338                    | 21            | 19              | 34              | 152           | 46            | 66            |
| I      | 4.5   | 92                  | 88                     | 5             | 3               | 8               | 35            | 10            | 17            |
| II     | 5.3   | 73                  | 73                     | 1             | 3               | 4               | 33            | 16            | 6             |
| III    | 11.95 | 113                 | 107                    | 6             | 4               | 11              | 54            | 7             | 13            |
| IV     | 31.75 | 131                 | 112                    | 8             | 4               | 8               | 48            | 9             | 22            |
| V      | 24.96 | 13                  | 13                     | 1             | 1               | 1               | 6             | 1             | 2             |
| 2008   | 78.46 | 422                 | 393                    | 21            | 15              | 32              | 176           | 63            | 86            |

SB-Saddleback, DBM-Dark brown male, LBM-Light brown male, AF-Adult female, Y-Yearling, K-Kids, UI-Unclassified.

**Table 6. The total count records on Nilgiri tahr (*Hemitragus hylocrius*) at Mukurthi National Park during the period 2007 and 2008.**

| Sector | Areas   | Number of N.tahr seen |      | Hours spent in Survey |       | N. tahr observers hours |       |
|--------|---|-----------------------|------|-----------------------|-------|-------------------------|-------|
|        |   | 2007                  | 2008 | 2007                  | 2008  | 2007                    | 2008  |
| I      | Nilgiri Peak, Devabetta. Pandiar top                          | 70                    | 81   | 148.3                 | 2.6   | 152.45                  | 3.18  |
| II     | Mukurthi peak, Chinna Mukurthi, Pichal bettu, Peechakal bettu | 67                    | 63   | 83.2                  | 4.23  | 118.15                  | 2.59  |
| III    | WCIII, WCII, Chettiparai                                      | 85                    | 88   | 152.05                | 3.84  | 122.25                  | 7.08  |
| IV     | Madipumalai, Nadugani, Sispara                                | 72                    | 92   | 126.15                | 1.89  | 151.08                  | 2.03  |
| V      | Varagapallam  | 7                     | 13   | 75                    | 0.15  | 75                      | 0.55  |
|        | Total   | 301                   | 337  | 584.7                 | 12.71 | 618.93                  | 15.43 |

**Table 7. The census records Nilgiri tahr (*Hemitragus hylocrius*) on Mukurthi National Park during the 2007 census record.**

| Areas                   | 1 <sup>st</sup> Day | 2 <sup>nd</sup> Day | 3 <sup>rd</sup> Day |
|-------------------------|---------------------|---------------------|---------------------|
| Nilgiri Peak            | 44                  | 18                  | 4                   |
| Devabetta               | 1                   | 0                   | 0                   |
| Terrace estate          | 0                   | 0                   | 0                   |
| Pandiar top             | 0                   | 0                   | 0                   |
| Mukurthi peak           | 18                  | 0                   | 0                   |
| Chinna Mukurthi         | 18                  | 0                   | 0                   |
| Pichal bettu            | 0                   | 0                   | 0                   |
| Pichakal bettu          | 0                   | 37                  | 0                   |
| Catchment view point    | 1                   | 0                   | 22                  |
| Catchment trekking shed | 0                   | 25                  | 0                   |

|                             |            |           |           |
|-----------------------------|------------|-----------|-----------|
| Catchment no 2              | 29         | 0         | 18        |
| Chettiparai                 | 5          | 7         | 0         |
| Kudugadibetta & Kolaribetta | 0          | 4         | 0         |
| Madipumalai                 | 1          | 0         | 0         |
| Naduganimattam              | 7          | 2         | 0         |
| Nadugani East               | 0          | 6         | 0         |
| Karadiguhai                 | 0          | 0         | 0         |
| <b>Total</b>                | <b>124</b> | <b>99</b> | <b>44</b> |

**Table 8. The census records Nilgiri tahr (*Hemitragus hylocrius*) on Mukurthi National Park during the 2008 census records.**

| Areas                 | 1 <sup>st</sup> Day | 2 <sup>nd</sup> Day | 3 <sup>rd</sup> Day | 4 <sup>th</sup> Day | 5 <sup>th</sup> Day |
|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Nilgiri Peak          | 0                   | 46                  | 43                  | 2                   | 0                   |
| Mukurthi shoulder     | 0                   | 1                   | 40                  | 0                   | 0                   |
| Mukurthi Peak         | 0                   | 0                   | 8                   | 10                  | 0                   |
| Chinna Mukurthi       | 0                   | 14                  | 46                  | 19                  | 0                   |
| Devabetta             | 0                   | 0                   | 5                   | 0                   | 0                   |
| Ellamalai             | 0                   | 0                   | 3                   | 0                   | 0                   |
| Nadugani West         | 0                   | 6                   | 3                   | 50                  | 0                   |
| Nadugani East         | 0                   | 0                   | 13                  | 53                  | 0                   |
| Madipumalai           | 0                   | 10                  | 0                   | 2                   | 0                   |
| Sispara               | 0                   | 0                   | 0                   | 3                   | 0                   |
| Kingerhundi           | 0                   | 0                   | 2                   | 0                   | 0                   |
| Western Catchment no2 | 0                   | 18                  | 22                  | 0                   | 0                   |
| Western Catchment iii | 0                   | 19                  | 16                  | 11                  | 13                  |
| Western Catchment ii  | 0                   | 18                  | 3                   | 20                  | 19                  |
| Chettiparai           | 0                   | 24                  | 8                   | 0                   | 0                   |
| Bangitapal            | 0                   | 0                   | 0                   | 0                   | 0                   |
| <b>Total</b>          | <b>0</b>            | <b>156</b>          | <b>212</b>          | <b>170</b>          | <b>32</b>           |

**Table 9. The three different methods showing the population status of Nilgiri tahr (*Hemitragus hylocrius*) in Mukurthi National Park during study period.**

| Method             | 2007       | 2008       |
|--------------------|------------|------------|
| Foot survey        | 377        | 426        |
| Census method      | 374        | 553        |
| <b>Total count</b> | <b>301</b> | <b>337</b> |