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## A Preliminary Checklist of Butterflies (Insecta: Lepidoptera) at Kunchebailu, Chikmagalur district, Karnataka

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### Abstract

The field survey was conducted to prepare a preliminary checklist of Butterflies at Kunchebailu, Chikmagalur district, Karnataka which is a part of Western Ghats area in India. Butterflies were sampled from November, 2019 to April, 2020 by following standard methods. This short term study revealed a total of 61 butterfly species belonging to 05 different families. Amongst them, family Nymphalidae records highest number of Butterfly species (41%), followed by Pieridae (20%), Papilionidae and Lycaenidae (16% each) families respectively. Whereas, the least number of Butterfly species was contributed by family Hesperidae (7%). Further, these butterflies were classified into Very Common (41%), Common (43%) and Rare (16%) based on relative abundance status. Interestingly, Butterfly species viz., *Castalius rosimum* Fabricius, *Pachliopta hector* Linnaeus, *Papilio clytia* Linnaeus, *Euchrysops cnejus* Fabricius, *Cepora nerissa* Moore and *Euploea core* Cramer which are listed in Schedule I, II and IV of Indian Wildlife Protection Act, 1972 were documented from the study area. Thus, the present investigation forms a baseline data on Butterfly diversity from the Western Ghats area and also may aid in need for its conservation in future.

**Keywords:** Butterflies, Nymphalidae, Indian Wildlife Protection Act 1972, Kunchebailu, Western Ghats

### Introduction

Insects contribute to more than half of all the species on this unique planet [23]. Among the most studied group in insects, butterflies are tantalizing and beautiful creatures [34] which are very specific to their food plants [5]. They are considered as the second largest pollinators followed after Honeybees [25, 26]. Butterflies accomplish pollination by being a key stone ecological processor in nature sustainability throughout the world [13]. Many butterflies are iconic, popular and form a natural heritage of our country [12]. The study on various aspects like the impact of habitat loss, fragmentation, climate change, the availability of host plants for oviposition and larval development [10, 27] on butterfly species has attracted many researchers attention throughout the world inspite of considering their important service in an environment quality assessment under terrestrial ecosystems [17, 28, 31]. Butterflies are an extremely important group of 'model' organisms used to investigate many areas of biological research, including diverse fields such as navigation, pest control, embryology, mimicry, evolution, genetics, population dynamics and biodiversity conservation [14]. They were also used as an 'Umbrella group' of species for Conservation and Management [3, 9]. In terms of indicator organisms for biodiversity studies, butterflies are an excellent choice as they are commonly present almost everywhere, attractive and easy to observe [24].

Butterflies are highly diverse group comprising over 250,000 species and make up around one quarter of all named species. There are approximately 17,200 butterfly species recorded from all over the world, amongst them 1,504 species of butterflies are recorded in India [1]. The butterfly fauna of southern part of the Indian peninsular is very rich and diverse compared to other part of the peninsular region, due to the availability of diverse habitat, a wide range of altitude gradients and are associated with microclimate regimes [27]. Of the various butterfly habitats found in India, the Western Ghats is one of the most diversified area containing a wide variety of species [11, 15, 19]. The Western Ghats section of Karnataka state, alone accounts for 331 species of butterflies, out of which 37 are endemic [6, 18, 36] belonging to five families, 166 genera and 331 species and they depend on more than 1,000 plant species for their breeding and feeding [21]. In Karnataka alone about 318 species of butterflies have been recorded [6].

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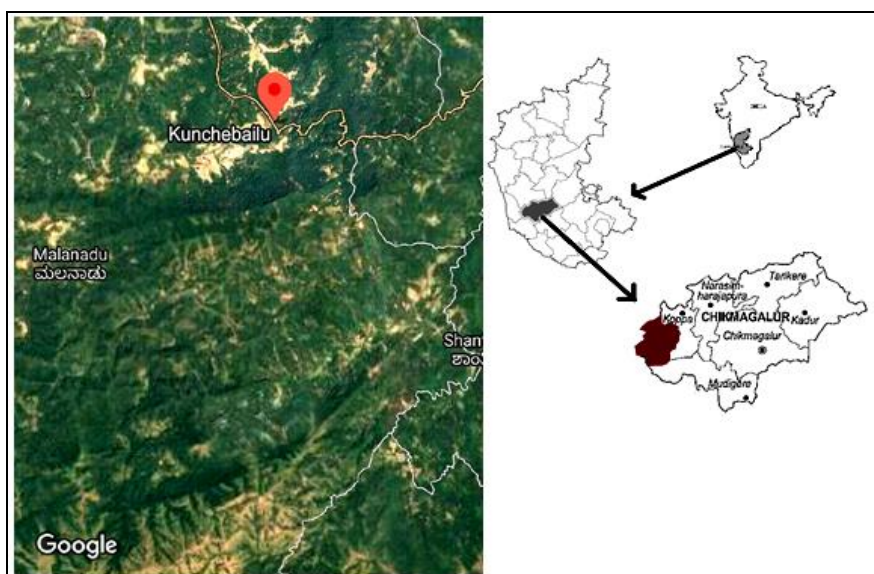
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However, studies related to butterflies from this study area are inadequate. Hence, a pioneer attempt has been made to

prepare a checklist of butterflies at Kunchebailu, Chikmagalur district, Karnataka.

## Materials and Methods



**Fig 1:** Map showing the study area of Kunchebailu, Chikmagalur District, Karnataka

The field survey was carried out at Kunchebailu (13° 23' 19.0"N latitude and 75° 17' 53.3"E Longitude) Chikmagalur District, Karnataka which is situated amidst Western Ghats, at a distance of 13kms from Shringeri. Observations were carried out Bimonthly basis from November, 2019 to April, 2020 at 9.00 to 11.00hrs and 15.00 to 18.00hrs to prepare a checklist of butterfly species. The study area was enriched with diversified vegetation comprising of both endangered fauna and flora. It is also predominant with Coffee Plantations, Nilgiri and Areca trees, which hosts food and shelter for the local and migratory butterflies. The Butterfly species were documented by employing Visual Count Method (VCM) and Pollard Walk Method (PWM) [4]. Far distant Butterflies are sighted using Binoculars (Nikon, Aculon A211; 8x42X) as per the standard methods [18, 20, 29]. Identification of recorded butterflies were based on the photographs captured using digital camera (Nikon D750, 70-300mm lens kit), field guides and through scientific literatures [2, 8]. The obtained data were analyzed statistically using MS Office Ultimate Program and PAST software (ver. 4.02, Canada Inc.).

## Results and Discussion

The preliminary checklist of Butterfly species recorded at Kunchebailu, Chikmagalur district, Karnataka during 2019-20 is represented in Table 1. Altogether, 61 butterfly species belonging to 5 different families viz., 25 species of Butterflies from Nymphalidae family, followed by 12 species from Pieridae, Papilionidae and Lycaenidae with 10 species each respectively and 04 butterfly species from Hesperidae family were recorded. The Density and Abundance of butterfly species were calculated using PAST Software. Most abundant butterfly species was found to be *Castalius rosimon* Fabricius (7.00) and least was *Tanaecia lepidea* Linnaeus (0.4). However, four butterfly species from Nymphalidae family and 3 species each from Papilionidae and Lycaenidae families were identified belonging to 'Rare' groups during the study. Interestingly, Butterfly species viz., *Castalius rosimon* Fabricius, *Pachliopta hector* Linnaeus, *Papilio clytia*

Linnaeus, *Euchrysops cnejus* Fabricius, *Cepora nerissa* Moore and *Euploea core* Cramer which are listed in Schedule I, II and IV of Indian Wildlife Protection Act, 1972 were documented from the study area (Table 1).

The ecological diversity indices were calculated for the observed Butterfly species. The Shannon Diversity index showed a high diversity indices value (3.927) representing the study area is enriched with good number of butterfly species. Other indices values substantiates the Shannon index value such as Dominance (0.023), Simpson reciprocal (0.977), Evenness (0.832), Brillouin (3.691), Menhinick (2.847), Margalef (9.789), Equitability (0.955), Fisher Alpha (18.880) and Berger-Parker (0.048) as represented in (Table 2) from the Western Ghats study area.

Further, Family Nymphalidae records highest number of Butterfly species (41%), followed by Pieridae (20%), Papilionidae and Lycaenidae (16% each) families respectively. Whereas, least number of Butterfly species was contributed by family Hesperidae (7%) as represented in Figure 2. Based on the relative abundance status (Table 1) butterfly species were classified into Very Common (41%), Common (43%) and Rare (16%) categories (Fig. 3). The present obtained results are in agree with the several researchers [2, 7, 15, 22, 30, 32, 33, 35], who have carried out similar type of studies at different parts of India and Karnataka.

The Dendrogram analysis of Butterfly species occurring at Kunchebailu, Chikmagalur District, Karnataka is as shown in Figure 4. The Algorithm Paired group from UPGMA pattern revealed that the Bray - Curtis Similarity index (0.3 – 1.0) representing for the recorded butterflies with Cophen Correlation Value of 0.8074. Hence, the recorded butterflies from the study area are almost having close relationship with phylogenetically modest similar adaptive characters and photographs of few butterflies species documented are represented in Plate 1.

## Conclusion

Findings of the present study underline the importance of Kunchebailu, Chikmagalur District, Karnataka as a preferred

habitat for butterflies study. The present study revealed 61 butterfly species belonging to five families of Lepidoptera, which are widely distributed amidst the study area, part of Western Ghats at Karnataka. The presence of scheduled Butterfly species under Indian Wildlife Protection Act, 1972 viz., *Castalius rosimon* Fabricius, *Pachliopta hector* Linnaeus, *Papilio clytia* Linnaeus, *Euchrysops cnejus* Fabricius, *Cepora nerissa* Moore and *Euploea core* Cramer also indicates the importance of this area for butterflies. It was noted that the existing butterfly species Density, Abundance and Seasonal occurrence varied significantly. Due to moderate tropical climatic conditions, the natural landscape and butterflies food plants may help to maintain and increase the butterfly

diversity from the study area in future. Thus, it is also imperative to carry out systematic studies on butterflies, through instigative and indepth research from butterfly Conservation point of view at Western Ghats.

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**Table 1:** Checklist of Butterfly species recorded at Kunchebailu, Chikmagalur district, Karnataka (2019 – 20)

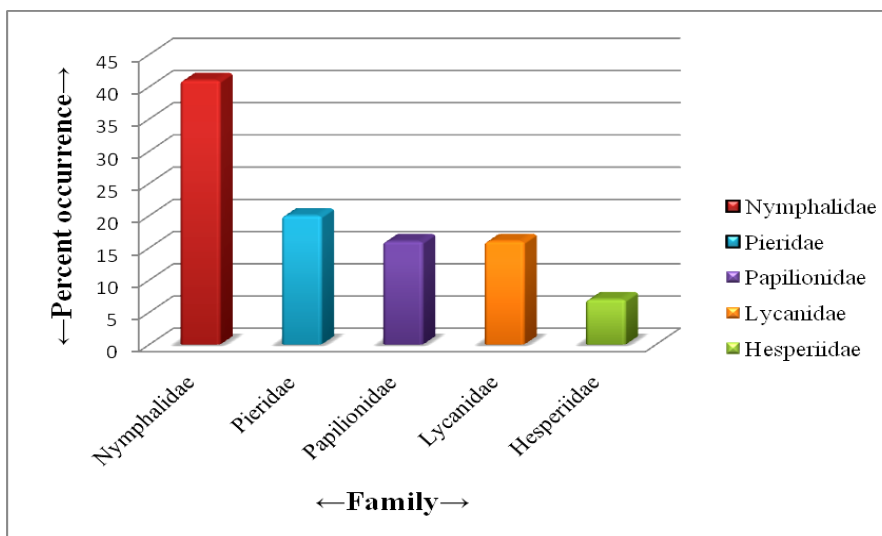
Sl. No.	Family	Sl. No	Common name	Scientific name	Density	Abundance	Status
1.	Nymphalidae (25 Species)	1.	Black Prince	<i>Rohana parisatis</i> Westwood	0.13	1.00	C
		2.	Blue Tiger	<i>Tirumala limniace</i> Cramer	0.93	3.50	C
		3.	Chocolate Pansy	<i>Junonia iphita</i> Cramer	0.40	2.00	R
		4.	Club Beak	<i>Libythea myrrha</i> Moore	0.13	2.00	R
		5.	Common Baron	<i>Euthalia aconthea</i> Cramer	0.40	1.50	C
		6.	Common Three-ring	<i>Ypthima asterope</i> Klug	1.27	3.16	R
		7.	Common Castor	<i>Ariadne merione</i> Cramer	0.66	3.33	VC
		8.	Common Crow	<i>Euploea core</i> Cramer	0.60	1.13	VC***
		9.	Common Evening brown	<i>Melanitis leda</i> Linnaeus	0.46	1.80	VC
		10.	Common Five ring	<i>Ypthima baldus</i> Evans	0.86	4.33	VC
		11.	Common Leopard	<i>Phalanta phalanta</i> Drury	0.53	4.00	VC
		12.	Common Sailer	<i>Neptis hylas</i> Moore	0.60	1.13	C
		13.	Dark- brand Bushbrown	<i>Mycalesis mineus</i> Linnaeus	0.60	3.00	VC
		14.	Dark-evening Brown	<i>Melanitis phedima</i> Cramer	0.20	1.50	C
		15.	Glad-eye Bushbrown	<i>Mycalesis patina</i> Moore	0.86	6.50	VC
		16.	Great Eggfly	<i>Hypolimnas bolina</i> Linnaeus	0.53	1.14	C
		17.	Grey Count	<i>Tanaecia lepidea</i> Linnaeus	0.13	0.40	C
		18.	Lemon Pansy	<i>Junonia lemonias</i> Linnaeus	0.80	2.40	VC
		19.	Nigger	<i>Orsotrioena medus</i> Evans	0.86	4.33	C
		20.	Palni Bush Brown	<i>Heteropsis davisoni</i> Moore	1.13	4.25	VC
		21.	Peacock Pansy	<i>Junonia almanac</i> Linnaeus	0.13	1.00	R
		22.	Plain Tiger	<i>Danaus chrysippus</i> Linnaeus	0.13	0.50	C
		23.	Rustic	<i>Cupha erymanthis</i> Drury	0.40	1.20	C
		24.	Southern Duffer	<i>Discophora lepida</i> Moore	0.33	0.71	C
		25.	Tawny Coster	<i>Acraea terpsicore</i>	0.13	1.00	VC
2.	Pieridae (12 Species)	1.	Common Emigrant	<i>Catopsilia pomona</i> Fabricius	0.26	0.80	VC
		2.	Common Grass Yellow	<i>Eurema hecabe</i> Linnaeus	0.60	1.80	C
		3.	Common Gull	<i>Cepora nerissa</i> Moore	0.60	2.25	VC**
		4.	Great Orange Tip	<i>Hebomoia glaucippe</i> Linnaeus	0.20	0.60	C
		5.	Lesser Gull	<i>Cepora nadina</i> Lucas	0.06	0.50	C
		6.	Mottled Emigrant	<i>Catopsilia pyranthe</i> Linnaeus	0.60	4.50	VC
		7.	Painted Sawtooth	<i>Prioneris sita</i> Felder Felder	0.46	1.75	C
		8.	Psyche	<i>Leptosia nina</i> Fabricius	0.46	3.50	VC
		9.	Small Grass Yellow	<i>Eurema brigitta</i> Stoll	1.06	2.66	VC
		10.	Spotless Grass Yellow	<i>Eurema laeta</i> Boisduval	1.00	7.50	C
		11.	Three Spot Grass	<i>Eurema blanda</i> Boisduval	0.53	2.66	VC
		12.	Yellow Orange Tip	<i>Ixias pyrene</i> Butler	0.46	1.75	C
3.	Papilionidae (10 Species)	1.	Blue Mormon	<i>Papilio polymnester</i> Cramer	0.46	2.33	VC
		2.	Common Mime	<i>Papilio clytia</i> Linnaeus	0.60	1.80	VC*
		3.	Common Mormon	<i>Papilio polytes</i> Evans	0.60	1.13	VC
		4.	Common Rose	<i>Pachliopta aristolochiae</i> Moore	0.40	1.50	VC
		5.	Crimson Rose	<i>Pachliopta hector</i> Linnaeus	0.26	1.33	R*
		6.	Lime Butterfly	<i>Papilio demoleus</i> Linnaeus	0.20	0.60	VC
		7.	Malabar Raven	<i>Papilio dravidarum</i> Wood-Mason	0.33	0.83	R
		8.	Red Helen	<i>Papilio Helenus</i>	0.26	1.33	R
		9.	Southern Birdwing	<i>Triodes minos</i> Cramer	0.40	1.50	VC
		10.	Tailed Jay	<i>Graphium Agamemnon</i> Evans	0.53	2.66	VC
4.	Lycaenidae (10 Species)	1.	Common Pierrot	<i>Castalius rosimon</i> Fabricius	0.93	7.00	R*
		2.	Common Shot Silverline	<i>Spindasis ictis</i> Hewitson	0.87	1.85	C
		3.	Forget-me-not	<i>Catochrysops Strabo</i> Fabricius	0.20	0.60	R

		4.	Gram Blue	<i>Euchrysops cnejus</i> Fabricius	1.40	2.44	C**		
		5.	Indian Sunbeam	<i>Curetis thetis</i> Drury	0.47	1.40	R		
		6.	Leaf Blue	<i>Amblypodia anita</i> Hewitson	0.07	1.00	C		
		7.	Lesser Grass Blue	<i>Zizina otis</i> Fabricius	0.40	1.50	VC		
		8.	Pale Grass Blue	<i>Pseudozizeeria maha</i> Kollar	0.47	1.80	VC		
		9.	Quaker	<i>Neopithecops zalmora</i> Butler	0.20	1.00	C		
		10.	Red Pierrort	<i>Talicauda nyseus</i> Khasiana Swinhoe	0.73	1.83	C		
		5.	Hesperiidae (04 Species)	1.	Common Small Flat	<i>Sarangesa dasahara</i> Moore	0.20	1.50	C
				2.	Grass Demon	<i>Udaspes folus</i> Cramer	0.26	2.00	C
				3.	Immaculate Snow Flat	<i>Tagiades gana</i> Moore	0.33	1.66	C
4.	Tamil Grass Dart			<i>Taractroceras ceramas</i> Evans	0.33	1.66	C		

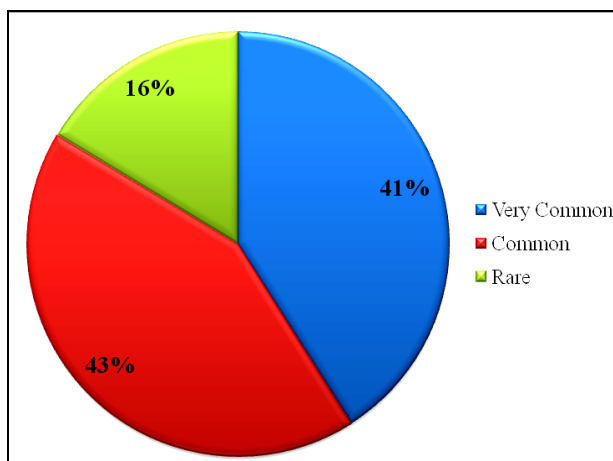
**Note:** C = Common; R = Rare; VC = Very Common. \* Schedule I, \*\* Schedule II and \*\*\* Schedule IV under Indian Wildlife Protection Act (IWPA), 1972.

**Table 2:** Ecological Diversity Indices of Butterfly species recorded at Kunchebailu, Chikmagalur district, Karnataka

Sl. No.	Indices	Index Values	Range	
			Lower Value	Upper Value
-	Taxa_S	61	-	-
-	Individuals	459	-	-
1.	Dominance_D	0.023	0.022	0.027
2.	Simpson_1-D	0.977	0.973	0.978
3.	Shannon_H	3.927	3.826	3.926
4.	Evenness_e^H / S	0.832	0.753	0.831
5.	Brillouin	3.691	3.598	3.691
6.	Menhinick	2.847	2.847	2.847
7.	Margalef	9.789	9.789	9.789
8.	Equitability_J	0.955	0.931	0.955
9.	Fisher_alpha	18.880	18.880	18.880
10.	Berger - Parker	0.048	0.041	0.070

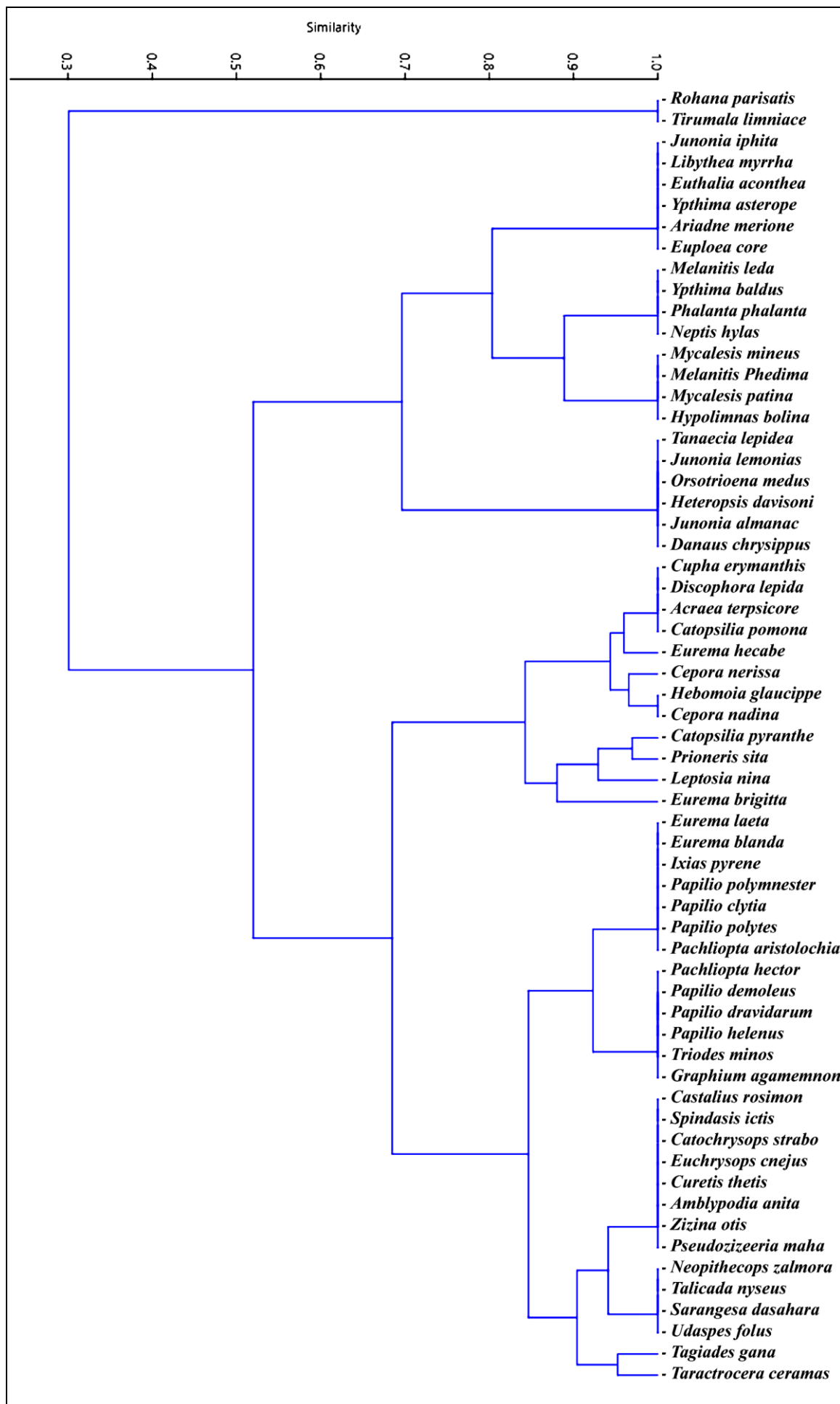


**Fig 2:** Per cent contribution of Butterfly families recorded at Kunchebailu, Chikmagalur district, Karnataka

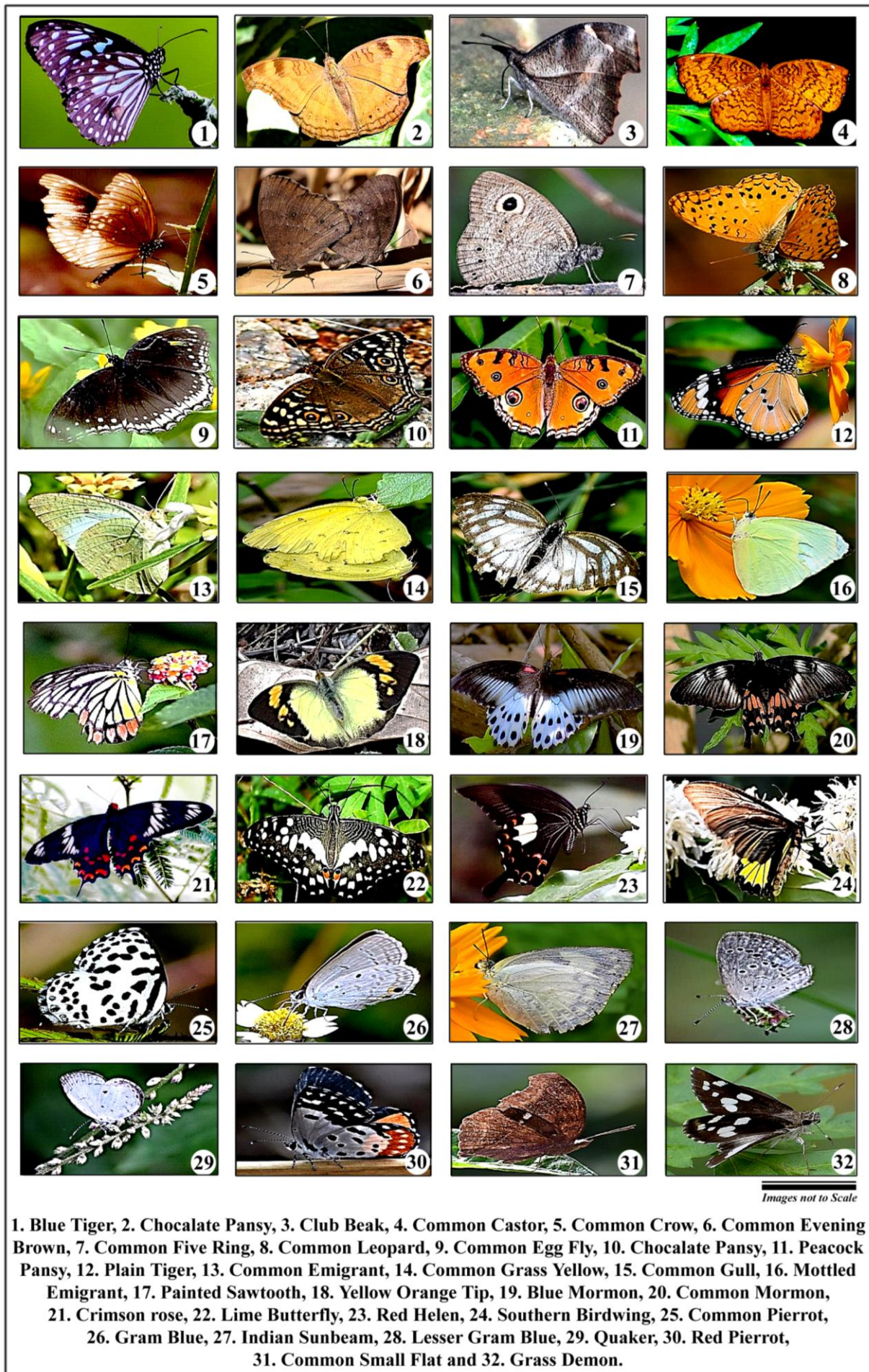


**Fig 3:** Relative abundance status in per cent values of Butterfly species recorded at Kunchebailu, Chikmagalur district, Karnataka





**Fig 4:** Dendrogram of Butterfly species occurring at Kunchebailu, Chikmagalur District, Karnataka



**Plate 1: Butterfly species documented at Kunchebailu, Chikmagalur District, Karnataka**



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