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Checklist of Orchids of Kottavasal Hills in Achancoil Forests, southern Western Ghats, (Kollam, Kerala), India

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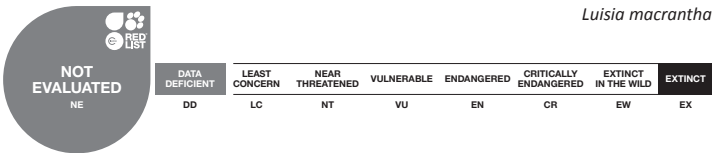
Abstract: The orchidaceous plant treasures in the Kottavasal Hills of Achancoil Shear Zone of the southern Western Ghats, situated in Kerala and a part of Agasthyamalai Biosphere Reserve, have not been subjected to a detailed floristic investigation. Field surveys were conducted during the period 2009–2012 and 53 orchid taxa were collected and documented. The present study points out that the orchid flora of Achancoil Shear Zone tends to have an affinity to the remnants of the Mozambique belt.

Keywords: Achancoil, orchids, southern Western Ghats.

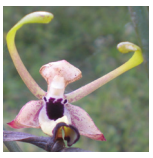
Achancoil is a shear zone (ASZ) that lies between the Madurai granulite block and Trivandrum khondalitic block. It is the continuum of the Mozambic belt of pan African orogeny, passing through Madagascar to Sri Lanka. The rock type and its genesis show the affinity of AKSZ to the remnants of the Mozambic belt, especially Sri Lanka (Rajesh et al. 1998). Biological linkages in between these geographical segments have great significance and hence worthy to be subjected to detailed investigation. The Kottavasal Hills are the highest hill ranges in the ASZ (Fig. 1).

Orchidaceae is one of the largest families of flowering plants in the world (Atwood 1986) with many species locally restricted and are generally rare (Benavides et al. 2005). Orchids comprise five subfamilies and approximately 870 genera and 30,000 species (Dressler 1993; Chen et al. 2009; Govaerts et al. 2009). Verma & Lavania (2014) reported 1414 orchid taxa under 186 genera from India; 265 taxa are found in Kerala comprising 108 terrestrials including six mycoheterotrophs and 157 epiphytic species distributed along different forest types (Sasidharan 2013). Orchid flora is one of the important components of tropical montane rainforests and grasslands like that of Achancoil for which there is no available literature.

This study deals with the enumeration of orchid flora of the seasonally inundated tropical montane forests and grasslands of Kottavasal in the ASZ of the southern Western Ghats. Endemic orchids have also been marked.



Luisia macrantha



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Methods

The study area is situated in Agasthyamalai Biosphere Reserve of Kerala, a part of the southern Western Ghats, about 40km east of Punalur and 30km west of Shenkottai, Tamil Nadu, within 09^{0}03'11"–09^{0}05'36"N & 77^{0}10'14"–77^{0}13'09"E. The study area includes 12km^2 of the tropical montane evergreen forest to grasslands. The altitudinal range varies from 751–1500 m. The survey for orchids was conducted during 2009–2012 and voucher specimens were collected to verify the taxonomy and distribution of each species using various publications (Fischer 1928; Sasidharan & Sivarajan 1996; Ramachandran & Nair 1988). Herbarium studies were also conducted to confirm the identity of each species at Kerala Forest Research Institute (KFRI), Jawaharlal Nehru Tropical Botanical Garden and Research Institute (JNTBGRI) and Calicut University (CALI). The occurrence and distribution of listed species were verified and analyzed with the help of standard publications (Ahmedullah & Nayar 1986; Gopalan & Henry 2000; Sasidharan 2013). The voucher specimens were deposited in the School of Environmental Sciences Herbarium, Mahatma Gandhi University, Kottayam, Kerala.

Results and Conclusion

During the present study, 53 orchid species belonging to 38 genera were recorded (Table 1). Among these orchids, 30 species (57%) were epiphytes, 17 (32%) were terrestrials and 6 (11%) were lithophytes. The present explorations resulted in the enumeration of 50 Asiatic elements. Among these, 15 species (28%) are considered endemic to India, viz.: *Anoectochilus elatus*, *Brachycorythis iantha, Bulbophyllum tremulum*, *Coelogyne nervosa*, *Conchidium filiforme*, *C. microchilos*, *Dendrobium georgei, D. kallarense, Eria pauciflora*, *E. mysorensis*, *H. longicornu*, *Luisia macrantha*, *Trias bonaccordensis*, *T. stocksii* and *Vanilla wightiana*; 15 taxa (28%) are Indo-Sri Lankan; and 11 taxa (21%) are Indo-Malayan elements. Indo-Chinese, Indo-Myanmar and Indo-Nepal elements contribute a single taxon representation (2% each). Four taxa (7.5%) in the orchid flora of Kottavasal Hills were enlisted from three or more provinces of Asia. Of the remaining, five species (10 %)

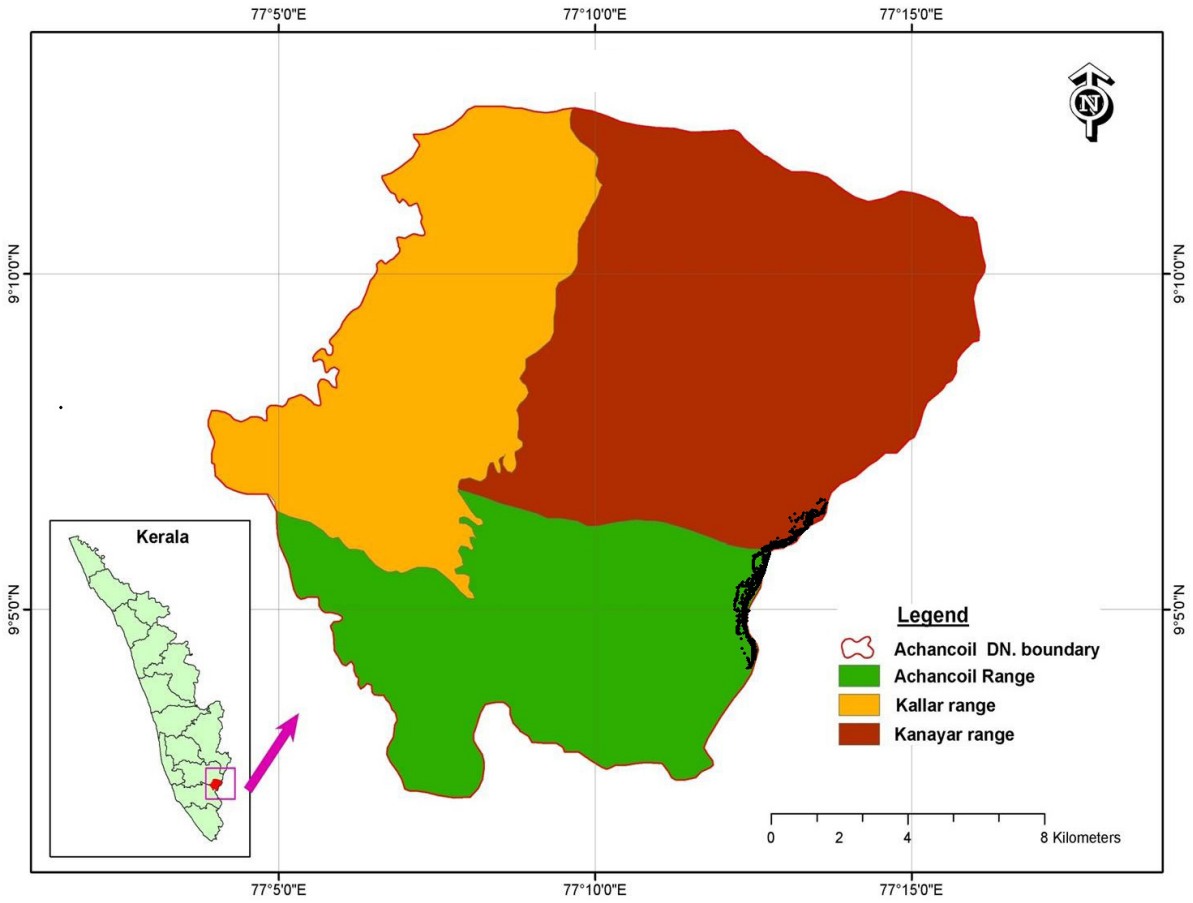

Figure 1. Kottavasal Hills marked in the map of Achancoil Forest Division.

Table 1. An orchid checklist of the Kottavasal Hills.

	Botanical Name	Life form	Distribution	Voucher No.
1	*Calanthe sylvatica* (Thouars) Lindl.	T	AF, MG, ICH & SL	JM2968
2	*Crepidium resupinatum* (G.Forst.) Szlach.	T	AS	JM2582
3	*Dendrobium herbaceum* Lindl.	E		JM2559
4	*Habenaria furcifera* Lindl.	L		JM2617
5	*Satyrium nepalense* D.Don	T		JM2750
6	*Dendrobium aphyllum* (Roxb.) C.E.C.Fisch.	E	AUAS	JM2501
7	*Geodorum densiflorum* (Lam.) Schltr.	T		JM2936
8	*Nervilia plicata* (Andrews) Schltr.	T		JM2766
9	*Cleisostoma tenuifolium* (L.) Garay	E	ICH	JM2588
10	*Peristylus richardianus* Wight	T	IN	JM2635
11	*Bulbophyllum sterile* (Lam.) Suresh	E	IMY	JM2622
12	*Aphyllorchis montana* Rchb.f.	T	IM	JM2982
13	*Arundina graminifolia* (D.Don) Hochr.	T		JM2742
14	*Crepidium purpureum* (Lindl.) Szlach.	T		JM2590
15	*Cymbidium aloifolium* (L.) Sw.	E		JM2664
16	*Liparis elliptica* Wight	E		JM2632
17	*Oberonia mucronata* (D.Don) Ormerod & Seidenf.	E		JM2769
18	*Pecteilis gigantea* (J. E. Smith) Rafin.	T		JM2626
19	*Pholidota imbricata* Hook.	E		JM2513
20	*Pteroceras leopardinum* (C.S.P.Parish & Rchb.f.) Seidenf. & Smitinand	E		JM2962
21	*Rhynchostylis retusa* (L.) Blume	E		JM2692
22	*Zeuxine affinis* (Lindl.) Benth. ex Hook.f.	T		JM2559
23	*Acampe praemorsa* (Roxb.) Blatt. & McCann	E	IS	JM2792
24	*Aerides ringens* (Lindl.) C.E.C.Fisch.	E		JM2735
25	*Conchidium braccatum* (Lindl.) Brieger	E		JM2749
26	*Dendrobium nutans* Lindl.	E		JM2684
27	*Dendrobium wightii* Hawkes & Heller	L		JM2731
28	*Disperis neilgherrensis* Wight	T		JM2770
29	*Eulophia epidendraea* (J.Koenig ex Retz.) C.E.C.Fisch.	T		JM2677
30	*Gastrochilus acaulis* (Lindl.) O.Kuntze.	E		JM2942
31	*Habenaria longicorniculata* Graham	T		JM2950
32	*Liparis wightiana* Thwaites	T		JM2638
33	*Luisia birchea* (A. Rich.) Blume	E		JM2762
34	*Oberonia verticillata* Wight	E		JM2536
35	*Schoenorchis nivea* (Lindl.) Schltr.	E		JM2681
36	*Sirhookera lanceolata* (Wight) O.Kuntze.	E		JM2902
37	*Trichoglottis tenera* (Lindl.) Rchb.f.	E		JM2543
38	*Polystachya concreta* (Jacq.) Garay & H.R.Sweet	E	PAN	JM2520
39	*Brachycorythis iantha* (Wight) Summerh. *	T	I	JM2760
40	*Conchidium microchilos* (Dalzell) Rauschert *	E		JM2703
41	*Eria pauciflora* Wight *	E		JM2627
42	*Habenaria longicornu* Lindl. *	L		JM2552
43	*Anoectochilus elatus* Lindl. *	T	WG	JM2608
44	*Bulbophyllum tremulum* Wight *	E		JM2915
45	*Coelogyne nervosa* A. Rich. *	L		JM2921
46	*Conchidium filiforme* (Wight) Rauschert *	E		JM2959
47	*Dendrobium georgei* J.Mathew *	E		JM2789
48	*Dendrobium kallarense* J.Mathew, K.V.George, Yohannan & K.Madhus. *	L		JM2787
49	*Luisia macrantha* Blatt. & McCann *	E		JM2935
50	*Pinalia mysorensis* (Lindl.) Kuntze *	E		JM2633
51	*Trias stocksii* Benth. ex Hook. f. *	E		JM2601
52	*Trias bonaccordensis* C.S. Kumar *	E		JM2929
53	*Vanilla wightiana* Lindl. ex Hook. f. *	T		JM2631

Abbreviations: AF - Africa, AS - Asia, AUAS - Australasia, ICH - Indo Chinese, I - India, IN - India to Nepal, IM - Indo Malaysia, IMY - Indo Myanmar, IS - Indo Sri Lanka, MG - Madagascar, PAN - Pantropics, PI - Peninsular India, WG- Western Ghats, E - Epiphytes, L - Lithophytes, T - Terrestrial. * - Endemic to India

Image 1. *Luisia macrantha* Blatt. & McCann.

Image 2. *Pecteilis gigantea* (J.E. Smith) Rafin.

Image 3. *Conchidium braccatum* (Lindl.) Brieger

Image 4. *Habenaria longicornu* Lindl.

were treated as Afro-Asian, Australasian and Pantropical elements (Table 1).

Endemicity of the orchids in the Kottavasal Hills throws light on the significance of biogeography of ASZ (Images 1–14). It is assumed that the invasion of African elements to the peninsular Indian region and migration of Indian endemics to Sri Lanka might have occurred along with the splitting of the Mozambic belt (Mathew 2015). *Calanthe sylvatica* present in the foothills of Kottavasal, is widespread from Africa, through Madagascar, Indochina to Sri Lanka (Sasidhran 2013). Besides that, the moderate rate (28%) of Indo-Sri Lankan orchids in ASZ validates the above hypothesis.

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Image 5. *Satyrium nepalense* D. Don

Image 6. *Trias bonaccordensis* C.S. Kumar

Image 7. *Trichoglottis tenera* (Lindl.) Rchb.f.

Image 8. *Vanilla wightiana* Lindl. ex Hook.f.

Image 9. *Arundina graminifolia* (D. Don) Hochr.

Image 10. *Dendrobium nutans* Lindl.

Image 11. *Habenaria longicorniculata* Graham

Image 12. *Cymbidium aloifolium* (L.) Sw.

Image 13. *Brachycorythis iantha* (Wight) Summerh.

Image 14. *Dendrobium kallarens*e J. Mathew, K.V. George, Yohannan & K. Madhus.

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