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A checklist of epiphytic Orchid flora of Sribhumi district (Barak valley), Assam, North–east India

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ABSTRACT

The present study was carried out to identify, document, and explore the diversity of epiphytic orchid species in Sribhumi district located in the Barak valley region of Assam, North-east India. An extensive field survey was conducted during different seasons across the six reserved forests under the Sribhumi Forest Division, namely Badsaitilla, Longai, Singla, Duhalia, Tilbhoom, and Patheria reserved forests. Orchid specimens were collected mainly during their flowering periods to ensure accurate identification. Each specimen was photographed in its natural habitat, carefully documented, and preserved as herbarium material following standard taxonomic procedures for further verification and reference. The investigation recorded a total of 43 species of epiphytic orchids distributed among 21 genera. Among these, the genus Dendrobium showed the highest species representation with nine species (21%). This was followed by Coelogyne with four species (9%), Aerides with three species (7%), while the remaining genera were represented by fewer species. The presence of several orchid species that have not been previously documented from the study area highlights the significant diversity of orchids in the region and suggests that the orchid flora of the Barak valley is remains unexplored. The results highlight the ecological significance of the forest ecosystems of Sribhumi district as important habitats for epiphytic orchids. The present study provides baseline information and an updated checklist of epiphytic orchid species from the valley, which may serve as a reference for further taxonomic studies, biodiversity assessments, and the development of effective conservation and management strategies aimed at protecting orchid diversity and maintaining the ecological integrity of forest habitats in the valley.

Keywords: *Epiphytic orchids, Orchidaceae, Reserved Forests, Sribhumi district, Assam, North-east India.*

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Introduction

Orchids constitute one of the largest and most diverse families of flowering plants with remarkable variation in floral structure, variation in floral morphology, colour, texture, ecological adaptations and habitat preferences. Most of the orchid species are epiphytes, grow on other plants commonly on trees for physical support rather than rooting in soil. However, they are not parasitic. Instead, they function as "air plants" using specialised aerial roots to absorb moisture and nutrients directly from the surrounding air, rainwater, and organic debris.

The family Orchidaceae is widely known for its horticultural value and ecological significance, particularly in tropical and subtropical forests. These plants are widely admired for their beauty and are considered among the most important ornamental plants in the world. Apart from their ornamental importance, orchids also play a significant role in maintaining forest ecosystem balance and biodiversity[1].

Globally, the family comprises approximately 28,000 species distributed across nearly 800 genera, occurring in diverse habitats ranging from tropical rainforests to temperate grasslands. In India, orchids represent a significant component of plant biodiversity. The country is estimated to harbour about 1,300 orchid species belonging to around 166 genera, representing all the major orchid tribes.

However, many forested regions of India still remain botanically unexplored, and the actual orchid diversity is likely to be higher than currently recorded.

The Northeast region of India is considered the richest orchid diversity hotspot in the country and the region comprises eight states, viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. It occupies 7.7% of India's total geographical area supporting 50% of the flora (ca. 8000 species) of which 31.58% (ca. 2526 species) is endemic. The floristic richness of the North - eastern region of India is known to all, where orchids are one of the major components of the vegetation with about 800 species, nearly 191 species of orchids grow in Assam [2]. The region lies at the intersection of the Indo-Malayan, Indo-Chinese, and Himalayan phytogeographic zones, which contributes to its remarkable plant diversity. The presence of dense forests, high rainfall, humid climate, and varied altitudinal gradients provides ideal ecological conditions for the growth of numerous orchid species.

Assam located in the northeastern part of India, is particularly rich in orchid diversity. The state is characterised by diverse vegetation types including tropical evergreen, semi-evergreen, moist deciduous, and bamboo forests.

The climatic conditions of Assam, including high temperature, heavy rainfall, and high humidity, create an ideal environment for orchid growth and survival. Many orchid species found in Assam are epiphytic in nature, growing on tree trunks and branches in forest ecosystems without deriving nutrients directly from the host plant.

Topographically, Assam can be broadly divided into three major physiographic regions: the Brahmaputra valley, the Barak valley, and the hill ranges of Assam [3]. The Barak valley, situated in the southern part of the state, comprises three districts- Cachar, Sribhumi, and Hailakandi. This region exhibits a rich and varied vegetation pattern represented by different forest types. Tropical wet evergreen forests occur at lower altitudes of the Borail Range and within reserve forests such as Loharbond, Sonai, Longai, and Badsaitilla located in Sribhumi districts. Tropical semi-evergreen forests are distributed in areas including Duhalia, Bhuban Pahar and Innerline Reserve Forests. In addition, moist deciduous mixed forests are found in the North Cachar Hills region, along with extensive grasslands, swampy areas, and transitional vegetation types across the valley [4].

Owing to its diverse vegetation and forest ecosystems, Assam supports a remarkable diversity of plant species. The state is known to harbour 3,854 taxa (including infraspecific taxa) belonging to 1,394 genera and 236 families. Of these, around 2,752 taxa belong to dicotyledons, 1,080 to monocotyledons, and 22 taxa represent gymnosperms. A significant number of these plants fall under various conservation categories, including about 167 endemic taxa, highlighting the botanical importance of the region [5]. The earliest attempts to document the vegetation of Assam can be traced back to the observations and records of F. Buchanan-Hamilton in the early nineteenth century. Later, the monumental work Flora of British India by [6] included numerous plant species from Assam and the northeastern region of India. Subsequent systematic floristic studies were carried out by early botanists such as [7] and [8], who documented about 3,431 species along with several varieties from northeastern India, many of which were reported from the Barak valley.

In later years, several floristic surveys and plant collections have been conducted periodically in this region. District-level botanical explorations have been undertaken by institutions such as the Botanical Survey of India (BSI), Assam University (Silchar), Gauhati University, Dibrugarh University, and Cotton University. The floristic study such as flora of Barak valley with their Economic Utility by [9], here a total of 596 species of herbaceous flora belonging to 142 families were enumerated. Some of the other work on floristic of Barak valley include [10], [11], [12], [13], [14], on phytosociology by [4] and [15].

The study of orchids in Assam was carried out by different worker in various places such as [16], [17], [18], [19], [20]. The orchid study was carried out in the Barak valley such as the Orchid Flora of Southern Assam Diversity and Their Conservation (Barak Valley) by bhattacharya et. Al. 2018 and [21].

Despite the rich biodiversity of Barak valley, scientific studies on orchid diversity remain limited. Most earlier studies in the region have focused primarily on herbaceous vegetation and general angiosperm diversity, with relatively little emphasis on the systematic documentation of orchid flora. As far as orchid studies in the state of Assam are concerned, no comprehensive account of its orchid flora is available in the Sribhumi district. And also, in the several areas of Southern Assam specially for Barak valley remains unexplored.

Therefore, the present study was undertaken to document the epiphytic orchid diversity of Sribhumi district in Barak valley, Assam. The objectives of the study were to explore and record the epiphytic orchid species occurring in different reserve forests of the Sribhumi district, to prepare a comprehensive checklist of the recorded species, and to highlight the ecological conservation status. This data also provides baseline information that may support future taxonomic research, make an updated flora of Barak valley, biodiversity conservation, and sustainable management of orchid resources in the region.

Materials and Methods

Study Area

Sribhumi district, is located in the southernmost part of Assam in the Barak valley region. The district lies between 92°15′-92°35′ E longitude and 24°15′-25°55′ N latitude. It shares international borders with Bangladesh to the west and is bounded by the Indian states of Tripura and Mizoram to the south. Geographically the forest which together cover more than 54,000 hectares of forest area in the district.

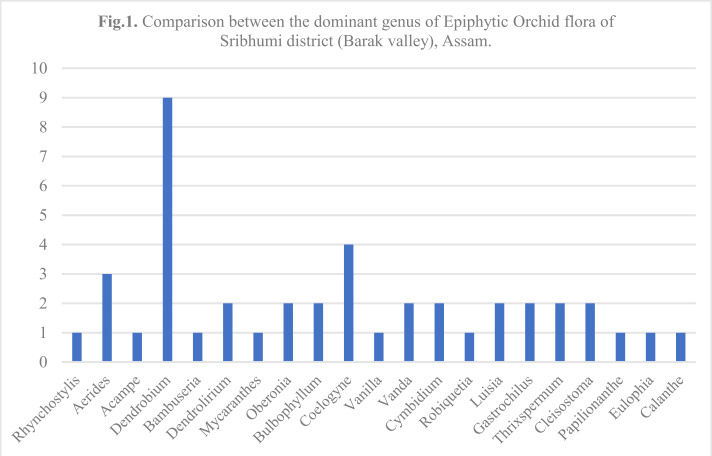
The district is characterised by tropical climatic conditions with high rainfall, warm temperature, and high humidity throughout most of the year. These environmental conditions favour the growth of dense forests and diverse plant species. The current survey was primarily conducted to the six reserved forest under the Sribhumi Forest Division such as Badsaitilla (24.34495°N and 92.34625° E), Longai (24.63°N and 92.40°E), Singla (24.54°N and 92.39°E), Duhalia (24.57° N and 92.46°E), Tilbhoom (24.50°N and 92.32°E), and Patheria (24.68°N and 92.30°E) Reserve Forest.

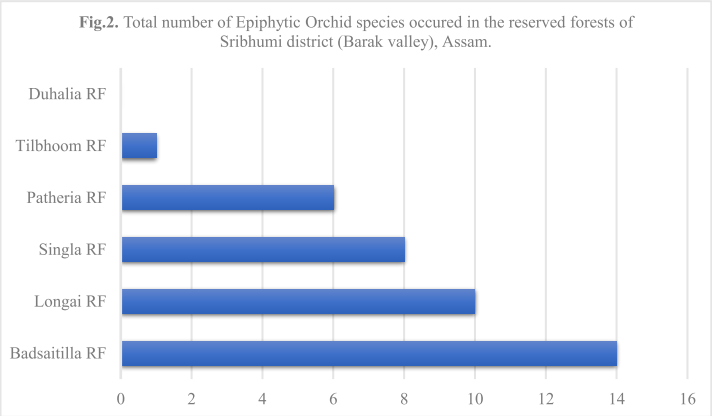
The forest landscape consists of lowland evergreen vegetation, dense tree cover, streams, river, hills track and rich undergrowth, which create favourable habitats for epiphytic orchids. The presence of mature old trees and high atmospheric humidity provides suitable microhabitats for orchid colonisation and growth [22].

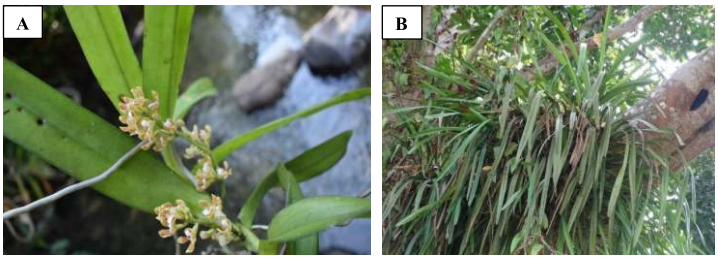
Methods

Extensive field surveys were conducted in the six reserved forests of the district during the different flowering seasons. Orchid specimens were collected from tree trunks and branches. The live specimens were photographed in their natural habitats to record their ecological characteristics. The standard field and herbarium methodologies were followed during the collection and processing of specimens as described by '[23] and [24].

The prepared herbarium specimens were deposited in the Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Eraligool Botanical Herbarium (PDUAMEBH), Eraligool, Sribhumi for future reference and scientific study. The identification and verification of plant species were carried out using regional floras, taxonomic keys, expert consultation, and relevant scientific literature. The Botanical nomenclature was verified through Plants of the World Online (https://powo.science.kew.org/) and The Plant List (http://www.theplantlist.org/). The conservation assessment for threat status was determined following the Red List categories and Criteria of the International Union for Conservation of Nature (https://www.iucnredlist.org/).







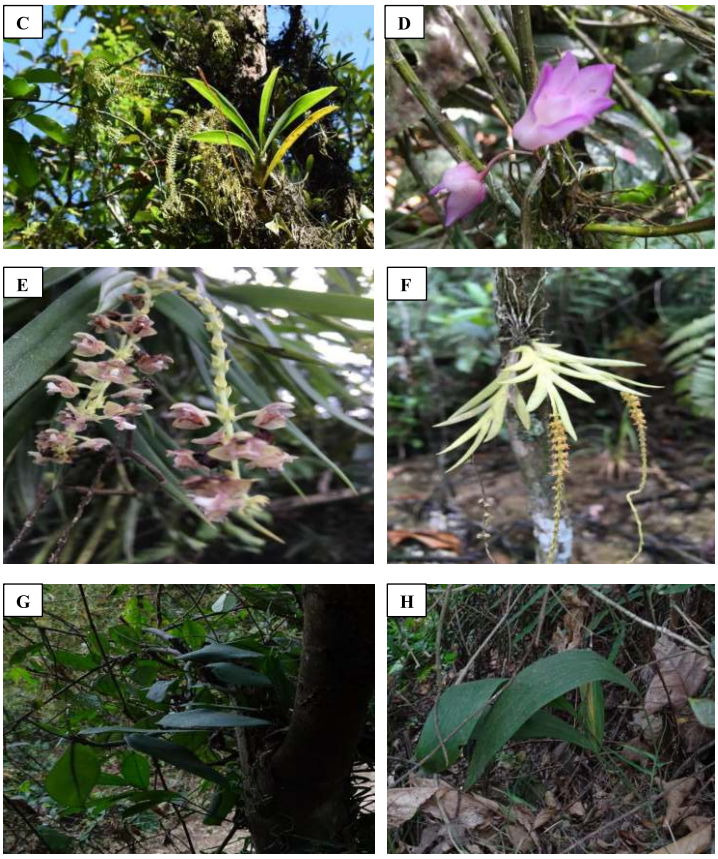


Fig.3. **A.** ***Acampe praemorsa*** var. l***ongepedunculata*** (Trimen) Govaerts; **B.** ***Rhynchostylis retusa*** (L.) Blume; **C.** ***Dendrolirium lasiopetalum*** (Willd.) S.C.Chen & J.J.Wood; **D.** ***Dendrobium parishii*** H.Low; **E.** ***Mycaranthes floribunda*** (D.Don) S.C.Chen & J.J.Wood; **F.** ***Oberonia mucronata*** (D.Don) Ormerod & Seidenf.; **G.** ***Vanilla borneensis*** Rolfe; **H.** ***Calanthe tankervilleae*** (Banks) M.W.Chase, Christenh. & Schuit.

Table.1. *List of Epiphytic Orchids species recorded from different reserved forest of Sribhumi District (Barak valley), Assam. [Bengali (Beng); Assamese (Assm); Not Cited (NC); Not Evaluated (NE); Least Concern (LC); Endangered (EN); Critically Endangered (CR)]*

Sl. No.	Scientific Name	Genus	Local Name	Flowering Seasons	Habit	Distribution in Study Area	Conservation status
1	***Rhynchostylis retusa*** (L.) Blume	***Rhynchostylis***	Kopou Phul (Beng)	May to June	Epiphyte	Badsaitilla RF	EN
2	***Aerides odorata*** Lour.	***Aerides***	Sukhphul (Beng)	May to June	Epiphyte	Longai RF	NE
3	***Aerides multiflora*** Roxb.	***Aerides***	NC	March to August	Epiphyte	Singla RF	NE
4	***Aerides falcata*** Lindl.	***Aerides***	NC	April and June	Epiphyte	Patheria RF	NE
5	***Acampe ochracea*** (Lindl.) Hochr.	***Acampe***	NC	September to February	Epiphyte	Badsaitilla RF	NE
6	***Dendrobium aphyllum*** (Roxb.) C.E.C.Fisch.	***Dendrobium***	Haliki-thutia-phul (Assm)	February to April	Epiphyte	Badsaitilla RF	LC
7	***Dendrobium densiflorum*** Lindl.	***Dendrobium***	NC	March through April	Epiphyte	Longai RF	NE
8	***Dendrobium fimbriatum*** Hook.	***Dendrobium***	Sunagabha (Beng)	March to June	Epiphyte	Singla RF	NE
9	***Dendrobium moschatum*** (Banks) Sw.	***Dendrobium***	NC	April–June	Epiphyte	Badaitilla RF	NE
10	***Dendrobium nobile*** Lindl.	***Dendrobium***	NC	Late winter to early spring	Epiphyte	Patheria RF	NE
11	***Dendrobium parishii*** H.Low	***Dendrobium***	NC	February through August	Epiphyte	Badsaitilla RF	NE
12	***Dendrobium transparens*** Wall. ex Lindl.	***Dendrobium***	NC	April to June	Epiphyte	Longai RF	NE
13	***Dendrobium lituiflorum*** Lindl.	***Dendrobium***	NC	February through April	Epiphyte	Singla RF	NE
14	***Dendrobium crepidatum*** Lindl. & Paxton	***Dendrobium***	NC	March to April	Epiphyte	Tilbhoom RF	NE
15	***Bambuseria bambusifolia*** (Lindl.) Schuit., Y.P.Ng & H.A.Pedersen	***Bambuseria***	NC	August to November.	Epiphyte	Badsaitilla RF	NE
16	***Dendrolirium lasiopetalum*** (Willd.) S.C.Chen & J.J.Wood	***Dendrolirium***	NC	January to April	Epiphyte	Longai RF	NE
17	***Dendrolirium tomentosum*** (J.Koenig) S.C.Chen & J.J.Wood	***Dendrolirium***	NC	April and May	Epiphyte	Patheria RF	NE
18	***Mycaranthes floribunda*** (D.Don) S.C.Chen & J.J.Wood	***Mycaranthes***	NC	April to June	Epiphyte	Singla RF	NE
19	***Oberonia ensiformis*** (Sm.) Lindl.	***Oberonia***	NC	August to November	Epiphyte	Badsaitilla RF	NE
20	***Oberonia mucronata*** (D.Don) Ormerod & Seidenf.	***Oberonia***	NC	August to December	Epiphyte	Longai RF	NE

21	***Bulbophyllum careyanum*** (Hook.) Spreng.	***Bulbophyllum***	NC	October to December	Epiphyte	Badsaitilla RF	NE
22	***Bulbophyllum odoratissimum*** (Sm.) Lindl. ex Wall.	***Bulbophyllum***	NC	Spring and Summer	Epiphyte	Patheria RF	NE
23	***Coelogyne cristata*** Lindl.	***Coelogyne***	NC	December to May	Epiphyte	Singla RF	NE
24	***Coelogyne nitida*** (Wall. ex D.Don) Lindl.	***Coelogyne***	NC	March to May	Epiphyte	Longai RF	NE
25	***Coelogyne imbricata*** (Hook.) Rchb.f.	***Coelogyne***	NC	July and September	Epiphyte	Badsaitilla RF	NE
26	***Coelogyne articulata*** (Lindl.) Rchb.f.	***Coelogyne***	NC	June to July	Epiphyte	Singla RF	NE
27	***Vanilla borneensis*** Rolfe	***Vanilla***	NC	March to May	Epiphyte	Badsaitilla RF	NE
28	***Vanda tessellata*** (Roxb.) Hook. ex G.Don	***Vanda***	NC	Summer to winter	Epiphyte	Patheria RF	LC
29	***Vanda coerulea*** Griff. ex Lindl.	***Vanda***	NC	October to November	Epiphyte	Longai RF	NE
30	***Cymbidium aloifolium*** (L.) Sw.	***Cymbidium***	NC	April and May	Epiphyte	Badsaitilla RF	NE
31	***Cymbidium bicolor*** Lindl.	***Cymbidium***	NC	April through June	Epiphyte	Badsaitila RF	NE
32	***Robiquetia spathulata*** (Blume) J.J.Sm.	***Robiquetia***	NC	Summer	Epiphyte	Badsaitila RF	NE
33	***Luisia trichorhiza*** (Hook.) Blume	***Luisia***	NC	March to May	Epiphyte	Longai RF	NE
34	***Luisia zeylanica*** Lindl.	***Luisia***	NC	March to August	Epiphyte	Duhalia RF	NE
35	***Gastrochilus calceolaris*** (Buch.-Ham. ex Sm.) D.Don	***Gastrochilus***	NC	March to April	Epiphyte	Badsaitilla RF	CR
36	***Gastrochilus dasypogon*** (Sm.) Kuntze	***Gastrochilus***	NC	Winter	Epiphyte	Longai RF	NE
37	***Thrixspermum centipeda*** Lour.	***Thrixspermum***	NC	June–July	Epiphyte	Singla RF	NE
38	***Thrixspermum formosanum*** (Hayata) Schltr.	***Thrixspermum***	NC	February- May	Epiphyte	Patheria RF	NE
39	***Cleisostoma racemiferum*** (Lindl.) Garay	***Cleisostoma***	NC	Summer	Epiphyte	Longai RF	NE
40	***Cleisostoma williamsonii*** (Rchb.f.) Garay	***Cleisostoma***	NC	April to June	Epiphyte	Singla RF	NE
41	***Papilionanthe teres*** (Roxb.) Schltr.	***Papilionanthe***	NC	Late spring to early summer	Epiphyte	Badsaitilla RF	NE
42	***Eulophia zollingeri*** (Rchb.f.) J.J.Sm.	***Eulophia***	NC	November to February	Epiphyte	Badsaitilla RF	NE
43	***Calanthe tankervilleae*** (Banks) M.W.Chase, Christenh. & Schuit.	***Calanthe***	NC	Late winter through spring	Epiphyte	Badsaitilla RF	NE

Results and Discussion

The present survey resulted in the collection and identification of 43 epiphytic orchid species belonging to 21 genera from different reserve forests of Sribhumi district in the Barak valley region of Assam. The diversity of orchids recorded in the study area highlights the ecological richness of the forest ecosystems and the suitability of the local climatic conditions for orchid growth. Among the recorded genera, *Dendrobium* was found to be the most dominant genus with nine species (21%), indicating its wide distribution and adaptability in the reserved forests. Species belonging to this genus were observed growing abundantly on tree trunks and branches in moist and shaded forest areas. The genus *Coelogyne* was represented by four species (9%), followed by *Aerides* with three species (7%). Other genera were represented by one or two species each.

The dominance of epiphytic orchids in the study area can be attributed to the presence of dense forest cover, high atmospheric humidity, and suitable host trees. The forests of Sribhumi district provide ideal microhabitats for epiphytic orchids, particularly in mature forest stands where large trees offer sufficient substrate and favourable environmental conditions.

Several orchid species recorded during the present survey were found growing on tree species belonging to families such as Fabaceae, Moraceae and Dipterocarpaceae. These host trees provide suitable bark texture and moisture retention that facilitate orchid attachment and growth. The presence of streams and shaded forest in the forest area contributes to maintaining high humidity levels, which essential for epiphytic orchid survival. The occurrence of a relatively high number of orchid species within a limited geographical area reflects the rich biodiversity of Barak valley forests. The location of the region within the Indo-Burma biodiversity hotspot along the inner line forest of Assam-Mizoram- Bangladesh border further contributes to the rich diversity of orchid species.

Some orchid species documented during the present study were recorded for the first time from the study area, indicating that the orchid flora of Sribhumi district remains incompletely explored. The species such as *Vanilla borneensis* Rolfe and *Acampe praemorsa* var. *longepedunculata* (Trimen) Govaerts. The recorded of these species highlights the need for further detailed botanical surveys and systematic studies in the region.

However, despite the richness of orchid diversity, the forest ecosystems of the region are facing increasing threats due to anthropogenic activities such as deforestation, shifting cultivation and illegal logging. These activities can lead to habitat destruction and fragmentation, which may adversely affect the survival of orchid species. Epiphytic orchids are particularly sensitive to habitat disturbance because they depend heavily on specific host trees and microclimatic conditions. Loss of mature trees and changes in forest structure can directly impact orchid populations. Therefore, conservation of forest habitats is essential for the protection of orchid diversity in the region. The findings of the present study provide valuable baseline data on the epiphytic orchid flora of Sribhumi district. Such documentation data is important for developing conservation strategies and for promoting awareness about the ecological importance of orchids.

Conclusion

The dominance of genera such as *Dendrobium*, *Coelogyne* and *Aerides* reflects the favourable ecological conditions of the forests for orchid growth. The study highlights the importance of the forest ecosystems of the district as habitats for orchid diversity. Further exploration and conservation efforts are necessary to protect these valuable plant resources and their natural habitats.

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Conflict Of Interest

There is no conflict of Interest

Sources Of Funding

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