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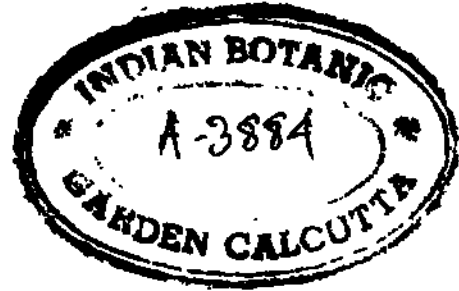
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REPORT
OF THE
BOTANICAL SURVEY OF INDIA
FOR
1966-67





**REPORT
OF THE
BOTANICAL SURVEY OF INDIA
FOR
1966-67**



Edited by
**THE DIRECTOR
BOTANICAL SURVEY OF INDIA
14 MADAN STREET, CALCUTTA-13**

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REPORT OF THE BOTANICAL SURVEY OF INDIA
FOR THE YEAR 1966-67

INTRODUCTION

Rev. Fr. Dr. H. Santapau held the office of the Director. He was assisted by the Deputy Director, Shri K. S. Srinivasan, of the Headquarters in his administrative and scientific works. The Botanical Survey of India has now under it the following organisations:

1. Headquarters at Calcutta.
2. Central National Herbarium at Indian Botanic Garden, Howrah.
3. Central Botanical Laboratory at Calcutta.
4. Indian Botanic Garden at Howrah.
5. Industrial Section, Indian Museum at Calcutta.
6. Five Regional Circles at Shillong, Poona, Dehra Dun, Coimbatore and Allahabad.

1. HEADQUARTERS

The following units are working on various branches of Botany in the Laboratory situated at 76 Acharyya Jagadish Chandra Bose Road, Calcutta. These units along with the Central Botanical Laboratory are under the supervision of the Joint Director, Dr. K. Subramariyam.

(a) ECOLOGY UNIT

This unit is conducting survey in Saurashtra coast, Midnapur and Orissa coast, humid tropical belt of western ghats, forest of Mysore, Madras, Kerala State and Chikmagalur district. The list of coastal plants and analytical data on Chandipur shore, Konark-Puri-Chilka sandy bar belt have been collected. Estuarine flora in Cuttack district has been compiled.

(b) CHEMICAL UNIT

In connection with the work on the chemical screening of Solanaceous plants for steroidal alkaloid and commercial exploitation thereof, the following plant materials were extracted—leaves of *Solarium giganteum*, fruits of *S. eleagnifolium* Cav., *S. auriculatum*, *S. indicum*, *S. pseudocapsicum*, *S. trilobatum*, *S. nigrum* and *S. vagum*.

/S-sitosterol has been isolated from the bark of *Canthium dicoccum* & fruits of *Nicandra physaloides*, terpenes and sterol are found in the leaves of *Wendlandia exserta* DC, *Rumex dentatus* Linn., *Clausena*

willdenovii W. & A., *Pavetta indica* Linn, and bark of *W. exserta* DC. & fruits of *Nelumbo nucifera* Gaertn.

Pharmacological studies were made with the crude extracts of *Orophaea kapchallica* Kurz and *Pieristormosa* Don.

(c) PHARMACOGNOSY UNIT

In connection with the monographic studies on Indian bark drugs the stem barks of *Ficus religiosa* Linn., *Psidium guajava* Linn, have been studied.

Leaves of *Cassia fistula* Linn, and *Hedera helix* Linn, have been studied pharmacognostically for antibacterial and antimalarial properties.

Pharmacognostic studies on different species of *Solarium* e.g. *S. trilobatum* Linn., *S. nigrum* Linn., *S. khasianum* Cl. have been made.

(d) CRYPTOGAMIC UNIT

Collection tours were undertaken in E. Himalayas and 24-Parganas. Mosses of Bhutan and W. Himalayas were continued and new species and new records were established.

II. CENTRAL BOTANICAL LABORATORY

(a) CYTOLOGY AND CYTOGENETICS SECTIONS

Chromosome numbers of 104 plants collected from Behala, Tollygunge, Dhakuria, Haringhata, Dattapukur, Garia, Baghajatin, Sibpur, Narendrapur, Baruijpur, Tarakeshwar, Chetla, Madanpur, Barrackpur, Sonarpur, Diamondharbour, Shillong, Lonavla, Khandala, etc., have been determined.

Karyotype of 13 species were worked out.

123 sheets were added to the Cytotaxonomic herbarium, being the total to 352.

(b) ECONOMIC BOTANY SECTION

In connection with the study of Pooideae of Upper Gangetic Plain the materials of the genera *Arundinella* Raddi, *Avena* L., *Lophochla* Reiche, *Koeleria* Pers., *Melanocenchris* Nees, *Microchloa* R. Br. were examined. Five taxa were added to the list of Pooideae of Upper Gangetic Plain.

Grasses of Burdwan district were examined—45 genera and 77 species (Panicoideae has 28 genera and 46 species and Pooideae has 17 genera and 31 species). Among them, the tribes Andropogoneae, Paniceae and Eragrosteae are represented by larger number of species, and they are also of fodder value.

(c) PLANT PHYSIOLOGY SECTION

Physiological studies on the cultivation of *Solanum khasianum* Cl. were completed during the year under report. The results of these experiments indicated that the month of July is the best time for raising the crop. In warmer weather, vegetative growth is enhanced but the reproductive growth is reduced ; whereas in cooler months, it is just the reverse. The effect of warmer weather appears to be largely on fruit setting. Since the dry weight per fruit is drastically reduced, glyco-alkaloid content per fruit is much poorer in the fruits of the experiment raised during warmer weather (March).

As a result of analysis of the various parts of the fruits, it was observed that the glyco-alkaloid is strictly concentrated on the surface of the seeds and about 80 per cent of the fruit weight is made up of seeds only. It appears, therefore, that the reduction in the fruit weight during warmer months is largely due to reduced seed setting. The seeds being directly correlated to the alkaloidal content, it is therefore reasonable to assume that reduced seed setting yields poorer alkaloid.

Physiological studies of the germination of seeds of *Rauwolfia serpentina* Benth. was continued and from the result it is concluded that during the development of seeds, about half the number in each inflorescence complete maturity while the remaining half fail to fill up the endospermic tissue. Some seeds which develop fully, appear to have more food for normal development than their neighbours. There appears to be a definite temperature and humidity requirements. It may be that the food stored in the endosperm is capable of further utilization by the growing embryo only when these conditions are fully achieved.

The plants of *Soldnum elaeagnifolium* Cav. and *S. latifolium* Dun. were raised. The first plants produced flowers but did not set fruit, whereas the foliage of the second species were analysed and gave 12 per cent glyco-alkaloid.

in. CENTRAL NATIONAL HERBARIUM

Exploration trips were undertaken in different parts of Andaman and Nicobar Islands; Murshidabad, Malda, Sundarban, Purulia in West Bengal; South Bihar.

During the period under report 3,990 herbarium sheets were incorporated, 9,097 sheets were identified.

1,542 herbarium sheets were sent on loan to different Indian and foreign institutions. 245 sheets were sent on exchange basis to some Indian and foreign institutions.

537 sheets were received on exchange basis from foreign institutions.

IV. INDIAN BOTANIC GARDEN

6,763 plants of different species, 2,412 winter and rainy season annual seedlings, 46 *Dahlia* cuttings and 73 hybrid cannas were distributed or sold to different Indian and foreign parties.

About 700 plants and 11 orchids were acquired on exchange basis.

Pollen taxonomy of Pedaliaceae, Verbenaceae, Euphorbiaceae and Palynological studies of Ranunculaceae, Lauraceae, Resedaceae, Solanaceae, Rutaceae, Bignoniaceae, Leguminosae, Rubiaceae, Moringaceae, Compositae, Cucurbitaceae and Samydaceae were continued in Palynology Section.

In Plant Introduction and Experimental Garden Section studies on the morphology, phenology, growth behaviour of 6 ornamental species of *Solanum*, collection and preservation for Carpological Museum, studies on the effect of Nitrogen on the growth and flowering of bulbous plants, etc., were continued.

V. INDUSTRIAL SECTION, INDIAN MUSEUM

The Industrial Section, Indian Museum concerns itself mainly with the collection, preservation, proper maintenance and display of all plant parts and plant products particularly to illustrate the vegetable wealth of India. The exhibition galleries apart from serving as an institution for the correct identification of the plant and plant products, supplying materials for research purposes, afford entertainment and knowledge to the general public. It also furnishes information on the economic and other aspects of the plants of India to Government as well as public and private enterprises.

VI. EASTERN CIRCLE

Exploration trips were undertaken in Subansiri Frontier Division, North Lakhimpur and Khasia and Jaintia Hill district.

1615 species were identified during the period under report.

Under Monocot scheme critical studies of the families Hypoxodaceae, Taccaceae, Roxburghiaceae, Flagellariaceae, Xyridaceae, Juncaceae, Dioscoreaceae, Alismataceae, Butomaceae, Potamogetonaceae, Typhaceae, Eriocaulaceae were made.

Shillong Flora Scheme : In Shillong seasonal collections are being made from time to time under Shillong Flora Scheme.

Identified 356 field numbers, collected from Shillong during the period under report.

373 species represented by 2,224 field numbers including the families from Rosaceae to Asteraceae were added in the enumeration list.

National Orchidarium : 250 specimens of living orchids were added to the collection of National Orchidarium, during the period, bringing the total number of the orchids in the National Orchidarium to 3,500.

VII. WESTERN CIRCLE

"Flora of Thirthahalli taluk (Shimoga dist), Mysore State"—collection of plants and identification of specimens in connection with the project have been completed.

The project 'Flora of Junnar and surrounding areas of Poona district, Maharashtra State⁷ is progressing satisfactorily. The project 'Studies on the Flora of Toranmal and surrounding areas of Dhulia district, Maharashtra State and studies on the Flora and vegetation of Phonda Ambolighat area in the southern part of Ratnagiri district, Maharashtra State' and 'Flora of Goa, Daman, Diu, Dadra and Nagarhaveli' are also progressing satisfactorily.

The following new projects had been initiated during the current year: 'Flora of Harsul-Surgana ranges in Nasik district, Maharashtra State', 'Study of Mosses of Sahyadris' and 'Critical study of the families Fabaceae, Rubiaceae, Asteraceae and Poaceae especially pertaining to Maharashtra State.'

Seven extensive exploration tours had been undertaken to a few areas within the jurisdiction of the Western Circle, six to Maharashtra State and one to Goa and more than 5,000 specimens of Angiosperms have been collected.

Herbarium, museum and experimental gardens are maintained properly. Advisory services are rendered to the outside parties and research institutes.

VIII. NORTHERN CIRCLE

Plant exploration tours were undertaken in Bhatinda and Ferozepur district of Punjab, Moradabad district in U.P., high altitude valleys in Kumaon around Bogdyar and the alpine zone at the approach to Amarnath" in Kashmir. From these collection tours more than 750 collection numbers of specimens were obtained.

Seasonal collection of fleshy fungi of Dehra Dun and environs was also continued. Materials for the publication of a book on alpine plants of Western Himalaya has been prepared.

IX. SOUTHERN CIRCLE

10,602 specimens were added to the Herbarium and 4,749 sheets were incorporated during the period under report making the total number of specimens to 146,507 including the Madras Herbarium.

Tours were conducted in Peechi range, Chalakudi range of Trichur district, Anaimudi range of Kottayam district, Palghat district, Peryar reserve forest of Cannanore district, Tirunelveli and Kanyakumari district, Coimbatore town and Salem district, East Godavari district and Vizag district.

The research work on the Flora of Kodaikanal and Nilgiri hills is being continued and work on families upto Leguminosae has been completed. Observation on morphology of 12 species of South Indian orchids has been made in connection with study on the morphology of orchid. Studies on the wild *Musa* specimens collected and introduced at the Experimental Garden at Yercaud are continued. Check list of the Flora of the Madras Presidency has been taken up and 50 families have been covered. Studies on the flora of Coimbatore town area have been taken up. Orchids in the National Orchidarium at Yercaud are maintained properly and their systematic studies are continued. Intergeneric and interspecific crosses of *Spathoglottis*, *Dendrobium*, *Luisia*, *Coclogyne* are continued and except for one intergeneric cross between *Dendrobium* and *Luisia*, other crosses are not successful. Out of the 5 species of orchids received from South America and 20 species from Government Botanic Garden, Ootacamund introduced in our orchidarium, 19 species have been established. In exchange we sent 20 species to Government Botanic Garden and 17 species to Messrs. Hindustan Aeronautics Ltd., Bangalore.

Experimental garden at Yercaud is busy in developing, maintaining and conserving the plants of the area under the jurisdiction of the Southern Circle. In addition to this, trials of wild plants for introduction in horticulture, study and introduction of exotic plants such as *Eucalyptus*, *Heliconia*, *Filicum*, *Casuarina*, *Cupressus*, *Lantana*, etc., medicinal plants such as *Dioscorea*, *Passiflora*, *Asparagus*, *Kalanchoe*, *Bryophyllum*, *Alocasia*, *Mentha*, etc., were continued.

X. CENTRAL CIRCLE

Tours were conducted in mixed deciduous and scrub forests of Varanasi and Mirzapur districts and 202 field numbers of plants were collected.

Floristic work on the mixed and scrub forests of the Allahabad and Mirzapur districts, dry and moist deciduous forests of Varanasi and Mirzapur, U.P.; sand dune vegetation of Jaisalmer and neighbouring districts of Rajasthan; mixed deciduous forests of Sidhi and

Rewa districts ; wet deciduous and semi evergreen forests of Bilaspur and Surguja districts of M.P. were continued. Herbarium work on Allahabad and Mirzapur flora, Pteridophytic flora involving ecology, phytogeography, systematics of the families A^sP^{leniaceae} > Gleicheniaceae, Polypodiaceae, Grammitidaceae, Viltariaceae, Salviniaceae, Marsileaceae, Parkeriaceae, Plagiogyriaceae, Flora of M.P. in respect of the families Rubiaceae to Gramineae and flora of South-east Rajasthan in respect of Ranunculaceae to Umbelliferae will be completed soon.

XI. PUBLICATION SECTION

Bulletin of the Botanical Survey of India and Records of the Botanical Survey of India were printed and published regularly by the Botanical Survey of India. During this period Vol. 8 Nos. 1 and 2 of the Bulletin were published and distributed. Flora of East Nepal by M. L. Banerji (Rec. Bot. Surv. India, Vol. XIX, No. 2) was also published.

The printing of the 2 special publications, viz., (1) Orchids of Bombay by Santapau and Kapadia and (2) Chapters on the History of Botany in India by I. H. Burkill were completed and released for sale.

Roxburgh's Icones Fasc. I is being printed in the Government of India Press (Photo-Litho Wing), Delhi.

Flora of Kodaikanal by K. M. Matthew (Rec. Bot. Surv. India, Vol. XX, No. 1) has been taken up for printing.

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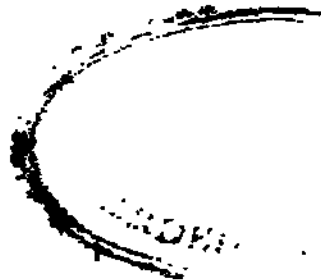
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Exploration trips were undertaken in different parts of Andaman and Nicobar Islands; Murshidabad, Malda, Sundarban, Purulia in West Bengal; South Bihar.

During the period under report 3,990 herbarium sheets were incorporated, 9,097 sheets were identified.

1,542 herbarium sheets were sent on loan to different Indian and foreign institutions. 245 sheets were sent on exchange basis to some Indian and foreign institutions.

537 sheets were received on exchange basis from foreign institutions.

IV. INDIAN BOTANIC GARDEN

6,763 plants of different species, 2,412 winter and rainy season Annual seedlings, 46 *Dahlia* cuttings and 73 hybrid cannas were distributed or sold to different Indian and foreign parties.

About 700 plants and 11 orchids were acquired on exchange basis-

Pollen taxonomy of Pedaliaceae, Verbenaceae, Euphorbiaceae and Palynological studies of Ranunculaceae, Lauraceae, Resedaceae, Solanaceae, Rutaceae, Bignoniaceae, Leguminosae, Rubiaceae, Moringaceae, Compositae, Cucurbitaceae and Samydaceae were continued in Palynology Section.

In Plant Introduction and Experimental Garden Section studies on the morphology, phenology, growth behaviour of 6 ornamental species of *Solarium*, collection and preservation for Carpological Museum, studies on the effect of Nitrogen on the growth and flowering of bulbous plants; etc., were continued.

V. INDUSTRIAL SECTION, INDIAN MUSEUM

The Industrial Section, Indian Museum concerns itself mainly with the collection, preservation, proper maintenance and display of all plant parts and plant products particularly to illustrate the vegetable wealth of India. The exhibition galleries apart from serving as an institution for the correct identification of the plant and plant products, supplying materials for research purposes, afford entertainment and knowledge to the general public. It also furnishes information on the economic and other aspects of the plants of India to Government as well as public and private enterprises.

VI. EASTERN CIRCLE

Exploration trips were undertaken in Subansiri Frontier Division, North Lakhimpur and Khasia and Jaintia Hill district.

1615 species were identified during the period under report.

Under Monocot scheme critical studies of the families Hypoxodaceae, Taccaceae, Roxburhiaceae, Flagellariaceae, Xyridaceae, Juncaceae, Dioscoreaceae, Alismataceae, Butomaceae, Potamogetonaceae, Typhaceae, Eriocaulaceae were made.

Shillong Flora Scheme: In Shillong seasonal collections are being made from time to time under Shillong Flora Scheme.

Identified 356 field numbers, collected from Shillong during the period under report.

373 species represented by 2,224 field numbers including the families from Rosaceae to Asteraceae were added in the enumeration list.

National Orchidarium: 250 specimens of living orchids were added to the collection of National Orchidarium, during the period, bringing the total number of the orchids in the National Orchidarium to 3,500.

VII. WESTERN CIRCLE

'Flora of Thirthahalli taluk (Shimoga dist.), Mysore State"—collection of plants and identification *in situ* specimens in connection with the project have been completed.

The project 'Flora of Junnar and surrounding areas of Poona district, Maharashtra State' is progressing satisfactorily. The project 'Studies on the Flora of Toranmal and surrounding areas of Dhulia district, Maharashtra State and studies on the Flora and vegetation of Phonda Ambolighat area in the southern part of Ratnagiri district, Maharashtra State' and 'Flora' of Goa, Daman, Diu, Dadra and Nagarhaveli' are also progressing satisfactorily.

The following new projects had been initiated during the current year: 'Flora of Harsul-Surgana ranges in Nasik district, Maharashtra State', 'Study of Mosses of Sahyadris' and 'Critical study of the families Fabaceae, Rubiaceae, Asteraceae and Poaceae especially pertaining to Maharashtra State.'

Seven extensive exploration tours had been undertaken to a few areas within the jurisdiction of the Western Circle, six to Maharashtra State and one to Goa and more than 5,000 specimens of Angiosperms have been collected.

Herbarium, museum and experimental gardens are maintained properly. Advisory services are rendered to the outside parties and research institutes.

VIII. NORTHERN CIRCLE

Plant exploration tours were undertaken in Bhatinda and Ferozepur district of Punjab. Moradabad district in U.P., high altitude valleys in Kumaon around Bogdyar and the alpine zone at the approach to Amarnath in Kashmir. From these collection tours more than 750 collection numbers of specimens were obtained.

Seasonal collection of fleshy fungi of Dehra Dun and environs was also continued. Materials for the publication of a book on alpine plants of Western Himalaya has been prepared.

IX. SOUTHERN CIRCLE

10,602 specimens were added to the Herbarium and 4,749 sheets were incorporated during the period under report making the total number of specimens to 146,507 including the Madras Herbarium.

Tours were conducted in Peechi range, Chalakudi range of Trichur district, Anaimudi range of Kottayam district, Palghat district, Peryar reserve forest of Cannanore district, Tirunelveli and Kanyakumari district, Coimbatore town and Salem district, East Godavari district and Vizag district.

The research work on the Flora of Kodaikanal and Nilgiri hills is being continued and work on families upto Leguminosae has been completed. Observation on morphology of 12 species of South Indian orchids has been made in connection with study on the morphology of orchid. Studies on the wild *Musa* specimens collected and introduced at the Experimental Garden at Yercaud are continued. Check list of the Flora of the Madras Presidency has been taken up and 50 families have been covered. Studies on the flora of Coimbatore town area have been taken up. Orchids in the National Orchidarium at Yercaud are maintained properly and their systematic studies are continued. Intergeneric and interspecific crosses of *Spathoglottis*, *Dendrobium*, *Luisia*, *Coclogyne* are continued and except for one intergeneric cross between *Dendrobium* and *Luisia*, other crosses are not successful. Out of the 5 species of orchids received from South America and 20 species from Government Botanic Garden, Ootacamund introduced in our orchidarium, 19 species have been established. In exchange we sent 20 species to Government Botanic Garden and 17 species to Messrs. Hindustan Aeronautics Ltd., Bangalore.

Experimental garden at Yercaud is busy in developing, maintaining and conserving the plants of the area under the jurisdiction of the Southern Circle. In addition to this, trials of wild plants for introduction in horticulture, study and introduction of exotic plants such as *Eucalyptus*, *Heliconia*, *Filicum*, *Casuarina*, *Cupressus*, *Lantana*, etc., medicinal plants such as *Dioscorea*, *Passiflora*, *Asparagus*, *Kalanchoe*, *Bryophyllum*, *Alocasia*, *Mentha*, etc., were continued.

X. CENTRAL CIRCLE

Tours were conducted in mixed deciduous and scrub forests of Varanasi and Mirzapur districts and 202 field numbers of plants were collected.

Floristic work on the mixed and scrub forests of the Allahabad and Mirzapur districts, dry and moist deciduous forests of Varanasi and Mirzapur, U.P.; sand dune vegetation of Jaisalmer and neighbouring districts of Rajasthan; mixed deciduous forests of Sidhi and

Rewa districts; wet deciduous and semi evergreen forests of Bilaspur and Surguja districts of M.P. were continued. Herbarium work on Allahabad and Mirzapur flora, Pteridophytic flora involving ecology, phytogeography, systematics of the families Aspleniaceae, Gleicheniaceae, Polypodiaceae, Grammitidaceae, Viltariaceae, Salviniaceae, Marsileaceae, Parkeriaceae, Plagiogyriaceae, Flora of M.P. in respect of the families Rubiaceae to Gramineae and flora of South-east Rajasthan in respect of Ranunculaceae to Umbelliferae will be completed soon.

XI. PUBLICATION SECTION

Bulletin of the Botanical Survey of India and Records of the Botanical Survey of India were printed and published regularly by the Botanical Survey of India. During this period Vol. 8 Nos. 1 and 2 of the Bulletin were published and distributed. Flora of East Nepal by M. L. Banerji (Rec. Bot. Surv. India, Vol. XIX, No. 2) was also published.

The printing of the 2 special publications, viz., (1) Orchids of Bombay by Santapau and Kapadia and (2) Chapters on the History of Botany in India by I. H. Burkill were completed and released for sale.

Roxburgh's Icones Fasc. I is being printed in the Government of India Press (Photo-Litho Wing), Delhi.

Flora of Kodaikanal by K. M. Matthew (Rec. Bot. Surv. India, Vol. XX, No. 1) has been taken up for printing.

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