

ARTIGOS

THE LABIATAE OF BAHIA: A PRELIMINARY CHECK-LIST

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RESUMO: (As Labiatae da Bahia: uma listagem preliminar) - É apresentada uma lista das espécies de Labiatae, que ocorrem na Bahia, Brasil. Esta lista foi baseada em espécimes vistos pelo autor. É demonstrada a riqueza da flora de Labiatae da Bahia e apresentados alguns padrões fitogeográficos das espécies.

Palavras-chave: Flora da Bahia, Brasil, Campo Rupestre, Cerrado, Endemismo, *Hyptis*, *Eriope*, *Salvia*.

ABSTRACT: (The Labiatae of Bahia: a preliminary check-list) - A list of the species of Labiatae, known to occur in Bahia, Brasil, is presented. This is based on specimens seen by the author. The richness of the Bahian Labiate flora is demonstrated. Some observations on phytogeographical patterns are given.

Key words: Flora of Bahia, Brasil, Campo Rupestre, Cerrado, Endemism, *Hyptis*, *Eriope*, *Salvia*.

Introduction

With the plans in progress for the production of a Flora of Bahia, it becomes a priority to compile both from published or unpublished data, lists of plant taxa either by locality or by systematic groups. This information will be of great value in the preparation of individual accounts for the Flora, but will also be a useful tool in the planning of the fieldwork required to make this production possible. Bahia is a very large State, with many areas still very poorly known in terms of their flora. Even those areas most intensively studied, such as the Mata Atlantica of the coast and the Campos Rupestres of the Chapada Diamantina, are still producing new and interesting plant taxa not previously known to

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Science and urgently need further study (MORI *et al.*, 1983; STANNARD, 1995). New roads are making possible the exploration of Western Bahia, which is at present a lacuna in our botanical knowledge, and it is important that these roads are utilized by botanists before the rich floras of the cerrados of Western Bahia are destroyed for agricultural development. It is to be hoped that regional planning authorities will make provision for local cerrado reserves for scientific and educational purposes.

The author of this paper has been working on South American Labiatae since 1968, and takes this opportunity to publish a provisional list of species for Bahia. The list is far from complete. To his knowledge there are more than 10 new species of Labiatae from Bahia awaiting publication, although many others have been published in recent years (HARLEY, 1985a, 1986, 1992, 1995) and there are many areas of Bahia, potentially rich in undetected species, some of which still have not been visited. Where it seems appropriate, notes on distribution or habitat have been appended, although these are still very preliminary.

The family Labiatae contains over 5000 species worldwide, and are found mainly in open savanna and montane regions with a seasonal and a subtropical or tropical climate (HARLEY & REYNOLDS, 1992). The species are particularly well developed in areas with a Mediterranean climate. In Brazil there are several centres of diversity: 1. Southern Brazil, from Rio Grande do Sul to Paraná, where many unique genera occur, restricted to this region and extending into N. Argentina and E. Paraguay. 2. The campos de altitude of the Serra do Mar, which is floristically allied to the previous area. 3. Cerrados of the Central Brazilian Planalto. 4. Campos Rupestres of the Serra do Espinhaço of Minas Gerais and Bahia, and other areas, especially in Goiás, where similar montane Pre-Cambrian sandstone and metamorphic deposits can be found.

The family Labiatae is of considerable economic importance. Many species are rich in essential oils, which are widely used in the flavouring and perfumery industry. Others are proven effective medicines, mostly used by local communities, and some species are important as a nectar source for bees in the production of honey. Unfortunately the rich resource of native Brazilian species is hardly utilized on a commercial scale, although many of the species are easier to grow than their European counterparts, which have been introduced or imported. It is to be hoped that this situation will be rectified, with the development of local industries using local species in a sustainable manner, to the benefit of local people.

Materials and methods

Recent studies (CANTINO, 1992) have provided evidence that the Labiatae as traditionally recognized is not a natural group, necessitating a major rearrangement between the two families Labiatae and Verbenaceae, with many genera traditionally placed in the latter family being relocated within the Labiatae. This new arrangement is as yet unpublished. As the author's studies have not included many of these genera, the circumscription of the Labiatae used in this paper is the traditional one.

The inclusion of taxa on this list is based on records accumulated over 20 years, based on specimens whose identity has been confirmed and which have been seen personally by the author. This has involved a considerable number of visits to herbaria in Brazil, Europe and North America, and a considerable amount of fieldwork in Bahia. Apart from the author's own published works, reference has been made to two published works by EPLING (1935-7, 1949), where citations of taxa for Bahia can be found. Species reported from Bahia which the author has not seen, but considers likely to occur, as well as species of doubtful taxonomic status are prefixed by ?. Taxa that are introduced, but are now fully naturalized are prefixed by *. Taxa endemic to Bahia have an E, placed at the end.

To provide a guide to habitat or region where species have been recorded, the following symbols, placed after the species name, have been used. It should be made clear, however that this is intended as a guide and is not exhaustive. Where habitat data is absent or insufficient, no symbols have been used:-

A: Áreas Anthropológicas; B: Brejo and similar wet habitats; Ca: Caatinga; Ce: Cerrado, (incl. campos gerais); Co: Costeira; CR: Campo Rupestre; D: Restricted in Bahia to Chapada Diamantina; M: Mata; MA: Mata Atlantica; ME: Mata Estacional, Semi-Estacional or Mata de Altitude; R: Restinga.

Results and discussion

Check-list of Labiatae in Bahia

Subfam. *Scutellarioideae* *Scutellaria* L.

- ? *S. agrestis* A. St.-Hil. ex Benth.
 ? *S. purpurascens* Sw. - MA (Co)
S. uliginosa A. St.-Hil. ex Benth. - MA (Co)

Subfam. **Lamioideae**

- ***Leonotis** (Pers.) R.Br.
 **L. nepetifolia* (L.) R.Br. - A
 ***Leonurus** L.
 **L. japonicus* Houtt. (*L. sibiricus* auct. non L.) - A
 ***Leucas** R. Br.
 **L. martinicensis* L. - A

Subfam. **Nepetoideae**

Tribe **Mentheae**

- Salvia** L.
S. fruticetorum Benth. (?ME) E
S. neovidensis Benth. (?ME) E

Tribe **Ocimeae**

- Ocimum** L.
O. campechianum Mill. (= *O. micranthum* Willd.) - Ca
O. selloi Benth. - ME
 **O. gratissimum* L. - A
 **O. americanum* L. - Ca
Hyptidendron Harley
H. asperum (Sprengel) Harley - Ce
 ?*H. canum* (Pohl ex Benth.) Harley - Ce
H. conspersum (Benth. in DC.) Harley (Ce?) (Rio Preto) E
Eriope Humb. & Bonpl. ex Benth.
E. latifolia (Mart. ex Benth.) Harley - Ce(D) E ?
E. hypoleuca (Benth. in DC) Harley - CR(D)
E. exaltata Harley - CR(D) E
E. salviifolia (Pohl ex Benth.) Harley - ME
E. sincorana Harley - CR(D) E
E. blanchetii (Benth.) Harley - R (Co) E
E. confusa Harley - CR(D) E
E. luetzelburgii Harley - CR(D) E
E. macrostachya Mart ex Benth. - M/CR(D)
E. glandulosa (Harley) Harley - CR(D)

- E. hypenioides* Mart. ex Benth. - Ce/CR(D) E
- E. polyphylla* Mart. ex Benth. - CR(D) E
- E. crassifolia* Mart. ex Benth. - CR(D) E
- E. tumidicaulis* Harley - Ce
- E. obovata* Epling - CR(D) E
- E. anamariae* Harley - CR(D) E
- E. montana* Harley - CR(D) E

***Hypenia* (Mart. ex Benth.) Harley**

- H. inelegans* (Epl.) Harley - Ce E?
- ? *H. reticulata* (Mart. ex Benth.) Harley - Ce (D)
- H. vitifolia* (Pohl ex Benth.) Harley - Ce(D)
- H. longicaulis* Harley ined. - Ca E
- H. salzmännii* (Benth.) Harley - Ca

***Hyptis* Jacq.**

Sect. *Subumbellaria*

- H. hagei* Harley - CR(D) E

Sect. *Minthidium*

- H. fasciculata* Benth. subsp. *fasciculata* - B (Co)

Sect. *Mesosphaeria*

- H. spicigera* Lam. - A
- H. suaveolens* (L.) Poit. - A
- H. pectinata* (L.) Poit. - A
- H. umbrosa* Salzm. ex Benth. - ME
- H. irwinii* Harley - CR(D) E

Sect. *Trichosphaeria*

- H. eriophylla* Pohl ex Benth. - Ce
- H. carvalhoi* Harley - Ce(D) E
- H. martiusii* Benth. - Ca
- H. multiflora* Pohl ex Benth. - Ce
- H. crinita* Benth. - Ce

Sect. *Polydesmia*

- H. crassifolia* Mart. ex Benth. - Ce(D) E
- H. nubicola* Harley - CR(D) E
- H. argyrophylla* Harley - CR(D) E
- H. halimifolia* Mart. ex Benth. - CR(D) E
- H. macrostachys* Benth. in DC. - CR(D)
- H. pinheiroi* Harley - Ce E
- H. calida* Mart. ex Benth. - CR(D)
- H. siphonantha* Harley - Ce E
- H. leptostachys* Epling subsp. *caatingae* Harley - Ca E

- H. silvinae* Harley - CR(D) E
- H. glomerata* Mart. ex Schrank - A
- H. carpinifolia* Benth. - B
- H. mutabilis* (L. Rich.) Briq. - M

Sect. *Fruticosae*

- H. fruticosa* Salzm. ex Benth. - Ca, R
- H. cuniloides* Epling - CR(D) E

Sect. *Leucocephala*

- H. leucocephala* Mart. ex Benth. - Ca
- H. stachydifolia* Epling - CR E

Sect. *Cyrta*

- H. microphylla* Pohl ex Benth. - B
- H. paludosa* St.-Hil. ex Benth. - B(R)
- H. recurvata* Poit. - B

Sect. *Cyanocephalus*

- H. selaginifolia* Mart. ex Benth. - Ce
- H. delicatula* Harley - CR(D) E
- H. rugosa* Benth. - Ce

Sect. *Gymneia*

- H. platanifolia* Mart. ex Benth. - Ca

Sect. *Hyptis*

- H. linarioides* Pohl ex Benth. - CR (D)
- H. sinuata* Pohl ex Benth. - B
- H. ramosa* Pohl ex Benth. - B(D)
- H. lanceolata* Poir. - B
- H. brevipes* Poit. - B (Co)
- H. lantanifolia* Poit. - B (Co)
- H. conferta* Pohl ex Benth. - Ce (Rio Preto)
- H. lorentziana* O. Hoffm. - B (Rio São Francisco)
- * *H. capitata* Jacq. - A?(Co) (introduced?)

Sect. *Eriosphaeria*

- H. crenata* Pohl ex Benth. - Ce
- H. velutina* Pohl ex Benth. - Ce
- H. oblecta* Benth. in DC. - Ce (Rio Preto)

Sect. *Xylodontes*

- ? *H. lutescens* Pohl ex Benth. - Ce

Sect. *Apodotes*

- H. multibracteata* Benth. - MA (Co)

Sect. *Pusillae*

H. atrorubens Poit. - B (Co)

***Marsypianthes* Mart. ex Benth.**

M. chamaedrys (Vahl) Kuntze - A

M. foliolosa Benth. in DC. - Ce

***Peltodon* Pohl**

P. tomentosus Pohl - Ce

***Rhaphiodon* Schau.**

R. echinus (Nees & Mart.) Schau. - Ca

From the above list, it can be calculated that 13 genera and 92 species have been recorded as native or naturalized in Bahia, 3 genera and 5 species of which are introduced from the Old World. Comparing the native Labiatae flora of Bahia with that of Brazil (22 genera and 402 species), Bahia has 45.4% of the genera and 21.6% of the species of those of Brazil, which constitutes a very high proportion of the total, in comparison to its area, which is only 6.6 % of the area of Brazil. Most of the genera that do not occur in Bahia are from the more temperate Southern States, which have a very different Labiate flora. Perhaps most remarkable is the high degree of endemism, with 35.6% of the native Bahian Labiate taxa endemic to the State. A breakdown of the figures by habitat demonstrates the family's preference for savanna and montane areas, with some species of *Hyptis* being characteristic of wetter areas. Equivalent figures for the major habitats are:

- i. **Cerrado:** 27 spp. (8 endemic taxa) = 29.3% of total (25% of endemic taxa)
- ii. **Campo rupestre:** 23 spp. (18 endemic taxa) = 25% (58.0% of endemic taxa).
- iii. **Caatinga:** 8 spp. (2 endemic taxa) = 8.6% (6.4% of endemic taxa).
- iv. **Dry Forest:** 7 spp. (2 endemic *Salvia* spp. probably belong here. Also *Hyptis mutabilis* (Rich.) Briq. is an additional species, widespread in a range of lowland forest habitats, included under Atlantic Forest in this analysis). (2 endemic taxa) = 7.6% (6.4% of endemic taxa).
- v. **Atlantic Forest:** 3 spp. 3.2% (0% of endemic taxa).
- vi. **Restinga:** 1 sp. (endemic). (Several other species not exclusive to restinga also occur here, and the total number is uncertain). (3.2% of endemic taxa).
- vii. **Brejo:** 12 spp (7 of the brejo species appear to be strictly coastal) : 13%. (0% of endemic taxa).

ix. **Anthropogenic areas:** 10 spp: 10.8% (0% of endemic taxa).

x. **Unaccounted for:** 1.

The above list demonstrates that the centre of diversity of the family is in the Cerrado and Campo Rupestre. However, in terms of local endemism, the Campo Rupestre, with slightly fewer species (23 taxa) can be seen to be much richer than the Cerrado (27 taxa) with 58% of total endemism as compared to 25% for the latter.

The two major genera of Labiatae in Bahia are *Hyptis* with 51 species and *Eriope* with 17 species. *Eriope*, a primarily Brazilian genus, is particularly characteristic of campo rupestre habitats and has its main centre of diversity in the Chapada Diamantina, with secondary centres in Minas Gerais and Goiás (HARLEY, 1976, 1988). However, in terms of local endemism, it is much richer than *Hyptis*, with 12 endemic species in Bahia. Of particular interest, however, is *E. blanchetii* (Benth.) Harley which is found in the coastal dunes near Salvador. *Hyptis*, with over 290 species in the Neotropics and 55 species in Bahia, displays a much wider habitat range, and is particularly well represented in Cerrado, where many species have fairly ample distributions. Section *Polydesmia* has one of its main centres of diversity in the campo rupestre and campos gerais of Bahia. Of the 13 species recorded from Bahia, 8 are endemic to it, with two others extending into neighbouring States (HARLEY, 1985a).

Species showing unusual phytogeographical relationships include: *H. irwinii* Harley, Sect. *Mesosphaeria*, which is widespread in moist habitats in the campo rupestre, and whose closest relatives are found in the Andes (HARLEY, 1974); *H. delicatula* Harley, Sect. *Cyanocephala*, with a close relative, *H. tripartita* Briq. in Eastern Paraguay (HARLEY, 1985b); *Hyptis stachydifolia* Epling and *H. leucocephala*, Sect. *Leucocephalae*, closely related to *H. elongata* Benth. from Peru; and *H. hagei* Harley, restricted to the Serra do Sincorá, in the Chapada Diamantina. Until very recently, this species, which shows several characters primitive in the genus, was unplaced in a Section (HARLEY, 1986). However detailed studies indicate its very close relationship to *H. asperifolia* Epling, belonging to the previously monotypic Sect. *Subumbellaria*, from Honduras. Distribution patterns such as this suggest that the genus *Hyptis* may have undergone phases of expansion and contraction, leading to extinctions, as the result of changing climates in the past.

A species only discovered in Bahia in the last few months, as the result of extensive fieldwork in the Rio São Francisco valley is the diminutive *Hyptis lorentzii* O. Hoffm., Sect. *Hyptis*. A species frequent in areas subject to flooding in Paraguay, Argentina and Uruguay and in the Chaco region of Bolivia, it extends into Brasil in the extreme South, Rio Grande do Sul and Santa Catarina and into Mato Grosso near Cuiabá. There are, however the occasional records from Tocantins, Pará and Amazonas. In Bahia, the species occurs in an area subject to flooding at the edge of the extensive São Francisco dune system, that still awaits exploration. This appears to be the only station for the species in N.E. Brasil

One genus less well represented in Brazil, but which has a wide distribution in Central America and the Andes, is *Salvia* Sect. *Calosphace*, with over 400 species in the New World. In Brazil, the genus is centred in the South, from Paraná southwards, and in the Serra do Mar, and, in the latter region, appears to be represented by a number of relictual species (HARLEY & HEYWOOD, 1992). A number of species also occur in the cerrados of Central Brazil, especially in Goiás and Minas Gerais. In Bahia, there appear to be only three species, two collected in the early part of the 18th century, for which modern data are absent, and a recently discovered, but undescribed, species in the mountains near Feira de Santana. Further collections of these are much needed. The Brazilian species are at present being revised by Elide Santos, Universidade Federal do Paraná.

Conclusions

A checklist provides the first stages in the development of phytogeographical studies in Bahia, and it is hoped to improve the list here presented, as further records become available, and to amplify it in the form of distribution maps. The development of a system for mapping plant species within the State will be of value not only to botanists, but also to other scientists who wish to get a more detailed picture of local vegetation patterns. Certain species are faithful to quite a limited ecological range, and as our knowledge of their ecological requirements develops, so we can use distribution maps for purposes beyond their immediate phytogeographical application. Local soil and climatic conditions are important in both agricultural development and in resource management, especially for the conservation of areas of high genetic

diversity. It is only with detailed studies and intensive collections in the field that we can hope to achieve these ends.

Another important application of such studies is the training of young biologists for whom field experience is as important an aspect in their formation as is laboratory work. Without the detailed knowledge of the local flora, university professors are greatly hampered in their task.

It is hoped that this initial list will be of value in these respects, and provides sufficient interest to stimulate others to begin to compile similar lists, where these are not already under way. The Northeast of Brazil is still relatively unexplored and much remains to be done, but with the unbounded enthusiasm and dedication which is apparent among biologists in the area, the future for a published Flora of Bahia looks very positive.

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