LAMIALES NEWSLETTER

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EDITORIAL

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Welcome to the third Lamiales Newsletter. We still require more articles for inclusion in the next Newsletter. We do rely on your support with articles to keep the Newsletter going. We can also print any requests for living research material or advertise any meetings relevant to Lamiales research. The editors can be contacted by e-mail using the following addresses: A.Paton@rbgkew.org.uk or R.Harley@rbgkew.org.uk. We are constantly updating directory of Lamiales researchers. If you are not already on the directory, published in the 2nd edition of the Newsletter (Nov. 1993), and would like to be included, please send details of your address and research interests to the editors, including an e-mail address if you have one.

A round table discussion on Labiatae is to be held on the 27th September 1995, during the 8th OPTIMA meeting, 25th Sept. - 1st October 1995, to be held in Sevilla, Spain. A provisional programme includes M. Mafei (Torino, Italy): Chemical taxonomy of Labiatae; N. Falciani & E. Nardi (Firenze, Italy): Systematic revision of *Stachys* sect. *Stachys* in Italy; T. Upson & S.L. Jury (Reading, UK): Moroccan *Lavandula*; R.M. Harley (Kew, UK): A new approach to the classification of the Lamiales: consequences for the Mediterranean Flora. Information on the OPTIMA meeting can be obtained from Dr Mejias, Dept. de Biología Vegetal y Ecología, Facultad de Biología, Avda. Reina Mercedes, s/n, 41012 Sevilla, Spain, FAX 34 (9)5 4557059.

The Instituto de Quimica (UNAM, Mexico City) have agreed to sponsor the next Lamiales Conference in late 1996. The details have not yet been finalised, we hope to be able to elaborate on plans in the next edition. Meanwhile any institution willing to co-sponsor the event should contact Mr Baldomero Esquivel, Instituto de Quimica, Cicuito Exterior, Ciudad Universitaria, Coyoacán, 04510 Mexico D.F., Mexico. If possible, copies of correspondence should be sent to Dr T.P.Ramamoorthy, 412 Heartwood Dr., Austin, TX 78745, USA.

THE IMPORTANCE OF PERICARP STRUCTURE IN THE CLASSIFICATION OF LABIATES

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Characters of fruit types, pollen morphology, presence of endosperm and shape of the corolla, are known to be particularly useful in the study of a phylogeny, and play a most important role in a recent classifications of the labiates at subfamilial, tribal and subtribal levels.

Wagner (1914) studied the pericarp of many labiates in transverse section, but his well illustrated work seems to have been forgotten during a long period. Other major contributions have been provided by Wojciechowska (1966), Hedge (1970) and Ryding (1992a, 1993b, c, d). The studies provide several examples of pericarp characters that are very useful in classification at different taxonomic levels.

A typical example of the pericarp structure in Lamiaceae is shown in figure 1. In the exocarp (nutlet epidermis), there are often cells which produce mucilage when becoming wet. The layers just below the exocarp are usually thin and/or soft (mesocarp s.str.), and further down, there is usually a layer of vertically arranged bone cells and/or layers of stone cells. The ➢

inner epidermis of the pericarp is usually thin. The coat of the seed is usually thin.

Hedge (1970), who studied many species of *Salvia*, found that they have a similar basic structure but show obvious differences in thickness of the pericarp, proportions of the individual layers and colour. The most distinctive species in general facies proved in general to have the most distinctive pericarp.

The tropical genus *Coleus*, to which the painted nettle belongs, differs from the related *Plectranthus* by having the stamens united, but as this difference is not quite consistent, *Coleus* has been reduced to a synonym. Ryding (1992a) found that most species with united stamens also have crystals in the mesocarp. The correlation of characters suggests that the species with united stamens probably represent a separate line of evolution, and a cladistic analysis might well support the resurrection of *Coleus* as a genus. *Solenostemon* and several other related genera may have to be included in this genus.

Leucas, *Leonotis* and *Acrotome* are three closely related genera from the Old World tropics, of which several have become widespread as weeds. In the largest genus, *Leucas*, the variation in pericarp structure was found to be well correlated to Sebald's infrageneric classification (Sebald,1980). The distribution of pericarp characters and some other morphological characters suggests that African *Leucas* are more closely related to the African *Acrotome* and *Leonotis* than to the Asiatic *Leucas* (Ryding 1993c). The above-mentioned examples show how pericarp characters can be useful in classification at generic and lower levels. Several pericarp characters, particularly the ones of the sclerenchyma (bone cells or stone cells), have been found to be rather conservative, to be consistent within genera and to vary only at higher taxonomic levels. Such characters apparently provide very important evidence, useful in the classification at subfamily, tribe and subtribe levels.

Cantino et al. (1992) divided the family into eight subfamilies, essentially on the basis of a cladistic analysis presented by Cantino (1992). Among many other characters, Cantino (1992) included fruit types, shape of mericarps, shape and size of mericarp scar and structures, but did not consider any anatomical characters of the pericarp. If added, some pericarp characters will provide additional support to clades in Cantino's phylogenetic tree. However, in a few cases, there are conflicts between pericarp characters and Cantino et al.'s (1992) classification.

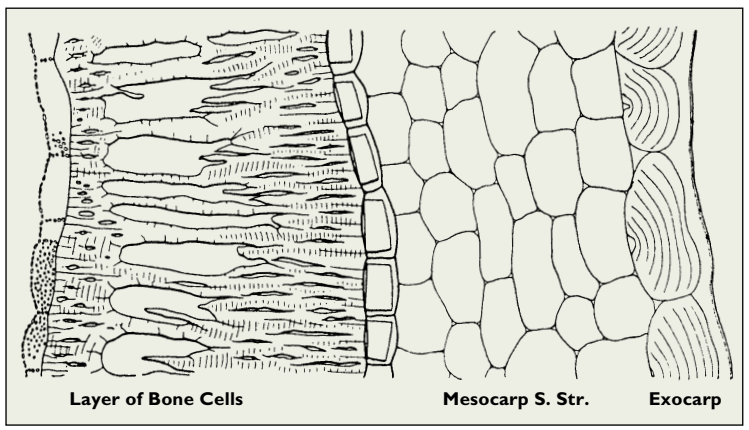

Figure 1. Pericarp of *Salvia officinalis* in transverse section. Illustration taken from Wagner (1914).

The largest subfamily, *Nepetoideae*, which forms a very distinct group and constitutes a well corroborated clade in Cantino's phylogenetic tree, gets additional support by the presence of myxocarpy (Ryding 1992b). The phenomenon has only been found in *Nepetoideae*, and within the subfamily, about 70% of the species are mucilaginous. Absence of myxocarpy in this subfamily can generally be regarded as a secondary derived condition.

In five articles, Wojciechowska studied the nutlet shape and pericarp characters in European labiates. In her largest work (1966), she divided the family into six informal groups based on pericarp characters. Her division agrees strikingly well with Cantino et al.'s (1992) subfamilial classification: group **A** includes the subfamily *Scutellarioideae*; **B** includes *Ajugoideae* and most *Teucrioideae* (the two subfamilies are placed in different subgroups); **D** includes most *Nepetoideae*; **E** and **F** include the *Lamioideae*. However, her group **C**, which includes various divergent pericarp types, is apparently polyphyletic.

In Cantino's (1992) cladogram, the subfamily *Pogostemonoideae* forms a weakly supported clade. This subfamily, which includes about six tropical to temperate Asiatic genera, has been found to be very polymorphic in pericarp characters (Ryding 1993c). The genera *Pogostemon* and *Anisomeles* are rather different, and the three related genera, *Leucosceptrum*, *Comanthosphace* and *Rostrinucula* (which were not included in Cantino's analysis) have been found to have a very different type of pericarp which contains large sclariform cells (Ryding 1993d). The three latter genera are probably extraneous to *Pogostemonoideae* and their systematic position is uncertain. Thus, the subfamily *Pogostemonoideae* had perhaps better be abandoned or given a new circumscription.

Ocimeae is a rather distinctive tribe under the subfamily *Nepetoideae*. It has a tropical distribution and is characterized by having the stamens lying on the lower lip of the corolla. The two predominantly African subtribes, *Plectranthinae* and *Ociminae*, are traditionally considered to differ in size and shape of the lower lip of the corolla, but these differences are apparently inconsistent. However, Ryding (1992a) found that there are consistent differences in pericarp characters. *Hoslundia*, a genus known by its berry-like and edible fruiting calyx, had to be moved from *Plectranthinae* to *Ociminae*. The widely disjunct genus *Rabdosiella* was found to be very polymorphic in pericarp characters. Later it was proved to be polyphyletic, and the two species were moved to *Plectranthus* and *Isodon*, respectively (Ryding 1993a). According to Ryding (1993a, b), the two latter genera are not as closely related as previously thought, and *Isodon* had better be excluded from the *Plectranthinae*, and it might form a separate subtribe together with the also East Asiatic *Skapanthus* and *Hanceola*.

Further results from pericarp studies will appear in publication in the near future, and it is my aim to have this structure investigated in at least one representative of as many labiate genera as possible, including the ones which have been transferred from Verbenaceae by Cantino et al. (1992). I am sure that the new data will be very useful in studies of the phylogeny, and contribute to further improvements of the classification of the labiates.

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PLECTRANTHUS ESCULENTUS N.E.BR. A MINOR TUBER CROP IN DIRE NEED OF RESCUE FROM EXTINCTION.

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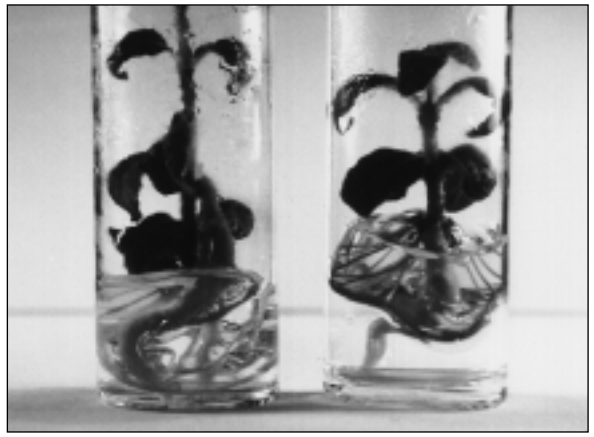
Just as it is likely that many tropical grasses were at one time grown for their grains, so it is likely that a number of African tubers were formerly cultivated more than now and have come to be displaced by more successful ones. The native crops that sustained local populations and early civilisation for centuries are neglected and unexplored. A social stigma leading to preference for exotic crops has emerged. This has threatened the existence of native crops which are now being considered as 'endangered species' (Miège, 1988). Many tuber crops so threatened, are known to be of local origin and there are long established traditions about their cultivation, storage, processing and preservation. Some of these crops have significantly contributed to rural diets and have become well adapted to different environmental conditions. *Plectranthus esculentus* N.E.Br. (syn. *Coleus dazo* A. Chev.& Perrot) is one such domesticated tuber crop (Agboola, 1979).

Plectranthus esculentus N.E.Br. was initially cultivated through selection of wild populations in the Upper Niger valley of the Hausaland and in the Central African Republic. The Central African area is considered the primary centre (Porteres, 1962; Harlan *et al*., 1976). The species has been reported to occur from ➢

Equatorial Africa, southwards to Angola, the eastern Transvaal, Swaziland and Coastal Natal in dry wooded areas (Fox and Young, 1982). Its cultivation for edible tubers has been reported (Dalziel, 1937; Purseglove, 1987; Peters *et al*, 1992; Rivera Nuñez and Obén de Castro, 1992). The plant is referred to as 'kaffir-potato' in English and 'Rizga' in the Hausa language (Dalziel, 1937). Its cultivation has been reported in Northern Nigeria, mostly around Adamawa, Bauchi, Niger, Kaduna, Plateau, and Taraba states (Gila, 1984). The taxonomic circumscription of *P. esculentus* has been documented by Morton (1962), Fox and Young (1982) and Codd (1985).



In vitro cultures of *Plectranthus esculentus*

Information on pathology, utilisation, preservation, nutritional value and other biochemical constituents of *P. esculentus* is scanty. This lack of information prompted a preliminary investigation on some of the tuber's biochemical constituents. The outcome suggests that the plant has a great potential to ameliorate current and predicted food shortages and to augment existing food varieties.

Biochemical analyses of freshly harvested tubers on dry weight basis indicated crude protein as 7.71%, crude fibre 5.99%, fat 0.27%, total ash content 4.48% and carbohydrate 29.32% (Kyesmu and Akueshi, 1989). Mineral content of the tubers (mg. per 100g. tuber weight) range from 8.00-21.75 sodium, 55.00-90.00 calcium, 1225.00-15,000.00 potassium, 100.00-155.00 iron, 15.50-64.75 magnesium, 0.5-1.0 copper and 1.00-3.00 manganese (Gila, 1984).

A critical chemotaxonomic survey of *Plectranthus* is much needed to reveal the potential of the plants. The biochemical constituents could be of potential medicinal significance or other uses. The isolation and identification of a compound Coleonol or Forskolin from *Plectranthus barbatus* (syn. *Coleus barbatus*) confirms the medicinal potential of the plants. Coleonol is a potent stimulant and pharmacological studies suggest it has potential for the treatment of hypertension, glaucoma, asthma and certain cancers (Valdes et al 1987).

A critical chemotaxonomic investigation of the tropical *Plectranthus* species will undoubtedly reveal significant chemical substances not yet reported. It is also probable that the plants could have anti-bacterial/anti-fungal properties (Richardson, 1992). Such a study may also help resolve some of the taxonomic confusion within the genus.

The author together with Dr. S.H. Mantell of Wye College, are currently researching micropropagation and microtuberisation of *Plectranthus esculentus.* The research aims at developing enabling *in vitro* technologies necessary for:-

a) The survival and conservation of the plant.

b) The multiplication of promising genetic materials (disease-free) for breeding trials.

c) The assessment of isoenzymes and random amplified DNA polymorphisms for distinguishing clones. Findings from such studies should suggest further lines of research. It is hoped that this will help halt the decline in, and encourage protection of, a traditional crop in danger of extinction. The potential of *P. esculentus* for agricultural use seems great.

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SOME USEFUL INDIGENOUS LABIATES FROM ETHIOPIA

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Eating and drinking habits would have been dull exercises had it not been for aromatic plants which enhance the desirable flavour and aroma of our food and drink. The common diseases such as cold, diarrhoea, etc. would have made life miserable for many, had it not been for the use of herbs in folk medicine. People with various cultures in different parts of the world, in one way or another use aromatic plants to season their food, to perfume their body and to treat ailments. Aromatic plants used as herbs or spices or in and/or aroma when added to food or other objects. Most of the chemicals responsible for these distinctive tastes, smells and medicinal properties are complex mixtures of compounds known as essential oils.

The Labiatae is one of the few plant families with various aromatic plants that provide some of the essential ingredients of life mentioned above. Almost all of the members of this family have fragrant herbage. The most common herbs like rosemary, thyme, oregano, basil, sage and mint are native to the northern and eastern edges of the Mediterranean sea. In Ethiopia, the family is represented by over 20 genera. The native Mediterranean aromatic plants, mentioned above are also cultivated in Ethiopia for their culinary properties. There are also indigenous species which have various local uses. Some of these, belonging to the genus *Thymus* and *Ocimum* (Labiatae) are mentioned here.

TOSIGN/TESNI: Abyssinian thymes

The genus *Thymus* is mainly a temperate taxon and is uncommon in the African tropics. There are, however, two species, *T. schimperi* Ronniger and *T. serrulatus* Hochst. ex Benth. which are endemic to the Ethiopian highlands growing on edges of roads, in open grassland, on bare rocks and on slopes, between 2200-4000 m. altitude.

Both species are perennial herbs, woody at the base and 5-40 cm high. The inflorescence is commonly crowded into globose and oblong heads with pink corollas. *T. schimperi* has ovate to elliptic leaves with entire margins. It is comparatively widespread in central, eastern and northern Ethiopia. It is locally known as *Tosign*. *T. serrulatus* has obovate to oblanceolate leaf-laminas with weakly crenate margins and is restricted to northern Ethiopia. It is locally known as *Tesni* or *Thasne.*

The fresh or dried leaves of both species are used locally as condiments in the preparation of chilli powder, stew, bread and tea. In traditional medicine, the boiled leaves are drunk to treat coughs, headaches, stomach-ache and gonorrhea. The pharmacological action of thyme is due mainly to the phenolic component thymol, which is a major component in the essential oil.

The genus *Ocimum* is represented by nine indigenous species. Two of the species, *O. forskolei* ➢

and *O. lamiifolium* which are important locally for their flavour, aroma and medicinal properties are discussed here.

AJUBAN – *Ocimum forskolei* Benth.

This is an erect perennial herb, woody at the base or branched subshrub or shrub 25-50 cm. high. The leaves are ovate to lanceolate. It has an inflorescence with many clusters of flowers that have whitish to pinkish corollas. It commonly grows along road sides, disturbed and overgrazed areas between sea level up to 2500 m. altitude from northern to southern Ethiopia. It is locally known as *Ajuban*, *Aba Timara* and *Techomere*. The fresh and dried leaves, flowers, fruits and tender stems are used to flavour "wot" (a thick, usually highly spiced stew), sauces, soups and coffee. They are also used against malaria, headaches and diarrhoea.

The major component of the oil is methyl chavicol, although variable mixtures of essential oils could be obtained from different cultivars and chemotypes.

DAMAKESSEH – *O. lamiifolium* Hochst. ex Benth.

This is a common subshrub or shrub up to 3 m. tall. The plant has a long, lax inflorescence with white, pink or lilac corollas. It commonly grows on clearings and edges of forests and bushland between 1200-2900 m. altitude in many parts of Ethiopia. It is locally known as *Damakesseh*.

O. lamiifolium is one of the commonly used medicinal plants. The fresh leaves are squeezed and the juice sniffed to treat colds and coughs and used as eye rinse to treat eye infections. The crushed leaves are put in the nostrils to stop nose bleeding. □

ESSENTIAL OILS OF LABIATAE FROM TURKEY – RECENT RESULTS

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Turkey is regarded as an important gene-centre for the Labiatae. The family is represented in Turkey by 45 genera, 546 species and a total of 731 taxa. The rate of endemism in the family is 44.2%.

Labiatae occurring in Turkey have been investigated for essential oils since 1946. Until 1970, there were only 8 papers. In 1970s 16 more studies appeared. 38 papers were observed in 1980s. However, in the first three years of 1990s, 56 papers have so far been published. Recent upsurge in the number of papers on Labiatae essential oils is due to the fact that our group has in recent years been engaged in an intensive study of the Turkish Labiatae.[1,2] Literature survey and the results of our ongoing research into essential oil composition of the Labiatae taxa of Turkey revealed that only about a quarter of the Labiatae of Turkey have been subjected to any degree of scientific analysis.

In this short review, I shall summarize the results of our research into essential oils of some important genera of the Turkish Labiatae in terms of major components of the oils. In the course of the ongoing work on the essential oils of Anatolian Labiatae in our laboratories, 140 taxa have been investigated, constituting 72% of the total number of taxa (195) studied in Turkey. During our studies, *Sideritis scardica* was discovered to grow in Turkey-in-Europe. *Salvia microphylla*, a central American species, was found to have been introduced and partially naturalized in Aydin province.

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Genus	Total no. of taxa in Turkey	Endemic sp. in Turkey	No. taxa in Turkey studied by us for ess. oil	Endemic sp. studied by us for ess. oil	Main compound: *species* (%) ref. no
Acinos	7		2		**isomenthone**: *suaveolens* (**51**)[3] **pulegone**: *suaveolens* (**48-75**)* **thymol**: *alpinus* (**30**)*
Ballota	16	8	1		**germacrene D**: *nigra* (**9-36**)*
Calamintha	12	4	2		**isopinocamphone**: *grandiflora* (**53**)[4] **piperitone oxide**: *nepeta* spp. *glandulosa* (**44**)[5] **piperitone oxide II**: *nepeta* ssp. *glandulosa* (**25-58**)*
Coridothymus	1		1		**carvacrol**: *capitatus* (**69-78**)[6]
Cyclotrichium	6	2	1	1	**pulegone**: *niveum* (**56**)[7]
Dorystoechas	1	1	1	1	**1,8 - co-cineole**: *hastata* (**9-21**)[8]
Lavandula	3		3	1	**camphor**: *stoechas* (**33**)*, *stoechas* spp. *cariensis* (**53**)* **fenchone**: *stoechas* ssp. *stoechas* (**40**), *stoechas* ssp. *cariensis* (**48**)*
Marrubium	24	9	1	1	**germacrene D**: *parviflorum* ssp. *oligodon* (**11**)*
Melissa	3		3		**carvacrol**: *officinalis* ssp. *inodora* (**15**), ssp. *officinalis* (**46**)[9] **citral**: *officinalis* (**35**)[9] **sabinene**: *officinalis* ssp. *altissima* (**13**)[9]
Mentha	12		7		**carvone**: *longifolia* ssp. *longifolia* (**54-64**)*, *longifolia* ssp. *typhoides* (**50**)*, *spicata* (c) (**38-74**)[10] **linalool**: *citrata* (c) (**34-38**)* **menthyl acetate**: *longifolia* (**39**)* **menthol**: *piperita* (c) (**36-37**)* **pulegone**: *pulegium* (**23-78**)*
Micromeria	22	6	5		**caryophyllene**: *myrtifolia* (**43**)[11] **piperitone oxide**: *congesta* (**45**)[12] **pulegone**: *fruticosa* ssp. *barbata* (**81**)[13], *fruticosa* ssp. *brachycalyx* (**57**)[14], *fruticosa* ssp. *serpyllifolia* (**33**)[15]
Nepeta	38	14	7	2	**1,8-cineole**: *italica* (**35-47**)* **4a** α**, 7**α**, 7**αβ**-nepetalactone**: *caesarea* (**91-95**)*, *racemosa* **32-91**)[16] linalool: *italica* (19-63)*
Ocimum	1		1		**linalool**: *basilicum* (**18-44**)[17]
Origanum	31	15	9		**carvacrol**: *majorana* (**32-78**)[18,19], *minutiflorum* (**42-82**)[19,20], *onites* (**55-80**)[21], *syriacum* var. *bevanii* (**42-79**)[22], *vulgare* ssp. *hirtum* (**3778**)[23] **caryophyllene**: *vulgare* ssp.*vulgare* (**20-23**)[24], *vulgare* ssp. *gracile* (**18**)[24] **p-cymene**: *vulgare* ssp. *vulgare* (**28**)* ß**-terpinene**: *sipyleum* (**23-24**)[25] **linalool**: *onites* (**51-92**)* **terpinen-4-ol**: *vulgare* ssp. *viride* (**17**)[24]

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Genus	Total no. of taxa in Turkey	Endemic sp. in Turkey	No. taxa in Turkey studied by us for ess. oil	Endemic sp. studied by us for ess. oil	**Main compound:** *species* (%) **ref. no**
Rosmarinus	1		1		**1,8-cineole**: *officinalis* (**28-54**)*
Salvia	92	44	8	1	**1,8-cineole**: *cryptantha* (**16-37**)*, *fruticosa* (**40-62**)[10] α-**pinene**: *tomentosa* (**29-63**)* α+β-**pinene**: *candidissima* (**18**)* β-**pinene:** *wiedemannii* (**30**)* β-**thujone**: *pomifera* (**51**)[26] **camphor**: *tomentosa* (**16-36**)* **carvacrol**: *verticillata* ssp. *amasiaca* (**20**) **linalyl acetate**: *sclarea* (**7-70**)[27] **sabinyl acetate**: *pisidica* (**16**)*
Satureja	14	4	7	2	**carvacrol**: *thymbra* (**30-47**)*, *spicigera* (**26-55**)*, *montana* (**53-63**)*, *cilicica* (**38**)[28], *cuneifolia* (**26-69**)[29], *parnassica* ssp. *sipylea* (**43**)[30] **thymol**: *cuneifolia* (**41-68**)*, *hortensis* (**34**)*, *spicigera* (**32-35**) **p-cymene**: *spicigera* (**34**)*
Sideritis	48	31	29	19	**1,8-cineole**: *arguta* (**23**)[31] *sipylea* (**17**)[31] α-**pinene**: *dichotoma* (**19**)[32], *libanotica* ssp. *kurdica* (**42**)[33], *pisidica* (**30**)[31], ssp. *kurdica* (**42**)[33], *pisidica* (**30**)[31] β-**pinene**: *congesta* (**34-35**)[31], *germanicopolitana* (**17**)*, *hispida* (**20**)*, *trojana* (**17**)[31], *libanotica* ssp. *libanotica* (**29-40**)[33], *scardica* †(**22**)[31], *stricta* (**33**)[31], *syriaca* ssp. *nusariensis* (**39**)[31] **borneol**: *lycia* (**18**)[31] **carvacrol**: *galatica* (**14**)[31], *lanata* (**18**)[31] **carvone**: *libanotica* ssp. *microchlamys* (**10**)[33] **caryophyllene**: *condensata* (**20**)[31], *hispida* (**11**)[31], *libanotica* ssp. *violascens* (**11**)[33], *bilgerana* (**10**)* δ-**elemene**: *montana* ssp. *montana* (**23**)[31], *tmolea* (**20**)[31] **germacrene D**: *montana* ssp. *montana* (**28**)[31] **myrcene**: *athoa* (**39**)[34], *germanicopolitana* ssp. *germanicopolitana* ssp. *germanicopolitana* (**37-48**)[35], *germanicopolitana* ssp. *viridis* (**16-49**)[35], *perfoliata* (**18-43**)[31], *sipylea* (**18-49**)[31] **sabinene** *montana* ssp. *montana* (**44**)[31]
Stachys	103	33	3		**carvacrol**: *cretica* ssp. *anatolica* (**33**)* **germacrene D**: *byzantina* (**28-41**)*, *thirkei* (**46**)*
Teucrium	39	8	8	1	α-**pinene**: *polium* (**14**)* β-**pinene**: *polium* (**22**)* **caryophyllene**: *chamaedrys* ssp. *sispirense* (**15**)*, *lamiifolium* ssp. *lamiifolium* (**34**)*, *orientale* (**19**)*, *scordium* ssp. *scordioides* (**33**)* **germacrene D**: *chamaedrys* ssp. *chamaedrys* (**27-28**)*, *lamiifolium* ssp. *lamiifolium* (**33**)*, *orientale* (**18**)*, *polium* (**17**)*

Genus	Total no. of taxa in Turkey	Endemic sp. in Turkey	No. taxa in Turkey studied by us for ess. oil	Endemic sp. studied by us for ess. oil	**Main compound:** *species* (%) **ref. no**
Thymbra	4		2	1	**carvacrol**: *spicata* var. *intricata* (**60-71**)[36], *spicata* var. *spicata* (**61-77**)[36]
Thymus	57	20	32	16	α-**pinene**: *cilicicus* (**17**)[37] α-**terpineol** + α-**terpenyl acetate**: *praecox* ssp. *skorpilii* (**25**)[38] α-**terpenyl acetate**: *longicaulis* ssp. *longicaulis* (**82**)[39] **borneol**: *cariensis* (**13**)[40], *leucostomus* var. *argillaceus* (**24**)[38] **carvacrol**: *eigii* (**65**)[38], *kotschyanus* var. *eriophorus* (**28**)[38], *kotschyanus* var. *glabrescens* (**57-70**)[38], *leucostomus* var. *leucostomus* (**22**)[38], *longicaulis* ssp. *chaubardii* var. *chaubardii* (**42**)[38], *longicaulis* ssp. *longicaulis* var. *subisophyllus* (**32**)[41], *sibthorpii* (**39-40**)[38] **caryophyllene oxide**: *haussknechtii* (**12**)[38] **citral**: *sipyleus* ssp. *sipyleus* var. *sipyleus* (**39-63**)[38] **geraniol**: *longicaulis* ssp. *longicaulis* (**69**)[39], *tracicus* var. *longidens* (**16-47**)* **linalool**: *haussknechtii* (**20**)[40], *sipyleus* ssp. *sipyleus* var. *sipyleus* (**22**)[38] **linalyl acetate**: *argaeus* (**45-66**)[38] **p-cymene**: *pectinatus* var. *pectinatus* (**33**)[38], *striatus* var. *interruptus* (**15**)[38] **thymol**: *atticus* (**38**)[38], *bornmuelleri* (**45**)[42], *comptus* (**35**)[38], *leucostomus* var. *argillaceus* (**15-35**)[38,43], *longicaulis* ssp. *chaubardii* var. *alternatus* (**70**)[44], *longicaulis* ssp. *chaubardii* var. *chaubardii* (**45-65**)[44], *longicaulis* ssp. *longicaulis* (**53**)[39], *longicaulis longicaulis* var. *subisophyllus* (**27-57**)[38, 41], *pectinatus* var. *pectinatus* (**35**)[45], *praecox* ssp. *skorpilii* var. *laniger* (**18-41**)[38], *pulvinatus roegneri* (**54**)[38,46], *sipyleus* ssp. *rosulans* (**36-vulgaris** (c) (**36**)[38], *zygoides* var. *lycaonicus* ssp. (**32**)*, **68**)[38], (**45**)[38]
Zizphora	6		6		**pulegone**: *clinopodioides* (**22**)[47,48], *taurica* ssp. *cleonioides* (**78**)[48], *taurica* ssp. *taurica* (**65**)[48], *tenuior* (**86-87**)[48,49] **thymol**: *persica* (**31**)[48,50]

(c) cultivated

***** unpublished results

† new record for Turkey

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THE ROLE OF THE LABIATAE IN THE VEGETABLE RESOURCES OF THE USSR

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Vegetable resources of the USSR: flowering plants; their chemical composition, utilisation in 8 volumes, has recently been published. This is the first reference book of its kind published on the Russian flora. It gives information on the chemical composition and useful properties of 7133 species attributed to 161 families. The families are arranged according to the A. L. Takhtajan system of Magnoliophyta (1987). Genera and species are arranged in alphabetical order. Descriptions of plants follow a set order - name of the species, Latin followed by the Russian vernacular; description of the species; habitat and distribution; information on chemical composition and useful properties. The latter information has been compiled from literature. The families covered by the text have been rather poorly studied. The only exceptions to this are the Apiaceae, Asteraceae and the Lamiaceae. The treatment of the Lamiaceae is in vol. 6 (fam. Hippuridaceae - Lobeliaceae).

An example of one of the entries in the new reference book is as follows:-

Genus *Dracocephalum* L. - (zmeegolovnik) - dragonhead, 39-31. (the first figure is the number of species in the flora of the former USSR, the second figure is the number of species described in the new reference work).

6. *D. moldavic*a L. - (Zmeegolovnik moldavskiy) - moldavian dragonhead Annual, about 10-15 cm height. - European Russia, Caucasus, Western Siberia, Far Eastern Russia & Middle Asia.

On steep slopes, near habitation, in kitchen-gardens and in parks.

Chemical composition: essential oil including linalool, linalyl acetate, neral, geranial, geraniol, geranyl acetate.

Above ground parts - essential oils, 9% including citral 20-50%, geraniol 20-50%, nerol 7%, citronellol 4%, thymol, limonene, geranyl acetate 43%, α-pinene, linalool. Tanning agents: Coumarins. Flavonoids: moldavozid. Stems: essential oil, 29%. Leaves and flowers: essential oil, 9%, including geraniol 9-21%, geranyl acetate, 7%, citral, 5%. Vitamins: C. Inflorescences: essential oil, 2%, including citral, geranyl acetate, α-pinene, limonene, linalool, geraniol, nerol, citronellol.

Useful properties. Above-ground part: In Mongolian medicine for diseases of liver and stomach. In popular medicine: infusion as anti-inflammatory, astringent, spasmolytic, sedative, wound-healing, for syncopes, functional disorder of gastro-intestinal tract, women's diseases; compress - rheumatism, common cold. In Zabaikalie medicine it is used for ➢

nephritis, gastro-enteritis and a gargle for stomatitis. In clinical tests it has been shown that a decoction shows good results in curing children's pyelonephritis.

In experimental tests it has been found that a tincture improves muscle tone and increases the amplitude of intestine contraction in vitro, it dilates mesentery vessels and increases the circulation rate. An extract manifests an antibacterial activity. It is used nutritionally in salads and as a spice. Its essential oils manifest antiprotist activity. It is also used in the perfume and cosmetic industries and for flavouring foods (citral). Leaves and flowers are used in the canning industry, as relish for food. Seeds are used as an astringent, for their sedative qualities or as a cure for meteorization. The plant is also used as a repellent, attractor of honey bees and as an ornamental.

The new work reveals that flavonoids have been discovered in 306 species within the family. Of these essential oils have been discovered in 188 species; phenol-carbonal acids in 107 species; alkanoids in 103 species; tanning agents in 96 species; coumarins in 89 species; iridoids in 88 species; diterpenoids in 67 species; steroids in 66 species; triterpenoids in 60 species, saponins in 58 species; quinones in 53 species (the genus *Salvia* only); cardenolides (cardiac glycosides) in 9 species; phytoecdysones in 4 species.

The above mentioned flavonoids occur in both under- and above-ground parts of the plants, although quinones have been discovered in under-ground parts only. The largest genera within the family are characterized by having a certain class of compounds present. *Dracocephalum, Mentha, Nepeta* and *Ziziphora* all have essential oils. *Phlomis* and *Phlomoides* have iridoids. *Salvia* has quinones. *Scutellaria* has flavonoids. *Stachys* and *Thymus* have phenolic acids and flavonoids.

In all, 160 species of Lamiaceae are used in both scientific and non-scientific medicine. 10 species are used in homeopathy, 43 species are used in traditional medicine and 140 species are used in popular medicine.

Plant Resources of the USSR (Vol 6) *is available from the Department of Plant Resources of the Komarov Botanical Institute, St Petersburg and costs $30.* □

FLORA OF CHINA VOL. 17: VERBENACEAE - SOLANACEAE

published 1st August 1994

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The Flora of China is scheduled to cover the vascular plants of China, including Taiwan and Hongkong, over 28,000 species in 25 volumes. It is based primarily on the monumental Flora Reipublicae Popularis Sinicae but will be far from a simple translation as all accounts will be the product of extensive collaboration between Chinese and "Western" botanists. Previously most work on Chinese plants fell into two distinct groups: work by American, European and Japanese botanists, largely before the development of taxonomic botany within China and with nearly all the type material not easily available to Chinese botanists, and a vast amount of work done by Chinese botanists since the establishment of the Peoples Republic, largely based on material available only within mainland China.

It was inevitable under these circumstances that species have been misinterpreted and / or described needlessly and a prime aim of the project is to bring the two bodies of expertise together and to sort out such problems. The initial manuscript for each family is produced in English by the Chinese authors. This is then revised extensively by an appointed collaborator, after which it is reviewed by other botanists with expertise on the floras of neighbouring regions and by other workers with specialist knowledge, finally going back to China for final approval. A particular point has been made of verifying all literature citations. Camera-ready copy is produced by Missouri Botanical Garden and printing organised by Science Press, Beijing, who are the joint publishers, responsible for distributing the work within Asia. The first part of the Flora, volume 17, includes the three families Verbenaceae, Lamiaceae and Solanaceae, nearly 1100 species, over 800 of them labiates. It will be available through the Missouri Botanical Garden, Department 11-Scientific Publications, P.O. Box 299, St. Louis, MO 63166-0299.

Orders can be faxed to [1] 314 577 9594 or emailed to dept11@mobot.org. They accept VISA and Mastercard. The price is tentatively set at $75 and standing orders for the entire work will be available. □