A TAXONOMIC REVISION OF LAMIUM

(Lamiaceae)

BY

J. MENNEMA

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Aan de nagedachtenis van mijn vader en Anneke,
Aan mijn moeder,
Aan Adrienne,
Aan Olle en Mark Jaap.
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**Summary**
I. GENERAL CHAPTER

I.1. INTRODUCTION

This taxonomic revision of the genus Lamium is mainly based on the study of herbarium collections, and to a smaller degree on field observations and abstracts from the literature.

In all c. 10,000 collections were examined. The most important quantitative characters were measured in 2700 collections, representing specimens from the entire distribution area of individual taxa.

Field observations were necessary to collect data on the colours of the corolla and of pollen. As habitat descriptions were very often missing on the labels of the herbarium collections, additional field observations were also indispensable in this respect. Unfortunately not all taxa could be investigated in the field (or in botanical gardens). Abstracts from the literature therefore completed the field observations and also provided information about chemistry and cytology.

Special attention is paid to the history of the taxonomy of the genus, in which the general history of plant systematics can be traced. Finally an intuitive phylogenetic reconstruction of the genus Lamium, based on the mutual relationships of the taxa, is presented.

I.2. TAXONOMIC HISTORY OF LAMIUM

In the Species Plantarum (1753) Linnaeus distinguished five species and one variety belonging to the genus Lamium as conceived here. These six taxa were distributed over three genera, viz. Lamium (album, album var. maculatum, amplexicaule, purpureum), Galeopsis (galeobdolon), and Orvala (garganica). One other species, designated by Linnaeus to Lamium, viz. Lamium multifidum, was transferred by Bentham (1848) to Wiedemannia, described in 1837 by Fischer & C. Meyer. In the second edition of the Species Plantarum (1763) Linnaeus distinguished eight species in Lamium, viz. the three mentioned in the first edition, Lamium multifidum, Lamium maculatum (as species), Lamium garganicum, Lamium laevigatum (in my opinion a synonym of Lamium maculatum), and Lamium orvala. It is striking, that Linnaeus erroneously maintained the genus Orvala (with the species Orvala garganica) next to Lamium orvala and that he placed his Lamium galeobdolon (transferred to Lamium in 1759) again in the genus Galeopsis. Willdenow, in the fourth edition of the Species Plantarum (1800), classified this species Lamium galeobdolon neither in the genus Lamium, nor in the genus Galeopsis, but in the genus Leonurus.
In the genus Lamium Willdenow distinguished 13 species: besides the eight, mentioned by Linnaeus in the second edition of the Species Plantarum, he listed Lamium rugosum (in my opinion a synonym of Lamium maculatum), Lamium molle (in my opinion a synonym of Lamium purpureum), Cirillo’s Lamium bifidum and two new species described by himself: Lamium incisum (in my opinion Lamium purpureum var. incisum) and Lamium tomentosum.

Up till that period the important botanists wanted to treat all the species of the world in one publication (of various volumes). Bentham in De Candolle’s Prodromus Systematis Naturalis (1848) is the last representative of this era: he mentioned that the genus Lamium comprised 35 species, included Lamium galeobdolon and excluded two dubious species. In ‘Die natürlichen Pflanzenfamilien’ Briquet (1897) noted 40 Lamium species; the genus was divided into three subgenera (Eulamium, Galeobdolon, and Orvala) and subgenus Eulamium was split into two sections: Pollichia (= Lamiopsis) and Lamiotypus. Briquet divided the section Pollichia into four subsections: Rhomboidea, Garganica, Amplexicaulia, and Purpurea.

During the last ninety years from time to time new species have been described. Now, as far as I could determine, a number of 162 names of Lamium species and a more or less equal number of names of infraspecific taxa are known, but I cannot vouch for the completeness of these lower-ranked taxa.

In the short survey of the taxonomic history of the genus Lamium the general history of taxonomy and its changing emphasis on different geographical regions can be recognized. The taxa, described by the Swede Linnaeus (1753) occur predominantly in (North-)Western Europe; the only Submediterranean species (Orvala garganica) was based on an illustration in a work by Micheli (1729). A diagram picturing the taxonomic history of Lamium is given in Fig. 1. After the

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![Fig. 1: Taxonomic history of Lamium](image_url)

The newly described species (first column), the newly described infraspecific taxa (second column), and the combinations (third column) in the genus Lamium, divided into time periods, each of about 40 years.
first publications of Linnaeus attention was focussed on new taxa in the European area and to a lesser degree on taxa in the (Sub)Mediterranean area, the latter ones sometimes cultivated in botanical gardens in Western Europe (Miller, 1768; Aiton, 1789). Linnaeus’ system inspired the writing of local floras in Europe, e.g. by Jenkinson (1775) ‘A Generic and Specific description of British Plants, translated from the Genera and Species Plantarum of the celebrated Linnaeus’. In these local floras Linnean names sometimes are replaced by new names (e.g. Crantz, 1769), committed to synonymy after introduction of the International Code of Botanical Nomenclature. In the same period (1753-1790) the first new combinations and transfers from one level in the taxonomic hierarchy to another have been made, particularly with regard to Lamium galeobdolon, described by Linnaeus as Galeopsis galeobdolon with the added remark ‘... vix tamen distincto genero nominari meretur’ (Linnaeus, 1759; Scopoli, 1771; Hudson, 1778; Willdenow, 1787).

In the period 1790-1830 the first species in the Irano-Turanian area was published (Willdenow, 1800). The main interest, however, was still focussed on the European and (Sub)Mediterranean area (Sibthorp & Smith, 1809, 1827): the number of newly described species in the European area culminated in this period and the number of new infraspecific taxa (i.a. Dumortier, 1827; Wimmer & Grabowski, 1829; Gaudin, 1829) in this area exceeded the new combinations.

The next period (1830-1870) can be characterized by the exploration of the Mediterranean and Irano-Turanian area (Bentham, 1836; Boissier, 1844, 1846, 1853, 1859; Grisebach, 1844; Kotschy, 1858) and the increasing number of infraspecific taxa by various authors in Europe (i.a. Opiz, 1852) and the (Sub)Mediterranean area (i.a. Tenore, 1831). In 1846 Von Siebold & Zuccarini described for the first time the one and only ’species’ of the Sino-Japanese area (Lamium barbatum), but this species was originally already mentioned by Linnaeus’ pupil Thunberg (1784), erroneously as Lamium gargaricun.

In the period 1870-1910 the first large floras from outside the ‘European’ area were printed. Willkomm & Lange (1870) published the Labiatae-volume of the Prodromus Floraee Hispanicae, mainly based on the collections of the famous European herbaria, Boissier (1879) finished the Labiatae-volume of his magnum opus Flora Orientalis, and from the hands of Battandier & Trabut (1905) the Flore Analytique et Synoptique de l'Algérie et de la Tunisie appeared. Especially Boissier (l.c.) described a number of new species for the Mediterranean and Irano-Turanian area. In the European area other botanists continued to create infraspecific taxa (i.a. Beck, 1893; Briquet, 1893; Ascherson & Graebner, 1898-99), leading to a peak in this period. Also in the local floras in the Mediterranean area (Béguinot, 1903; Fiori & Paolletti, 1907; Lojacono, 1907) a new number of infraspecific taxa were created.

In the period 1910-1950 the general trend continues. The production of publications is, however, less than in other periods, due to World War II. The
Labiatae-volume of Hegi’s Illustrierte Flora von Mittel-Europa (Gams, 1927) appeared; other large floras in this period are the Prodromus Florae Peninsulae Balcanicae (Hayek, 1929) and the Flora Aegaea (Rechinger, 1943). Especially Gams (l.c.) and Hayek (l.c.) published a great number of infraspecific names and new combinations. These new transfers were mainly infraspecific: subspecies became varieties and vice versa, varieties formae, and so on. In the European area (small) publications contained new infraspecific taxa and putative hybrids, particularly in Sweden (i.a. Nilsson, 1925; Segerström, 1928; Sylvén, 1931), in Great-Britain (i.a. Druce 1924, 1929; Britton, 1926), and in the Netherlands (i.a. Danser, 1926; Jansen, 1930; van Ooststroom, 1940, 1947).

In the last period (1950–now) all mentioned developments are recognizable. New editions of (traditional) local floras and original new floras in Europe were published. New publications of large floras ‘outside Europe’, written by European botanists, appeared: the Labiatae-volumes of Davis’ Flora of Turkey (Mill, 1982) and of Rechinger’s Flora Iranica (Mennema, 1982), mainly with new combinations, and i.a. the Flora of Cyprus (Meikle, 1985). However, with the appearance of the Flora of Japan (Ohwi, 1953), the Labiatae-volume of the Flora U.S.S.R (Gorshkova, 1954), the Iconographia Cormophytorum Sinicorum (Anon., 1974), the Flora Reipublicae Popularis Sinicae (Anon., 1977 a and b), the Flora Palestinae (Feinbrun, 1978) and the Labiatae-volume of Takhtajan’s Flora Armenia (Menitskiy, 1987), autochttonic botanists from ‘outside Europe’ are occupied with writing their own floras, a new element in taxonomic history. In Europe the small articles with new infraspecific taxa and new combinations
continue to appear (i.a. van Ooststroom, 1951; Sylvén, 1959; Soó, 1968; Soó & Borhidi, 1968; Bjelcic et al., 1982). For the first time the new combinations outnumber the infraspecific taxa in almost all the areas of the genus Lamium.

A total view of all areas together (Fig. 2) shows three general developments:
1. At first new species were created with a peak in the period from 1830 to 1870;
2. Later on infraspecific taxa were described, with a peak in the period from 1870 to 1910.
3. In the period from 1910 to 1950 the number of new infraspecific taxa is surpassed by the number of new combinations, particularly on the infraspecific level; the peak of new combinations took place in the last decades. I can not escape the impression, that present authors sometimes are searching for 'free' infraspecific ranks to make new combinations ...

I.3. CONCEPT OF LAMIUM IN THIS REVISION

In the present revision the original Lamium concept of former authors—from Linnaeus (1759) till Briquet (1897)—has been accepted. It is rather difficult to select arguments for the delimitation of the genus, as Lamium is mainly not characterized by the presence of certain characters, but by their absence. It is striking that Lamium almost always can be found at the end of keys to the genera of Labiatae, when discriminating characters are exhausted. The absence of important and recognizable characters implied the danger that the genus Lamium became a repository of insertae sedis Labiatae. Especially in this century various authors of East-Asiatic Labiatae-species have thus used Lamium to deposit their new species, in my opinion wrongly so.

It is difficult to give a definition of Lamium in which it stands out from related genera by means of one or preferably two characters. As with so many genera, Lamium can only be defined polythetically: no single character suffices. Lamium has to be defined by a combination of characters that are each usually present: the cordate or reniform leaves with the shallow incisions, the campanulate calyx with its oblique mouth and subequal teeth, the lower lip of the corolla with two lateral lobes with one or two teeth, the truncate apex of the nuts. An important argument to delimit the genus Lamium is derived from the study of chromosomes: the base number \( n = 9 \), rather uncommon in other genera of the Stachyoideae, is characteristic for the genus (see I.5).

In the present revision of the genus Lamium three subgenera are recognized: Galeobdolon, Lamium and Orvala, and in subgenus Lamium three sections: Amplexicaule, Lamiotypus and Lamium. Recognized are 16 species, 4 of which with respectively 3, 2, 3 and 3 subspecies and one subspecies with 3 varieties; two species are divided into each 5 varieties. Only one taxon of hybrid origin is recognized.
I.4. MORPHOLOGICAL CHARACTERS OF LAMIUM

It is well-known, that the value of a character may substantially differ in related groups. For instance, in the genus Carex the number of two or three stigmas is an important character to divide the genus into subgenera (Kern & Reichgelt, 1954). However, the same character is used in the related genus Scirpus to distinguish two taxa on subspecific level, viz. Scirpus lacustris subsp. lacustris and subsp. tabernaemontani.

At the beginning of this monographic study of Lamium I investigated the material for the first time rather roughly to get an impression about the value of the various characters, available to delimit the genus, the subgenera, the sections, and the species. This impression did not change fundamentally during the second, more intensive investigation of all the specimens. Moreover this early survey gave an indication of those characters worthy of further thorough investigation.

Life-form

The species of the genus Lamium are herbaceous and have an annual or perennial life-form. The taxa of the subgenera Galeobdolon and Orvala are perennial, those of the three sections of subgenus Lamium are both perennial and annual. The perennial taxa possess more or less woody rhizomes, which are lacking in the annual taxa.

Indumentum

In general all taxa of the genus Lamium are hairy all over the plant, except Lamium glaberrimum which has only a pubescence on the corolla tube. The indumentum is rather variable both in the type of hairs and the intensity of hairiness. Shortly stalked and sessile glands are usually present, especially on the margins of the bracts and the calyx teeth. Field observations convinced me of the relation between the intensity of the indumentum and the habitat of the plants. For that reason I pay less attention to the indumentum as discriminative character than former authors often did.

Stem

The stems are decumbent or erect, simple or branched at the base, In the upper part of the plants side branches are lacking, except in Lamium galeobdolon subsp. flavidum. The internodes become shorter towards the top of the stem. The length of the stem is (≤ 5-) 20-40 (-95) cm, but this may to some extent be influenced by the average size of herbarium-sheets. In spite of the variability the length of the stem can be a rather discriminative character, especially at the infraspecific
level. In cross-section the stem is distinctly quadrangular; the sides are, depending on the length of the stem, (1-) 1½-2½ (-5) mm. The indumentum is often lacking or hardly present at the base of the stem and increases upwards. Usually the indumentum of the stem is rather homogeneously distributed over the sides and the ribs, except in Lamium galeobdolon subsp. galeobdolon, where stems are exclusively or mainly hairy on the ribs. Field observations give the impression that in some species the young shoots are more hairy than the adult plants (e.g. Lamium galeobdolon s. lat. and Lamium maculatum).

Leaves

The leaves are always petiolate on the lower nodes, the upper ones are usually sessile or rarely amplexical (Section Amplexicaule and Lamium galactophyllum). In the case of rather large leaves, the petiole is always shorter, in the case of rather small leaves it is as long as or longer than the blade. There are no essential differences between the cauline leaves and those with the verticillasters, the floral leaves, neither in length, nor in shape. Usually the uppermost cauline leaves and the lowermost floral leaves are the biggest ones. Both up and downwards the length of the leaves decreases and there may be a little change in the shape of the leaves. The diagrams in Chapter II are based on the sizes, according to Fig. 3, a of the uppermost cauline leaves and the lowermost floral leaves. The leaves vary in length from (≤ ½-) 1-6 (-16) cm, their index from (0.6-) 0.8-1.6 (-3.5). Both the length and the index of the leaves are discriminative characters on the specific level (e.g. Lamium album and Lamium tomentosum) as well as on the infraspecific level (Lamium amplexicaule, Lamium galeobdolon, Lamium garganicum and Lamium purpureum). The smallest leaves (½ cm) are found in alpine and montane taxa (Lamium amplexicaule var. bornmuelleri, Lamium garganicum var. armenum and microphyllum, Lamium purpureum var. ehrenbergii). living on rocks and stone screes. The shape of the leaves in the genus Lamium normally is cordate or reniform, sometimes ovate or lanceolate with an acute apex and a cordate base. The incisions of the leaves are shallow and mostly regular and crenate, in the upper leaves sometimes dentate. The leaves of Lamium amplexicaule var. incisum and orientale and of Lamium glaberrimum are more deeply incised and may be divided into lobed segments. The incisions are of discriminative value, especially on the infraspecific level (e.g. in Lamium amplexicaule and Lamium purpureum). The indumentum on the leaves usually differs from that of the stem; normally the indumentum of the leaves is (appressed) pubescent. Glandular hairs have not been observed on the leaves.

Inflorescence

The inflorescence in the genus Lamium consists of verticillasters in the axils of the floral leaves. The number of verticillasters corresponds with the number of pairs
of floral leaves and is (1–) 3–5 (–10). The number of verticillasters is of no discriminative value. The verticillasters may be crowded or remote, a character with discriminative value, not only on the infraspecific level (e.g. Lamium purpureum), but even on the specific level (Lamium confertum). The number of flowers per verticillaster at the lowermost floral leaves is (2–) 10–16 (–≥ 20). Especially on the infraspecific level this character may have a discriminative value (Lamium galeobdolon and Lamium garganicum).

The presence (or absence) of very small bracts in the inflorescence as well as the bracts themselves give important discriminative characters on the subgeneric and sectional level. The bracts are lacking in the section Amplexicaule of subgenus Lamium. In all other sections of this subgenus and in the other subgenera the bracts are extremely small: (1–) 2–6 (–13) mm; the width varies from ½ to 1 mm.
Normally the bracts are hidden in the verticillaster, but in the subgenus *Galeobdolon* they are spreading and reflexed. Dried specimens of this subgenus may be recognized immediately by this character. The indumentum of the bracts is usually hirsute. The apex of the bracts in the subgenus *Lamium* is hirsutely hairy too. In subgenus *Galeobdolon* the apex is clearly glabrous and distinctly corneous. This is also the case in subgenus *Orvala*, but here the apex is very short (< ½ mm).

**Calyx**

Although there is a certain variation in the calyces in species of the genus *Lamium*, there is on the other hand a great similarity: the calyx is campanulate with an oblique mouth and the calyx teeth are subequal. The length of the calyx is (½ –) 1 - 1½ (-2½) cm. After anthesis the calyx often enlarges. The number of nerves in the tube may vary: 5, 10 or more, but is mostly 10. The teeth are (narrowly) triangular or rarely deltoid (*Lamium galeobdolon* subsp.) The length of the teeth in relation to the length of the tube of the calyx may be of discriminative value, on the specific level (*Lamium confertum*) as well as on the infraspecific level (*Lamium album* and *Lamium purpureum*). Very often the calyx is glabrous or glabrate at the base of the tube and towards the teeth it is usually hirsute. The calyx of *Lamium eriocephalum* and *Lamium tomentosum* is densely villose, tomentose or woolly. Glandular hairs are almost always present, especially at the margin of the teeth of the calyx. The aristate apex of the calyx teeth is similar to the apex of the bracts:

![Fig. 4. The calyx teeth of: a. subgenus *Orvala*; b. subgenus *Galeobdolon*; c. subgenus *Lamium*.](image-url)
hirsute in the subgenus *Lamium*, clearly glabrous and distinctly corneous in the subgenus *Galeobdolon*, and glabrous and corneous too in the subgenus *Orvala*, but with conspicuously shorter teeth (< ¼ mm). In Fig. 4 the differences in the aristate apices of the calyx teeth are given.

**Corolla**

The length of the corolla, as measured according to Fig. 3, b varies from ½–4½ cm. Usually the length of the corolla is rather constant and characteristic for each taxon; in *Lamium garganicum* the length may be very variable: Briquet s.n. collected 9 flowers of one specimen and arranged them in order of size from 2½–4½ cm! Cleistogamous flowers are known from *Lamium amplexicaule* (all varieties), *Lamium bifidum*, *Lamium confertum*, and *Lamium purpureum* var. *ehrenbergii*. Specimens only with cleistogamous flowers are observed in *Lamium amplexicaule* var. *bornmuelleri*; in all other taxa cleistogamous flowers are only found in specimens with chasmogamous flowers too. So the described varieties *clandestinum* and *cryptanthum* in *Lamium* do not make sense taxonomically. The corolla in the genus *Lamium* is bilabiate with an arched upper lip. The lower lip usually has two small lateral lobes, each with 1 or 2 teeth, and one median lobe. The lateral lobes of *Lamium galeobdolon* are oblique-ovate and toothless. The apex of the upper lip varies from rounded or truncate to bilobed or bifid (even observed in one specimen of *Lamium garganicum!*), the apex of the median lobe of the lower lip is bilobed or bipartite (or acute in *Lamium galeobdolon*). The shape of the corolla tube is a very important character on the level of the subgenus (faintly sigmoid: subgenus *Galeobdolon*; straight: subgenus *Orvala*) and on the sectional level in the subgenus *Lamium* (sigmoid: section *Lamiotypus*; straight: section *Amplexicaule* and section *Lamium*). In the section *Lamiotypus* the sigmoid corolla tube is not always exserted from the calyx. The presence of an internal ring of hairs in the tube of the corolla is of less importance as a discriminative character. The colour of the corolla is according to field observations and reliable label-data usually pink or purple, or white, rarely crimson to reddish (*Lamium orvala*) or yellow (*Lamium galeobdolon*). The honey guides are dependent of the colour of the corolla: dark purple (pink or purple flowers), yellowish green (white flowers), deep red (crimson to reddish flowers) and light brown (yellow flowers). From pink and purple flowered *Lamium* taxa also specimens with white flowers are known. In white flowered *Lamium* taxa rather rarely specimens can be observed with (light) pink flowers. In Japan mixed populations of white and pink flowered specimens of *Lamium album* subsp. *barbatum* have been recorded regularly.

**Stamens and ovaries**

The stamens never protrude beyond the upper lip of the corolla; their filaments reach a length from 4–6 mm in small flowered taxa (e.g. *Lamium amplexicaule*,
Lamium purpureum) up to 12–15 mm in large flowered taxa (e.g. Lamium garganicum, Lamium orvala). The anterior stamens are 1–5 mm longer than the posterior ones and 1–4 mm lower attached. The filaments are viscidly hairy and sometimes bear short glandular hairs (not observed in subgenus Orvala and in section Ampelicaule of subgenus Lamium). The anthers are $\frac{3}{4}$–$3\frac{1}{2}$ by $\frac{1}{2}$–1$\frac{1}{2}$ mm; they may be dorsally and ventrally tufted hairy (subgenus Lamium) or glabrous (subgenus Galeobdolon and subgenus Orvala). The colour of the pollen has only been observed in the species Lamium album, Lamium amplexicaule, Lamium galeobdolon, Lamium garganicum, Lamium maculatum, Lamium orvala and Lamium purpureum and varies from yellowish white to red orange. My colleague, the late Dr. J. Muller informed me, that the pollen of the species in the genus Lamium is uniform in size and shape. The style of the ovaries is always shorter than the upper lip of the corolla, glabrous or subglabrous, and usually equally bifurcate.

Fruits

The nutlets of the species of the genus Lamium are rather uniform. They are obovoid with a truncate apex and are in cross-section trigonous with one convex and two flat sides. The colour is dull-brown and the fruits very often show small greyish spots. The length of the fruits is (2–) 2$\frac{1}{2}$–3$\frac{1}{2}$ (–5) mm, the width (1–) 1$\frac{1}{4}$–1$\frac{3}{4}$ (–2$\frac{1}{2}$) mm.

The percentage of ripe fruits appears to vary strongly in herbarium specimens of Lamium as shown in Table 1. Obviously there is a big gap in the percentages of ripe fruits between 17 and 56%. To give an explanation for this gap I have tried to find a correlation with one or more other characters of the various species concerned. Only one character, the life-form of the species, appeared to correlate. All species with a percentage of ripe fruits higher than 55% are annuals, and all species with a percentage of ripe fruits lower than 20% are perennials. In general herbarium specimens are collected in the flowering time. The explanation of the correlation must be that the ripening of fruits of annual Lamium species takes place in a shorter period than the ripening of fruits of perennial species. In the literature I could not find any data about the correlation between the life-form and the rate of fruit ripening, neither for Lamium, nor for other plant genera. Random studies in other genera (e.g. Geranium, Polygonum) led, however, to the same result: herbarium specimens with a percentage of specimens with ripe fruits of more than 50% were annuals, and species of the same genus with less than 20% of ripe fruits were perennials. So it looks as if the correlation observed in Lamium is a more general phenomenon.
Table 1. Percentages of herbarium specimens with ripe fruits of Lamium species. As only one specimen of Lamium glaberrimum could be investigated, this species is not entered.

<table>
<thead>
<tr>
<th>Species</th>
<th>Number of investigated specimens</th>
<th>Specimens with ripe fruits (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamium album</td>
<td>197</td>
<td>10</td>
</tr>
<tr>
<td>Lamium amplexicaule</td>
<td>258</td>
<td>68</td>
</tr>
<tr>
<td>Lamium bifidum</td>
<td>42</td>
<td>62</td>
</tr>
<tr>
<td>Lamium confertum</td>
<td>182</td>
<td>74</td>
</tr>
<tr>
<td>Lamium eriocephalum</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Lamium flexuosum</td>
<td>140</td>
<td>8</td>
</tr>
<tr>
<td>Lamium galactophyllum</td>
<td>9</td>
<td>56</td>
</tr>
<tr>
<td>Lamium galeobdolon</td>
<td>235</td>
<td>9</td>
</tr>
<tr>
<td>Lamium garganicum</td>
<td>325</td>
<td>12</td>
</tr>
<tr>
<td>Lamium macrodon</td>
<td>26</td>
<td>73</td>
</tr>
<tr>
<td>Lamium maculatum</td>
<td>254</td>
<td>17</td>
</tr>
<tr>
<td>Lamium moschatum</td>
<td>73</td>
<td>66</td>
</tr>
<tr>
<td>Lamium orvala</td>
<td>118</td>
<td>8</td>
</tr>
<tr>
<td>Lamium purpureum</td>
<td>473</td>
<td>67</td>
</tr>
<tr>
<td>Lamium tomentosum</td>
<td>40</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2. Chromosome numbers (2n) of Lamium species, mainly obtained from Bolkhovskikh et al (1969) and Moore (1982).

<table>
<thead>
<tr>
<th>Subgenus Galeobdolon</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamium flexuosum</td>
<td>18 (Wieffering, in litt.)</td>
</tr>
<tr>
<td>Lamium galeobdolon f. argentatum</td>
<td>36 (Smejkal, 1975)</td>
</tr>
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I.5. CHROMOSOME NUMBERS

The chromosome numbers of 19 taxa in the genus *Lamium* have been extracted from the literature. They are listed in Table 2.

From the species *Lamium eriocephalum*, *Lamium galactophyllum*, *Lamium glaberrimum*, and *Lamium macrodon* chromosome numbers are not available. According to Bolkhovskikh et al. (1969) Marchal found in 1920 the deviant chromosome numbers $2n = 16$ for *Lamium album* and $2n = 32$ for *Lamium galeobdolon*, probably miscounts.

It is evident that all taxa listed in Table 2 must be considered as diploids except *Lamium confertum*, *Lamium galeobdolon* f. *argentatum* (the originally cultivated tetraploid of subsp. *galeobdolon*) and subsp. *montanum* and *Lamium purpureum* var. *incisum*, which are tetraploids. It is evident too, that species from different subgenera and different sections have been examined, and that in all cases the base number $x = 9$. The chromosome number $2n = 18$, found in the *Lamium* taxa, is rather uncommon in other genera of the *Stachyoideae* to which *Lamium* belongs. Moore (1982) reported it only for *Leonurus cardiaca* and *Stachys ocymastrum*.

Unfortunately chromosome numbers of the related genera *Moluccella* and *Wiedemannia* are not available.

I.6. CHEMICAL CHARACTERS

It is of little use to mention in this monograph the occurrence of several chemical compounds in *Lamium* species recorded in literature (e.g. Hegnauer 1966-1973; Kritikos & Harvala, 1970; Sharma & Singh, 1981). The data are too fragmentary and too incomplete to use them as criteria for delimitation of *Lamium* taxa below the genus level. Moreover, many authors gave no or incomplete and inaccurate data about morphology and geography of the plants used. An exception forms the research of the former Laboratory for Experimental Plantsystematics in Leiden (Netherlands). Adema (1968) investigated species of *Lamium* and some related genera, using paper chromatography, for the presence of iridoid glucosides. One of the more striking results was, that in the allotetraploids *Lamium confertum* (= *Lamium moluccellifolium*) and *Lamium purpureum* var. *incisum* (= *Lamium hybridum*) no traceable amounts could be found of iridoid glucosides, present in all other *Lamium* taxa investigated, except *Lamium galactophyllum*. Another result was the difference between *Lamium galeobdolon* and the other *Lamium* species. *Lamium galeobdolon* does not have the *Lamium* compounds (e.g. lamiol and laminoside) but contains harpagid-type iridoid glucosides, the more common type of iridoid glucosides in *Labiatae*.

Wieffering & Fikenscher (1974) arrived at the same conclusion: *Lamium galeobdolon* (= *Lamiastrum*) differs from *Lamium* by accumulating predominantly aucubin-like glycosides of the C-9-aglycon group. They also investigated leaves of the three subspecies of *Lamium galeobdolon* for aucubin-like
glycosides and ascertained that it seems likely, that subsp. montanum is of allopolyploid origin with the two diploid taxa (subsp. flavidum and galeobdolon) as parents as Dersch (1963) and Polatschek (1966) had already presumed, although not on the basis of arguments derived from phytochemistry.

I.7. GEOGRAPHY AND ECOLOGY

The distribution of the genus Lamium may be characterized as temperate Eurasian (holarctic). The area reaches from Western Europe to Eastern Asia, including Northern Africa North of the Atlas Mountains and Macaronesia (Açores, Madeira and the Canary Islands), approximately between 65 and 30° Northern latitude. It is not quite clear whether the occurrence of the genus Lamium in Macaronesia is natural or due to introduction by man. Outside the natural area a small number of taxa is introduced (and sometimes naturalized) in Greenland and Iceland, in the America’s, Australia, and Tropical and South Africa. Lamium amplexicaule s. str. has by far the largest distribution area of all taxa in the genus. It is not only found in the whole Eurasian temperate zone, but also in the total area where introductions of Lamium taxa have been recorded. Lamium eriocephalum and Lamium galactophyllum, both endemic in Asia Minor, have the smallest distribution area. A certain number of taxa possesses a disjunct area; the isolated position of Portugal in the areas of Lamium bifidum and Lamium confertum is remarkable. The disjunction of the distribution area of the shade loving Lamium flexuosum is probably due to felling of the original forests in the Mediterranean area in ancient times.

In Table 3 the areas of distribution of the Lamium taxa are given. The centre of diversity is obviously found in the Irano-Turanian and the Mediterranean regions. This is in accordance with the view, that the Mediterranean and Irano-Turanian regions are also a centre of diversity for the entire family Labiatae (Meusel et al., 1978). It is striking that Lamium galeobdolon s. lat. and Lamium orvala of the subgenera Galeobdolon and Orvala do not occur in these regions. This induced me to the hypothesis, that both European subgenera have developed from the older, Eurasian subgenus Lamium. Unfortunately fossils are lacking to give further information about the origin and the evolution of the genus Lamium.

As for ecological data, the labels of most herbarium specimens are so poor in information, that it was impossible to derive the full ecological ranges of the individual taxa from them. In Lamium album for instance, the ecological data were totally lacking in 55% (subsp. album), 71% (subsp. barbatum), and 51% (subsp. crinitum) of the herbarium sheets investigated. If there were any data, they usually were restricted to such simple information as: ‘roadside’, ‘forest’, ‘field’, and the like. Herbarium specimens giving more complete ecological information about the habitat, the soil, the altitude, and the plant community, are exceptional. Field
Table 3. The distribution of the Lamium taxa. The columns 1–5 correspond with the phytogeographical division of Europe according to Walter & Straka (1970): 1 = Boreal; 2 = Atlantic; 3 = Central Europe; 4 = Submediterranean; 5 = Mediterranean. The columns 6–9 are mainly based on the phytogeographical division of Asia by Takhtajan (1969): 6 = Irano-Turanian; 7 = Central-Asia; 8 = East Siberian; 9 = Sino-Japanese.

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Observations and reliable data from the literature were necessary to obtain the needed information, and for the very rare species (e.g. Lamium eriocephalum and Lamium galactophyllum) this did not always give a satisfactory picture.

Roughly the habitats of the taxa of the genus Lamium can be listed under two categories: forests on the one hand and rocky mountain slopes / cultivated fields on the other. Forest (and derivations of it like thickets, under hedges and so on) is the habitat of the taxa of the subgenera Galeobdolon and Orvala. Rocky mountain slopes (and anthropogenic derivations like waste ground, cultivated fields, gardens, and roadsides) is the dominating habitat in the subgenus Lamium.
The data about the soil and the plant community are too incomplete to be summarized in general terms. In only a few cases a certain preference for a calcareous soil may be recognized in the habitat of a species (e.g. *Lamium orvala*).

The range of altitude in the genus *Lamium* is very large, from sea-level up to 4800 m (*Lamium tomentosum*). Most of the taxa are known from sea-level up to c. 1000 m; typical montane species are *Lamium eriocephalum* (1800–3200 m), *Lamium galactophyllum* (1400–2550 m), *Lamium garganicum* subsp. *corsicum* (1000–2500 m), *Lamium macrodon* (900–2700 m), and the already mentioned *Lamium tomentosum* (1300–4800 m), as well as the infraspecific taxa *Lamium amplexicaule* var. *bornmulleri* (1500–2000 m) and *Lamium purpureum* var. *ehrenbergii* (1700–2300 m).

I.8. CRITERIA FOR DELIMITATION OF SUBGENERA, SECTIONS, SPECIES AND INFRASPECIFIC TAXA

For supraspecific delimitation I choose three 'important' (i.e. constant or diagnostic) character states: the anthers glabrous and the aristate apex of the bracts and the calyx teeth corneous and glabrous too versus the anthers dorsally and ventrally tufted hairy and the aristate apex of the bracts and the calyx teeth hairy to the top. The fact that these characters always appear in combination induced me to distinguish three subgenera. Other constant characters as the position of the bracts and the shape of the corolla tube are important too for delimitation on subgeneric level.

On the other hand the presence or absence of the bracts and the shape of the corolla tube are used to divide subgenus *Lamium* into three sections.

All specimens belonging to one species always differ in the same combination of three or more, often more or less variable characters from all specimens belonging to any other species. When a certain number of intermediates have been found linking two generally recognized species, they have been united into one species. This led in some cases to merging two or more species into one, where in a part of the distribution area these 'species' are rather well recognizable.

Infraspecific taxa are distinguished in cases where the mutual similarities are greater than the discriminative characters and in cases where the variable characters as length of stem, leaves and corolla, the number of flowers per verticillaster, and so on, show a certain overlap. The rank of subspecies was chosen not only on the basis of greater importance of the discriminative characters as compared to those separating varieties, but also because of differences in distribution and habitat.

I.9. HYBRIDIZATION

Only one hybrid can be recognized with confidence in the genus *Lamium*, viz. *Lamium × holsaticum* (*L. album × maculatum*). The hybrid itself will be treated after

16
the species (chapter II.5). In the same chapter the *Hybrida excludendae* and the *Hybrida dubiae* are also recorded.

Attempts to produce hybrids artificially have always been unsuccessful. Bernström (1955a & b) tried to hybridize *Lamium amplexicaule* and *purpureum*, treated in many floras as the parentage of the tetraploid *Lamium purpureum* var. *incisum*. His attempt failed, in my opinion not surprisingly, as the parent species belong to two separate sections of the subgenus *Lamium*. Stace (1975) crossed parental material of *Lamium confertum* and *purpureum* to produce the hybrid *Lamium x boreale*, but his crosses failed.

Summarizing it can be said, that the hybridization in the genus *Lamium* gives hardly any information about the relationship of the various taxa. It is striking, that the only hybrid *Lamium x holsaticum* has particularly been recorded in the border region of the areas of both parent species.

I.10. AN INTUITIVE PHYLOGENETIC RECONSTRUCTION

In postulating an intuitive phylogenetic reconstruction of the genus *Lamium*, I start from the axiom, that species with a large, disjunct distribution area are older than species with a small and continuous area. In this perspective it is striking that *Lamium orvala* (= subgenus *Orvala*) possesses a rather small but continuous area. The total area of *Lamium galeobdolon* is continuous too with some outposts, but is larger. *Lamium flexuosum*, also belonging to the subgenus *Galeobdolon* has a disjunct area, but as mentioned before, this is probably due to the cutting down of forests in the Mediterranean area in ancient times. But the latter are historical times, not geological ones. By comparison with some species of the subgenus *Lamium* such as *Lamium album* s.lat. and *Lamium garganicum* s.lat. the distribution areas of the species of the subgenera *Galeobdolon* and *Orvala* are small and rather continuous. According to the above mentioned axiom subgenera *Galeobdolon* and *Orvala* are supposed to be relatively young. The geographical aspect, that the distribution areas of both subgenera mainly are situated outside the centre of diversity (see table 3), lends support to this hypothesis.

Although both subgenera *Galeobdolon* and *Orvala* are distinguished from subgenus *Lamium* by the same characters, viz. anthers glabrous, bracts and calyx teeth with a corneous, glabrous aristate apex, this does not mean, that they are closely related with each other. To the contrary, it is in my opinion highly probable that their phylogenetic pathways have been separate. *Lamium orvala* with its straight corolla tube and large flowers is most closely related to *Lamium garganicum*. The taxa of subgenus *Galeobdolon* with their sigmoid corolla tube and smaller flowers are related with *Lamium maculatum*. It is remarkable that in both lines of development the same change in habitat can be observed: from rocks and open field via forest-margins to forest.
*Lamium purpureum* possesses various characters that lead me to consider it to be a central species. A diagram picturing the relationships is given in Fig. 5. The translation of the diagram in terms of an intuitive phylogenetic reconstruction is as follows.

At first, starting from (the forerunner of) *Lamium purpureum*, the development of species with amplexical upper leaves could take place. In this line the section *Amplexicaule* (*Lamium amplexicaule*, *eriocephalum* and *macrodon*) soon branched off by loosing the bracts. It is remarkable that there is a great similarity in the development within the two species *Lamium amplexicaule* and *purpureum*. In both species infraspecific taxa occur with (irregularly) incised leaves (*Lamium amplexicaule var. incisum* and *orientale* ←→ *Lamium purpureum var. hybridum* and *incisum*) and dwarf forms from the montane regions (*Lamium amplexicaule var. bornmuelleri* ←→ *Lamium purpureum var. ehrenbergii*). The diversification within *Lamium amplexicaule* mainly took place in the Irano-Turanian region and that within *Lamium purpureum* mainly in the Western European region. The occurrence of a tetraploid variety (*Lamium purpureum var. incisum*), however, has no known counterpart in *Lamium amplexicaule* s. lat.

In the section *Lamium* two species are closely related to *Lamium purpureum*: *Lamium bifidum* and *confertum*. Both species may have developed rather early from (the forerunner of) *Lamium purpureum*. Both possess a subarea in Portugal, where *Lamium purpureum* occurs too. Still it goes too far, as Bernström (1955b) indirectly supposed, to look for the origin of the tetraploid *Lamium confertum* in a joint ancestorship of *Lamium bifidum* and *Lamium purpureum*. The main characters of *Lamium confertum* (index leaves < 1.0; lowest verticillaster remote; calyx teeth longer than the calyx tube) are lacking in both putative ancestors. Except the common subarea in Portugal the distribution of *Lamium bifidum* and *purpureum* is distinctly different. *Lamium confertum* spread rather recently, i.e. after the last glacial periods, in Northern Europe, and *Lamium bifidum* in the Western Mediterranean area. Because of its bifid corolla the latter species is seen as the putative forerunner of another Mediterranean species *Lamium garganicum*, from which *Lamium glaberrimum*, restricted to the Krym (U.S.S.R.), developed, and also *Lamium orvala* (section *Orvala*).

Apart from the species of the section *Amplexicaule* there is still another species with amplexical upper leaves, *Lamium galactophyllum*. This species, still present in a small montane area in Asia Minor, is considered by me as the central (oldest) species of the section *Lamiotypus*, descended from the same ancestor as *Amplexicaule*. *Lamium galactophyllum* has preserved its bracts and possesses a sigmoid corolla tube. Via *Lamium moschatum*, related to *Lamium galactophyllum* by also having upper leaves with whitish (or pinkish) spots at the base, *Lamium tomentosum* and *Lamium album* arose. The latter species is closely related to *Lamium maculatum* and can be considered its parental species; the only known hybrid in *Lamium* is the hybrid of *Lamium album* and *maculatum.*
Fig. 5. The phylogenetic relationships in the genus *Lamium*.
The habitat of the latter species is in forest-margins, the same habitat where Lamium flexuosum is growing. This species is in my view derived from Lamium maculatum because of its glabrous anthers and a glabrous aristate apex of the bracts and calyx teeth, also the characters of the forest plant Lamium galeobdolon. The latter has been placed in a separate genus (Lamiastrum, Galeobdolon) by many recent authors (i.a. Grintescu, 1963; Dvoráková, 1966; Polatschek, 1966; Holub, 1970; Wegmüller, 1971, 1973; Ball, 1972; Mill, 1982; Hämet-Lahti et al., 1984; Clapham et al., 1987) on the basis of a number of morphological and chemical characters: the lateral lobes of the lower lip, the deviating yellow colour of the corolla, and the absence of lamiol and lamioside. Concerning the last character it is rather unfortunate that the chemical characters of Lamium flexuosum never have been investigated. The oblique-ovate lateral lobes of the lower lip are also observed in a form of Lamium album, viz. var. splendens; that indicates a certain relationship of Lamium album with the younger Lamium galeobdolon (via Lamium maculatum). Although I do not deny that the position of Lamium galeobdolon is a special one, I completely agree with Bentham (1848) who united Lamium galeobdolon and flexuosum in the section Galeobdolon. The fact, that both species have spreading or reflexed bracts, has contributed to this opinion. Muller (1978) investigated a number of Lamium seedlings of the North-western European lowland. The number was too low—only 5 taxa—to draw conclusions on phyllogenetic relationships, but interestingly he mentioned a certain similarity between Lamium maculatum and Lamium galeobdolon. Lamium maculatum possesses hypocotyls with an emarginate tip and Lamium galeobdolon with a deeply emarginate tip; all other tips of the hypocotyls investigated are rounded-truncate (Lamium album, Lamium amplexicaule, Lamium purpureum var. purpureum and incisum). In this character I find some support for the supposed relationship between Lamium maculatum and Lamium galeobdolon and for the supposition that Lamium galeobdolon finds its origin in Lamium maculatum.

I.11. REFERENCES

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II. TAXONOMIC CHAPTER

II.1. INTRODUCTION

After the description of the genus and the key the subgenera, sections, species and infraspecific taxa are treated in alphabetical order. In addition the one recognized hybrid has been treated. Criteria for what is understood by the concepts subgenera, sections, species, subspecies and varieties are given in Chapter I.8.

Synonyms are listed in chronological order, supplied with the most important literature references. Literature has been abbreviated mainly according to F.A. Stafleu & R.S. Cowan, Taxonomic Literature (6 volumes, 1976-1986), and G.H.M. Lawrence et al., Botanico-Periodicum-Huntianum (1968).

Of the synonyms not every type could be obtained for verification. To give some information about the absence of the types in the various well-known herbaria I have added in brackets: not found in ... Lectotypes have been assigned by the present author.

To show the variability of the quantitative characters diagrams are added. Diagrams give more information than minimum, average and maximum values. In the key I use averages for the quantitative characters; in the descriptions the minimum and maximum values are added. In Chapter I.4 is described how the various parts of the plant were measured. In principle the quantitative data in my descriptions are based on measurements of all the available specimens for each taxon. If a very large number of specimens of one taxon was available, measurements were made on at least 5 specimens from each country or province. In that way I tried to collect a reliable spectrum of the quantitative characters within the whole distribution area of the taxon.

The data on distribution, habitat and altitude are mainly based on data from the labels; if necessary, data from the literature were added. The sequence of the habitats mentioned reflects a decreasing preference of the plants.

The variability is described briefly and the main variable characters are mentioned. All taxa below the rank of the treated taxon, that I could find in literature, are included in alphabetical order. These lower-ranked taxa are in my opinion not of taxonomical value; completeness of the lists of names is not claimed.

The list of the cited collections (see Chapter III) is complete in the cases of rare taxa and of taxa which were known under other names. If there were too many collections, I made a selection of the cited specimens. Exsiccateae collections have been preferred; furthermore attention has been paid to a well-balanced distribu-
tion over the countries concerned and the total number of examined collections is mentioned.

Geographical names have been spelled according to the available volumes of the ‘Gazetteers’ (Official standard names approved by the United States Board on geographic names) and to the latest edition of ‘The Times’ atlas of the world (1980). In some cases the original label names are added in square brackets. Names neither in the Gazetteers, nor in the Times atlas have been spelled according to the original labels.

All names which could not be ascertained as synonyms have been summed up as Species et varietates dubiae respectively Hybrida dubiae, while Lamium names which do not belong to the genus as conceived here, are given under Species excludendae. Putative Lamium hybrids belonging to one of the treated taxa, have been listed up as Hybrida excludendae.

The major part of the material studied in this work consisted of dried specimens. Herbaria, from which material was examined, are if possible indicated in the text by the following abbreviations according to the Index Herbariorum, 7th ed. (1981). Foreign institutes I visited personally, have been marked with an asterisk (*).

AMD Hugo de Vries-Laboratorium, Amsterdam, Netherlands.
AWH* Natuurwetenschappelijk Museum (Dr Henri van Heurck), Antwerpen, Belgium.
— Private herbarium J. F. Ballintijn, Purmerend, Netherlands.
B Botanischer Garten und Botanisches Museum, Berlin, Germany.
BAS* Botanisches Institut der Universität, Basel, Switzerland.
BM* British Museum (Natural History), London, Great Britain.
— Private herbarium G. Bosc, Toulouse, France.
BP Botanical Department of the Hungarian History Museum, Budapest, Hungary.
— Private herbarium J. Bruinsma, Breugel, Netherlands.
BR Jardin botanique national de Belgique, Meise, Belgium.
BRNU Institute of Plant Biology, University of J. E. Purkyne, Brno, Czechoslovakia.
C Botanical Museum and Herbarium, Copenhagen, Denmark.
CAL Central National Herbarium, Botanical Survey of India, Howrah, India.
COI Botanical Institute of the University, Coimbra, Portugal.
E Royal Botanic Garden, Edinburgh, Great Britain.
ERE Department of Plant Taxonomy and Geography, Botanical Institute of the Academy of Sciences of the Armenian S.S.R., Yerevan, U.S.S.R.
FI Herbarium Universitatis Florentinae, Firenze, Italy.
G* Conservatoire et Jardin botaniques de la Ville de Genève, Chambéry, Switzerland.
GB Botanical Museum, Göteborg, Sweden.
GOET Systematisch-Geobotanisches Institut, Göttingen, Germany.
— Private herbarium Prof. Dr. W. Greuter, Berlin, Germany.
GRM* Muséum d'Histoire Naturelle, Grenoble, France.
GRO Biological Centre, Department of Systematic Botany, Haren (Groningen), Netherlands.
H Botanical Museum, University of Helsinki, Helsinki, Finland.
HBG* Institut für Allgemeine Botanik und Botanischer Garten, Hamburg, Germany.
— Private herbarium Ir. H. P. van Heel, Veere, Netherlands.
— Private herbarium Dr. A. Huber-Morath, Basel, Switzerland.
ISTE Istanbul Üniversitesi Eczacilik Fakültesi Herbaryum, Istanbul, Turkey.
II.2. LAMIASTRUM

Lamium Linnaeus, Sp. Pl. (1753) 579. - Type species: Lamium purpureum L., according to Britton and Brown (1913).

Orvala Linnaeus, Sp. Pl. (1753) 578. - Type species: Orvala garganica L. [= Lamium orvala (L.) L.].


Galeobdolon Adans., Fam. Pl. 2 (1763) 190. - Type species: Galeobdolon luteum Hudson [= Lamium galeobdolon (L.) L.].


Lamiopsis (Dumort.) Opiz, Seznam (1852) 56. – Type species: Lamiopsis amplexicaulis (L.) Opiz [= Lamium amplexicaule L.].

Annual or perennial, small to middle sized herbs, glabrate at the base to variously hairy towards the apex; shortly stalked and sessile glands usually present, especially on the bracts and the calyx. Stems decumbent or erect, simple or branched, homogeneously hairy (except L. galeobdolon subsp. galeobdolon: hairs exclusively on the ribs). Leaves petiolate, the upper ones usually sessile or amplexicaul; cordate, reniform, rhomboid or (upper) ovate to ovate-lanceolate with cordate or attenuate to truncate base and acute to tapering acuminate apex, crenate, dentate, serrate or irregularly (deeply) incised; no significant differences between cauline and floral leaves. Verticillasters remote or crowded, with usually 10-20 bisexual flowers. Bracts, if present, linear, usually less than 1/2 as long as the calyx, aristate apex hairy or glabrous. Calyx campanulate with oblique mouth, with c. 10 nerves; longer after anthesis; teeth subequal, (narrowly) triangular, rarely deltoid, aristate apex hairy or glabrous. Corolla subiabiate; white, pink, purple, rarely crimson to reddish or yellow; tube straight or sigmoid, mostly abruptly dilated and exserted from the calyx, with or without internal ring of hairs; upper lip arched, rounded, truncate, emarginate, bilobed or bifid, margin entire or undulate; lower lip mostly about as long as the upper lip and at a right angle to the latter, lateral lobes rounded with 1 or 2 teeth, or oblique-ovate and toothless, median lobe bilobed to bipartite, margin mostly undulate. Stamens not exserted beyond the upper lip, the anterior ones longer than the posterior ones and lower attached; filaments viscidly hairy and sometimes also with short glands; anthers dorsally and ventrally tufted hairy or glabrous; pollen light yellow to red orange. Disc half-circular, lobed, fleshy. Style not longer than the corolla, (sub)glabrous, usually equally bifurcate. Nutlets obovoid with truncate apex, in cross-section trigonous with one convex and two flat sides, dull-brown, very often with small greyish spots.

II.3. KEY TO ALL TAXA EXCEPT HYBRIDS

1. Anthers dorsally and ventrally tufted hairy. Bracts and calyx teeth with a hairy aristate apex .............................................................. Subgenus II. Lamium
2. Bracts absent. Upper leaves amplexicaul........Section A. Amplexicaule
3. Perennial. Verticillasters crowded in densely, woolly globes. Corolla 3 cm or longer..............................................................4. L. eriocephalum
3. Annual. Verticillasters usually remote, and if crowded, not in densely, woolly globes. Corolla less than 2 1/2 cm
4. Calyx in anthesis 1 cm, the tube always shorter than the teeth .... ..............................................................5. L. macrodon
4. Calyx ½ cm, the tube as long as the teeth....3. L. amplexicaule
5. Leaves 1½-2⅓ x as long as broad

......................3.a. L. amplexicaule var. aleppicum
5. Leaves at the utmost as long as broad, usually shorter than broad.
6. Plant very small, ≤ 5 cm, with very small leaves, c. ½ cm long. Flowers only cleistogamous. Verticillasters crowded...

......................3.c. L. amplexicaule var. bornmuelleri
6. Plant larger, 10 cm or longer, with larger leaves, 1 cm or longer. Also chasmogamous flowers. Verticillasters remote
7. Leaves mostly coarsely and irregularly crenate to lobed

......................3.b. L. amplexicaule var. amplexicaule
7. Leaves partite to divided
8. Especially the floral leaves partite to divided. Verticillasters conspicuously remote. Corolla c. 1½ cm long, about 2½ x as long as the calyx.

......................3.e. L. amplexicaule var. orientale
8. Especially the cauline leaves partite to divided. Verticillasters remote. Corolla 1⅓-2⅓ cm long, about 3½ - 4 x as long as the calyx.

......................3.d. L. amplexicaule var. incisum
2. Bracts present. Upper leaves usually sessile, not amplexicaul
9. Corolla tube straight

Section C. Lamium
10. Leaves deeply divided into 5-lobed segments

....................................................14. L. glaberrimum
10. Leaves usually crenate, serrate, or not deeply irregularly incised
11. Perennial, rhizome present

....................................................13. L. garganicum
12. Corolla c. 1½ cm long. Calyx less than 1 cm. Bracts 1-2 mm long. Nutlets 2½ by 1¾ mm.

......................13.a. L. garganicum subsp. corsicum
12. Corolla 2⅓-3½ cm long. Calyx mostly 1-1½ cm long. Bracts 2-10 mm long. Nutlets 2⅓-4⅔ by 1½ - 2½ mm
13. Stem usually longer than 30 cm. Leaves cordate, 3½-5 cm long, index 1.2-1.5. Verticillasters mostly with 10 or more flowers

......................13.b. L. garganicum subsp. garganicum
13. Stem usually shorter than 30 cm. Leaves usually reniform, ½-2½ cm long, index 0.7-1.1. Verticillasters mostly with 10 or fewer flowers

......................13.c. L. garganicum subsp. striatum
14. Stem 15-30 cm long. Leaves 2 cm or longer. Verticillasters remote. Nutlets 2⅓-3⅔ by 1½ mm

......................13.c.3. L. garganicum var. striatum
15. Stem 10–15 cm long. Leaves c. 1 cm, the upper ones rhomboid, irregularly crenate. Verticillasters mostly with 6 flowers. Upper lip corolla usually truncate.................
......13.c.1. L. garganicum var. armenum
15. Stem about 5 cm long. Leaves ½–1 cm, the upper ones reniform, regularly crenate. Verticillasters with 2–4 flowers. Upper lip corolla usually bifid.........................
13.c.2. L. garganicum var. microphyllum

11. Annual, rhizome lacking
16. Leaves with a white central band; index cauline leaves 1.2–1.4. Corolla white; upper lip bifid...11. L. bifidum
16. Leaves without a white central band; index cauline leaves 0.8–1.1. Corolla pink to red-purple, very rarely white; upper lip rounded
17. Corolla 2–2½ cm long. Calyx in anthesis c. 1 cm; tube shorter than the teeth...........12. L. confertum
17. Corolla less than 2 cm. Calyx less than 1 cm; tube longer than to as long as the teeth.................
...........................................15. L. purpureum
18. Leaves regularly and mostly faintly crenate
19. Stem c. 5 cm long. Leaves c. ½ cm long. Flowers mostly always cleistogamous. Calyx teeth ½–⅜ as long as the tube .................
......15.a. L. purpureum var. ehrenbergii
19. Stem 10 cm or longer. Leaves 1½–2 cm long. Flowers usually chasmogamous. Calyx teeth about as long as the tube .................
......15.e. L. purpureum var. purpureum
18. Leaves irregularly and usually deeply incised, especially the upper ones
20. Verticillasters remote, especially the lower ones. The upper leaves rhomboid...........
15.d. L. purpureum var. moluccellifolium
20. Verticillasters crowded. The upper leaves cordate to obovate
21. Stem 10–20 cm long; very often rather hairy. Corolla ¾–1¼ cm long; tube
usually not exserted from the calyx ..... 15.b. L. purpureum var. hybridum
21. Stem 20–30 cm long; mostly glabrous or glabrate. Corolla c. 1½ cm long; tube conspicuously exserted from the calyx ..... 15.c. L. purpureum var. incisum

9. Corolla tube sigmoid, abruptly dilated or ventrally saccate..............

........................................ Section B. Lamiotypus
22. Upper leaves usually with whitish or pinkish spots at the base.

Corolla tube not exserted from the calyx

23. Floral leaves reniform, index 0.7–0.8; upper leaves amplexicaul and always with whitish spots at the base ..... 7. L. galactophyllum

23. Floral leaves cordate, index 1.1–1.4; upper leaves sessile and usually with whitish or pinkish spots at the base ..... 21. L. purpureum var. hybridum

24. Calyx usually 1 cm long, slightly longer after anthesis.

Corolla usually 1½ cm long ................................

......................... 9.a. L. moschatum subsp. micranthum

24. Calyx usually 1¾–1½ cm long, much longer after anthesis. Corolla usually 1¾–2 cm long ........................

............................... 9.b. L. moschatum subsp. moschatum

22. Upper leaves without whitish or pinkish spots at the base.

Corolla tube exserted from the calyx

25. Corolla purple; internal ring of hairs perpendicular to the tube of the corolla. Pollen orange......8. L. maculatum

25. Corolla white, rarely pink; internal ring of hairs oblique. Pollen light yellow


Leaves 1–2½ cm long. Corolla tube faintly sigmoid, ventrally saccate.................. 10. L. tomentosum


27. Corolla c. 3 cm long; pink or white. Petiole of the lowermost floral leaves usually longer than the flowers of the same verticillaster........................

........................... 6.b. L. album subsp. barbatum

27. Corolla c. 2–2½ cm long; white. Petiole of the lowermost floral leaves as long as or shorter than the flowers of the same verticillaster
28. Bracts small, 2–3 mm long. Calyx small, c. 1 cm long; teeth as long as or shorter than the tube
...............6.a. L. album subsp. album
28. Bracts larger, 4–6 mm long. Calyx larger, 1¼–1½ cm long; teeth usually longer than the tube
...............6.c. L. album subsp. crinitum

1. Anthers glabrous. Bracts and calyx teeth with a usually clearly corneous aristate apex
29. Corolla 3½ cm or longer; crimson to reddish or brownish purple; tube straight. Bracts not spreading or reflexed. Aristate apex very short...
...............Subgenus III. Orvala
16. L. orvala
29. Corolla to 2½ cm long; yellow, white or rarely pink; tube faintly sigmoid. Bracts spreading or reflexed. Aristate apex long
...............Subgenus I. Galeobdolon
30. Corolla white, rarely pink; lateral lobes rounded, to 2 mm long. Calyx tube about as long as the teeth........1. L. flexuosum
30. Corolla yellow; lateral lobes oblique-ovate, 5–6 mm long. Calyx tube longer than the teeth...............2. L. galeobdolon
31. Stem 20—30 cm long, hairs exclusively on the ribs. Verticillasters with fewer than 10 flowers. Calyx teeth usually ⅛ as long as the tube........2.b. L. galeobdolon subsp. galeobdolon
31. Stem 30–50 cm long, evenly hairy. Verticillasters with 10 or more flowers. Calyx teeth usually ½ x as long as the tube
32. Rhizome with stolons. Stem simple. Cauline leaves 3–5 cm long. Corolla 2 cm or longer........2.c. L. galeobdolon subsp. montanum
32. Rhizome without stolons. Stem branched. Cauline leaves 5–10 cm long. Corolla less than 2 cm........2.a. L. galeobdolon subsp. flavidum

II.4. DESCRIPTION OF ALL TAXA EXCEPT HYBRIDS

I. Subgenus Galeobdolon (Adans.) Asch.

Subgenus Galeobdolon (Adans.) Asch., Fl. Prov. Brandeb. 1 (1864) 525. - Type: Lamium galeobdolon (L.) L.
Section Galeobdolon Benth., Lab. Gen. spec. (1834) 515.

Bracts spreading or reflexed. Bracts and calyx teeth with a clearly glabrous corneous aristate apex. Anthers glabrous.
1. Lamium flexuosum Ten. – Figs. 6 and 7.


*Lamium arcanthelica* Garsault, Fig. Pl. Anim. Méd. (1764) tab. 317; Descr. Pl. Anim. (1767) 197, nomen illeg. Garsault's binary names cannot be accepted, because the Linnean system of binary nomenclature for species is not consistently employed.


*Lamium heterophyllum* Scheele, Flora 26,1 (1843) 567; Linnaea 22 (1849) 594. – Type: Sieber s.n., Jugoslavia, Dalmatia (not seen).

*Lamium flexuosum* Ten. var. *typicum* Bég. in Fiori & Paol., Fl. Anal. It. 3 (1903) 34, nomen inval.


*Lamium rugosum* Sibth. & Smith, Fl. Gr. 6 (1827) 45, non Aiton 1789, nomen illeg. – Type: Sibthorp s.n., s.d. (holo. OXF).

Perennial. *Rhizome* cauliform, woody, very short to a few dm long, with stolons. *Stem* usually decumbent and flexuous, simple or branched, (15–) 30–40 (–80) cm long, 1½–2 (–3) mm Ø, sparsely hirsute. *Leaves*: *petiole* (½–) 1½–2½ (–5) cm, always shorter than the blade, the upper leaves sessile; *blade* ovate to (upper) ovate-lanceolate with a cordate to attenuate to truncate base and an acute to (upper) slightly tapering-acuminate apex, coarsely and partly double-crenate to (upper) dentate, sparsely appressed-pubescent on both sides: *cauline leaves* (1–) 3½–6½ (–8½) cm long, index (1.2–) 1.4–1.7 (–2.0); *floral leaves* (1–) 4½–6 (–9) cm long, index (1.2–) 1.6–1.9 (–2.1). *Verticillasters* 4 or 5, usually remote, with (6–) 10–18 (or more) flowers. *Bracts* (3–) 4–6 (–10) mm long, ½–1 mm broad, hirsute and especially on the margin with short glandular hairs. *Calyx* usually with 10 or more nerves, 1–1¼ (–1⅓) cm long, longer after anthesis, hirsute; teeth about as long as the tube, triangular to narrowly triangular, on the margin with short glandular hairs. *Corolla* white, rarely pink or purple, 1½–2 (–2½) cm long; tube taintly sigmoid, abruptly dilated, ¾–1 cm long, not exserted from the calyx, outside glabrous to subglabrous, inside with an oblique ring of hairs dorsally at 3 mm from the base ventrally pointing backwards; upper lip arched, 7–10 (–12) by 4–6 mm broad, apex rounded and margin entire to faintly undulate, outside velutinous, inside glabrous; lower lip about as long as the upper lip and at a right angle to the latter, glabrous, lateral lobes rounded, to 2 mm long, tooth minute, to ¾ mm long, or absent, median lobe 4–5 by 4–5 mm, bilobed, margin undulate. Anterior *stamens* 10–12 mm long, c. 3 mm longer than the posterior ones and attached c. 1½ mm lower; filaments with short glandular hairs; anthers 1¾–2
Fig. 6. *Lamium flexuosum*: a. upper part (1 ×); b. uppermost cauline leaf (1 ×); c. calyx (2 ×); d. corolla (2 ×).
Fig. 7. Lamium flexuosum.
by ¾–1 mm; pollen colour unknown. Disc c. 1½ mm broad. Style about 3 mm shorter than the corolla, subglabrous. Nutlets (2–) 2½–3 (–3¼) by (1¼–) 1½–1¾ (–2) mm.

Distribution. S. France (extinct now at Montpellier), Spain, Italy S. of Rome, and Sicilia, Morocco, Algeria and Tunisia – Fig. 8.

Habitat. Roadsides under hedges, in thickets, in forests (Quercetum), in mountain meadows.

Altitude. From about sea-level up to 2360 m (Morocco).

Variability. Lamium flexuosum is a rather uniform, well recognizable species, and very closely related to Lamium galeobdolon.

There are no reasons to consider Lamium pubescens a separate taxon.

In S. Italy (Calabria) specimens are found with leaves with a white central band like the leaves of Lamium galeobdolon f. argentatum. Fiori s.n., Gavioli s.n., Sarfatti & Corradi s.n., and Mennema 1104 have short triangular calyx lobes, c. ½ x as long as the tube.

Infraspecific taxa I found in the literature are recorded below in alphabetical order.

var. incisum Lojac., Fl. Sic. 2 (1907) 232.
var. major Lojac., Fl. Sic. 2 (1907) 232.
var. microphyllum Lojac., Fl. Sic. 2 (1907) 232.
2. Lamium galeobdolon (L.) L. – Fig. 9.


Cardiaca sylvatica Lam., Fl. Franc. 2 (1778) 384. – Type: not found in P.

Galeobdolon umbrosum Wibel, Prim. Fl. Werthem. (1799) 139, nomen nudum.


Perennial. Rhizome cauliform, woody, very short to a few dm long. Stem decumbent, simple or branched, 20-50 (-65) cm long, 1-3 (-4) mm Ø, sparsely hirsute. Leaves: petiole (½-) 1-2½ (-6) cm long, usually shorter than the blade, the upper leaves sessile; blade ovate to ovate-oblong, the upper also to ovate-lanceolate, with a (lower) slightly cordate to attenuate to truncate or (upper) truncate base and an acute to (upper) tapering acuminate apex, coarsely and partly double-crenate to (upper) dentate, sparsely appressed-pubescent on both sides; cauline leaves 1-10 (-11) cm long, index (1.0-) 1.2-2.0 (-2.5); floral leaves (1½-) 2-11 (-15) cm long, index (1.0-) 1.1-2.2 (3.5). Verticillasters (3-) 4-5 (-10), remote, with (2-) 6-14 (-20) flowers. Bracts (2-) 4-5 (-7) mm long, c. ½ mm broad, sparsely hirsute and especially on the margin with short glandular hairs. Calyx 5- or 10-nerved, sometimes with more nerves, (¾-) 1 (-1½) cm long, longer after anthesis, at the base subglabrous or sparsely appressed-puberulous, towards the apex more densely appressed-puberulous, pubescent or hirsute; teeth ½ or ¾ x as long as the tube, deltoid or triangular, short glandular hairs on the margin not always present. Corolla yellow with brownish markings, (1¼-) 1¾-2¼ (-2½) cm long; tube gradually dilated, ¾-1½ cm long, mostly exerted from the calyx, outside glabrous to subglabrous, inside with an oblique ring of hairs dorsally at 4-5 mm from the base ventrally pointing backwards; upper lip faintly arched, 8-12 by 6-8
Fig. 9. Lamium galeobdolon.
Fig. 9. *Lamium galeobdolon* (continued).
Fig. 9. Lamium galeobdolon (continued).
mm, apex rounded, margin entire to faintly undulate, outside sparsely to densely puberulous to velutinous with longer patent stiff hairs on the margin, inside glabrous; lower lip 6–8 mm long and laid back, glabrous, lateral lobes oblique-ovate without teeth, 5–6 by 3–3½ mm, median lobe 5–8 by 3–4 mm, not bilobed, margin undulate. Anterior stamens 11–12 mm long, c. 3–4 mm longer than the posterior ones and attached c. 1½–2 mm lower; filaments with short glandular hairs; anthers 2–2½ by 1–1½ mm; pollen yellowish. Disc c. 1½ mm broad. Style about as long as the corolla, glabrous. Nutlets (2¾–) 3½–4 (4½–) by 1¾–2 (2½) mm.

Variability. Lamium galeobdolon s.lat. is rather variable; three subspecies are clearly distinguishable. In the literature I found various infraspecific taxa below the rank of subspecies without any annotation to which subspecies these varieties and formae belong. These infraspecific names, referring mainly to the incisions of the leaves (incisum), the indumentum of the calyx (glabrescens, hirtum, puberulum), the length of the calyx teeth (brachyodonton, inerme, spiniferum), and the colour of the corolla (pallescens, pallidum), are listed here in alphabetical order.

var. albifolium Bolzon in Bég. in Fiori & Paol., Fl. Anal. It.3(1903) 34.
var. pallidum Sylvén, Bot. Not. 1931 (1931) 386.
var. subnudum Maly in sched. in Bjelic, Glasnik 15 (1982) 143.

Notes. 1. Mr. J. Schiess (Scheveningen, Netherlands) collected a number of specimens in the Pyrenees in 1970. These specimens induced me to think, that perhaps a new polyploid subspecies occurs in this area, not recognized until now by the lack of good distinguishable morphological characters. My colleague Dr. P. Baas was so kind to measure the stomatal length of leaves of the three subspecies and of a specimen, collected by Mr. Schiess in the Pyrenees. The results are

subsp. galeobdolon 21–24 μm, average 23 μm
subsp. flavidum 23–29 μm, average 25 μm
subsp. montanum  24–33 µm, average 30 µm
Pyrenean specimen  29–41 µm, average 34 µm.

There is a convincing similarity of these stomatal lengths of subsp. galeobdolon and subsp. montanum and those of British material of both subspecies, and also of subsp. flavidum, cultivated in the Botanic Garden at Cambridge (Wegmüller, 1971). The remarkable stomatal length of the Pyrenean specimen invites further biosystematical research, especially of the chromosome numbers of specimens, collected in the Pyrenees.

2. Linnaeus (1753) originally published Galeopsis galeobdolon in the first edition of Species plantarum with the added remark: ‘Fructificatio parum recedit a con-generibus, vix tamen distincto genero nominari meretur’. Already in 1756 Linnaeus transferred the species in Nathhorst’s dissertation to the genus Lamium, at first sight as a nomen nudum and without any reference to the basionym: Lamium galeobdolon 657. In the reprint in the Amoenitates (1759), however, a paragraph was added (p. 475): ‘Numeri specibus adpositi indicant eandem plantam in Magnoli Botanico Monspeliensi, si numerus libro adscribatur’. But Magnol’s work is unnumbered. Rothmaler (1941) elucidated: … ‘man muss dazu die Pflanzen des Werkes—ohne die Hinweise—durchnumerieren’. In Magnol’s Botanicum Monspeliense (1686) nr. 657—I counted the species personally!—is: ‘Lamium folio oblongo luteum PIN. in umbrosis saxosis monti Capouladou, & montis Lupi versus septentrionum oritur’.

As Gutermann et al. (1973) have observed, a direct reference to Galeopsis galeobdolon is absent, but also these authors are of the opinion that Linnaeus intention undoubtely was to reclassify his species in the genus Lamium. I can agree with this point of view, the more so as Linnaeus himself has announced the possibility of this reclassification three years before by adding the remark ‘Fructificatio parum etc.’ as mentioned above.

Unfortunately I brought some confusion (Mennema, 1971) about the typification of Lamium galeobdolon (L.) L., as I discovered that Linnaeus recognized the species as a Lamium, based on material of another subspecies than to which Galeopsis galeobdolon belongs. The protologue is also mainly based on the other subspecies and in the Linnaean herbarium there are specimens of both subspecies (sheets no. 734.4 and 734.5 according to Savage, 1945).

But, as I accepted Galeopsis galeobdolon as the basionym, the type specimen must undoubtedly be in accordance to the description of Galeopsis galeobdolon: ‘Verticil-lis sexfloris’ and this refers directly to the specimen on sheet no. 734.4, which Polatschek (1966) correctly indicated as the holotype.

2.a. Lamium galeobdolon (L.) L. subsp. flavidum (F. Herm.) A. Löve & D. Löve – Figs. 9 and 10.
Fig. 10. *Lamium galeobdolon* subsp. *flavidum*: a. middle part (1 x); b. calyx (2 x); c. corolla (2 x).


in this way without a clear indication of the rank of the taxon (Art. 35.1 Code). - Type: F. Hermann s.n., Austria, Karnische Alpen, Plöckenpass (not seen).

Rhizome without stolons. Stem branched, (20–) 35–50 (–65) cm long, homogeneously hairy. Cauline leaves (3–) 5–10 (–12) cm long, index (1.3–) 1.5–2.0 (–2.4); floral leaves (–4) 5–11 (–15) cm long. index (1.5–) 1.6–2.2 (–3.5). Verticillasters with (10–) 12–14 (–20) flowers. Calyx towards the apex hirsute or appressed-puberulous and pubescent; teeth usually $\frac{1}{2}$ x as long as the tube and deltoid. Corolla less than 2 cm.

Distribution. SE. France, SE. Germany, S. Switzerland, Austria, N. Italy and Apennines N. of Rome, W. Jugoslavia, and scattered in Czechoslovakia - Fig. 11.

Habitat. Particularly in light forest (Fagus and Picea), forest margins, in thickets and hedges, (shady) roadsides, in meadows, among pebbles, on walls; prefers calcareous soil.

Altitude. From 200 m up to 1800 m (Osttirol, Austria).
Variability. See under the species. Infraspecific taxa exclusively referring to subsp. *flavidum* are unknown.

2.b. *Lamium galeobdolon* (L.) L. subsp. *galeobdolon* – Fig. 9


*Galeobdolon luteum* Hudson f. *borealis* F. Aresch., Bot: Not. 1868 (1868) 35. – Type: unknown.


*Galeobdolon argentatum* Smejkal, Preslia 47 (1975) 241. – Type: Smejkal s.n., Czechoslovakia, Moravia, Brno, at the border of Svatka river near Cerveny kopec (holo. BRNU).

Rhizome with stolons. Stem simple, 20-30 (-40) cm long, hairs exclusively on the ribs. *Cauline leaves* 1-2½ (-3) cm long, index (1.0-) 1.2-1.4 (-1.5); *floral leaves* (1½-) 2-3½ (-4) cm long, index (1.0-) 1.1-1.4 (-1.6). *Verticillasters* with (2-) 6-8 flowers. *Calyx* towards the apex hirsute; teeth usually ⅓ × as long as the tube and triangular. *Corolla* large, usually 2 cm or longer.

Distribution. S. Scandinavia, E. England, Netherlands, Germany, Poland, Czechoslovakia, and Balkan, S. to Albania and Turkey (Istanbul), Baltic, Central and South-western division of the U.S.S.R, E. to Ural – Fig. 12.

Habitat. Particularly in light, deciduous forests (especially in *Fagus*-forest), forest margins, in thickets and hedges, at shady places along streams; with an indistinct preference for calcareous soil.

Altitude. From sea-level up to c. 2000 m (Romania).

Variability. See under the species. The typical subspecies appears to me much more homogeneous than the rather variable subsp. *montanum*. A numerical investigation of material of both subspecies in the Netherlands (Mennema, 1971) showed, that there were no ‘transitional forms’ as found by Endtmann (1966) in
Germany. However, according to Soó & Borhidi (1968) and Bjelcic (1982) a large number of formae, viz. *hirtum*, *inerme*, *pallescens*, *parviflorum*, *puberulum*, *spiniferum*, and *subnudum* refer to subsp. *galeobdolon*. There is a difference in opinion about *f. glabrescens*: according to Bjelcic (1982) these formae refers also to subsp. *galeobdolon*; furthermore he distinguished two new formae, one with stolons in the leaf axils (*axillaris*) and one without stolons (*fruticulosus*).


Note. During the last decade a cultivated forma with permanently silvery white variegated leaves [var. *florentinum* Hort., cv. *Variegatum*, recently even described as species: *Galeobdolon argentatum* Smejkal] has frequently escaped from gardens in various parts of Europe. In the Netherlands this garden escape has been naturalized and has been recorded already in more localities than the native subspecies (Mennema, 1980, 1984 & 1985).
An official name for this forma is lacking. Expecting more publications about this garden escape, a new combination is presented below:

*Lamium galeobdolon* (L.) f. *argentatum* (Smejkal) Mennema, *comb. nov.*


*Fig. 13. Upper part of Lamium galeobdolon* subsp. *montanum* (1 x).*

*Galeobdolon luteum* Hudson var. *majus* Schur, Enum. Pl. Transs. (1866) 534. – Type: Schur s.n., Romania, mountain woods at the Pojana near Brașov [Kronstadt] (not seen).


Rhzonde with stolons. Stem simple, (25–) 30–45 (–60) cm long, homogeneously hairy. Cauline leaves (2–) 3–5 (–9) cm long, index (1.1–) 1.4–1.8 (–2.6); floral leaves (2½–) 3–7½ (–9) cm long, index (1.2–) 1.6 — 2.1 (–2.9). Verticillasters with (8–) 10–14 (–20) flowers. Calyx towards the apex hirsute; teeth usually ½ x as long as the tube and deltoid. Corolla large, usually 2 cm or longer.

Fig. 14. Distribution of *Lamium galeobdolon* subsp. *montanum*. 47
Distribution. Great-Britain, Netherlands, Belgium, Luxembourg, France, Germany, NW. Switzerland, N. Austria, Poland, Czechoslovakia, E. Hungary, and N. Spain (Pyrenees), scattered in S. Italy, South-western division of the U.S.S.R., Balkan, N. Turkey and Iran – Fig. 14.

Habitat. Particularly in deciduous forests (especially in Fagus-forest), forest margins and along forest trails, in thickets and hedges, also along streams and in damp and shady places; with a certain preference for calcareous soil.

Altitude. From sea-level up to 1900 m (Hautes-Pyrénées, France).

Variability. See under the species. According to Soó & Borhidi (1968) and Bjelcic (1982) a small number of formae, viz. brachyodontum and incisum refers to subsp. montanum. There is a difference in opinion about f. glabrescens: according to Soó & Borhidi (1968) these forma refers also to subsp. montanum. Bjelcic (1982) added a new forma with branched florescence, obviously teratological:

II. Subgenus Lamium L.

Subgenus Eulamium Asch., Fl. Prov. Brandenb. 1 (1864) 523. – Type: Lamium purpureum L.

Bracts, if present, not spreading or reflexed. Bracts and calyx teeth with a hairy aristate apex. Anthers dorsally and ventrally tufted hairy.

A. Section Amplexicaule Mennema, sect. nov.

Bracteae nullae. Corolla tubus rectus. Folia superiora amplexicaulia. – Typus: Lamium amplexicaule L.

Bracts absent. Corolla tube straight. Upper leaves amplexicaul.

Note. The section Amplexicaule does not coincide with subsection Amplexicaulia Briquet of section Pollichia (Willd.) Briquet, as the description above limits the number of species belonging to the section: Lamium amplexicaule, Lamium eriocephalum and Lamium macrodon. Lamium bifidum, Lamium confertum and Lamium purpureum var. ehrenbergii of Briquet’s subsection Amplexicaulia belong in my opinion to section Lamium.

3. Lamium amplexicaule L. – Fig. 15.

Annual. Stem erect or decumbent, branched, especially at the base, < 5-30 (−70) cm long, (½−) 1-1½ (−2) mm Ø, glabrous to glabrate at the base, appressed-pubescent towards the apex. Leaves: petiole (½−) 1-1½ (−2) cm long, about as long as the blade or longer, the floral leaves amplexicaul; blade reniform and rhomboid to cordate, the upper ones cordate to rhomboid, mostly coarsely and irregularly crenate to (upper) lobed, sometimes very deeply incised, sparsely to moderately appressed-pubescent on both sides; cauline leaves ½−2 (−3) cm long, index (0.7−) 0.8−1.0 (−1.2) [var. aleppicum: 1.5−2.2 (−2.7)]; floral leaves ½−2 (−3) cm long, index (0.6−) 0.7−0.9 (−1.1) [var. aleppicum: 1.5−2.2 (−2.6)]. Verticillasters (2−) 3−5 (−7), mostly remote, with (6−) 8−16 (−20) flowers. Bracts not present. Calyx many-nerved, ½ (−3/4) cm long, longer after anthesis, moderately to densely pubescent to hirsute, also with short glandular hairs; teeth subequal, as long as the tube, sometimes shorter, narrowly triangular. Corolla purple, (1¾−) 1½−2 (−2½) cm, in cleistogamous flowers c. ½ cm long, tube abruptly dilated, (1−) 1½−1½ (−2) cm long, exserted from the calyx, outside glabrous at the base, towards the lips puberulous, no internal ring of hairs; upper lip arched, (3−) 4−5 by 3−4 mm, apex rounded, margin entire to faintly undulate, outside pubescent to velutinous, inside glabrous; lower lip about as long as the upper lip or longer and at a right angle to the latter, glabrous, lateral lobes rounded, ¾−1 mm long, tooth absent or to ¾ mm long, median lobe 2−3 (−4) by 2−3 (−4) mm, bipartite, margin undulate. Anterior stamens 4−5 mm long, c. 1−2 mm longer than the posterior ones and attached c. 1 mm lower; filament usually without short glandular hairs; anthers ¾−1 by c. ½ mm. Disc c. ½ mm broad. Style c. 2−3 mm shorter than the corolla, glabrous. Nutlets 2−3 (−3¾) by 1−1½ mm.

Distribution. See under the varieties.
Fig. 15. *Lamium amplexicaule*.
Habitat. Cultivated land, in gardens, also in open, waste places, roadsides, in lawns, under hedges, on walls, in desert, on rocky mountain slopes, sometimes in oak-forest; on sandy and stony, calcareous as well as non-calcareous soils.

Altitude. From sea-level up to 3900 m (Tibet, China).
Fig. 16. Lamium amplexicaule var. aleppicum, var. bornmuelleri, var. incisum, and var. orientale.
3.a. Lamium amplexicaule L. var. aleppicum (Boiss. & Hausskn. ex Boiss.) Bornm. - Fig. 16.


Stem 5-15 (-25) cm long. Leaves 1-2 (-3½) cm long, index 1.5-2.2 (-2.7), rather regularly, coarsely crenate to lobed. Verticillasters rather crowded, mostly with 10-12 flowers. Corolla 1½-2 (-2½) cm long, cleistogamous flowers shorter, about 3-4 x as long as the calyx. Nutlets large, (2½-) 3 (-3¼) by (1¾-) 1½ mm.

Distribution. Scattered in SE. Turkey, N. Syria, Iraq and Iran - Fig. 17.

Fig. 17. Distribution of four varieties of *Lamium amplexicaule*: var. *aleppicum* (▲), var. *bornmuelleri* (■), var. *incisum* (○), and var. *orientale* (●).
Habitat. See under the species.

Altitude. From sea-level up to 1800 m (Iran).

Variability. This variety is a rather homogeneous taxon. Plants with cleistogamous flowers are known. Infraspecific taxa lower than the rank of variety are unknown.

3.b. Lamium amplexicaule L. var. amplexicaule


flowers shorter, \((2\frac{1}{2}-) 3-3\frac{1}{2} (-4) \times\) as long as the calyx. Nutlets \(2-2\frac{1}{2} (-2\frac{3}{4})\) by \(1-1\frac{1}{4} (-1\frac{1}{2})\) mm.

**Distribution.** Throughout Europe, except in the Faeröer and Spitzbergen, probably N. of the Alps as archaeophyte or even as neophyte (Gams, 1927), in Asia from Turkey and the Middle East to Japan, N. of the Tropic of Cancer, and in N. Africa, including the Açores, Madeira and the Canary Islands. Introduced in Iceland and Greenland (and naturalized in both countries), in many states of Canada and the U.S.A., and on the Bermuda Islands, in S. America (Peru, Chile, Argentina, Falkland Islands), in Abyssinia and S. Africa (Zimbabwe, Transvaal, Cape of Good Hope), and in Australia (Queensland, New South Wales, S. Australia) – Fig. 18.

**Habitat.** See under the species.

**Altitude.** See under the species.

**Variability.** Var. *amplexicaule* is a very variable taxon, as also testified by the long list of synonyms. Especially the size of the plants (*majus, nanum, rumelicum*), the indumentum (*hirtum, nemetzii, stepposum, tel-aviensis*), the length of the calyx teeth (*longidens*), and the flower colour (*albiflorum, roseiflorum*) can diverge highly. Plants with cleistogamous flowers are known too (*calyciflorum, clandestinum, crypthanthum, mauritanicum*).

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Fig. 18. Distribution of *Lamium amplexicaule* var. *amplexicaule*, without the introduced specimens.
The infraspecific taxa lower than the rank of variety, not mentioned in the list of synonyms, are listed below in alphabetical order.


3.c. *Lamium amplexicaule* L. var. *bornmuelleri* Mennema – Fig. 16.


**Stem** < 5 (-10) cm long. **Leaves** c. ½ cm long, index 0.8-1.0, irregularly crenate to lobed. **Verticillasters** crowded, with 8 (-12) only cleistogamous flowers. **Nutlets** large, (2¼-) 2¼ (-3) by 1¼-1½ mm.

**Distribution.** Very rare and scattered in mountains in SE. Turkey, Lebanon, Syria, Jordan, Iraq and Iran – Fig. 17.

**Habitat.** See under the species.

**Altitude.** From 1500 m up to 2000 m.

**Variability.** Var. *bornmuelleri* is a very uniform taxon. Infraspecific taxa lower than the rank of variety are unknown.

**Notes.** 1. This variety is named after J. F. N. Bornmueller, who collected it in 1910 (*Bornmueller 12290*) and identified it as *L. amplexicaule* L. var. *kurdicum* Bornm., described in 1907. However, the type-specimen of var. *kurdicum* (*Bornmueller 1711*) is without any doubt *L. amplexicaule* L. var. *aleppicum* (Boiss. et Hausskn.) Bornm.

2. Var. *bornmuelleri* bears great similarity in appearance and habitat to *L. purpureum* L. var. *ehrenbergii*.

3.d. *Lamium amplexicaule* L. var. *incisum* Boiss. – Fig. 16.


Stem 10-15 (-25) cm long. Leaves (½-) 1-1½ (-2) cm long, index 0.6-0.8 (-1.0), partite to divided, especially the cauline leaves. Verticillasters remote, mostly with 10-12 flowers. Corolla usually 1¾-2¾ cm long, cleistogamous flowers shorter, about 3½-4 x as long as the calyx. Nutlets small, 2-2½ by 1 (-1¼) mm.

Distribution. Very rare and scattered in Greece, Turkey, Caucasian division of the U.S.S.R., Syria, Iraq and Iran – Fig. 17.

Habitat. See under the species.

Altitude. From sea-level up to 300 m.

Variability. Var. incisum is a rather uniform taxon. Plants with cleistogamous flowers are known. Infraspecific taxa lower than the rank of variety are unknown.

3.e. Lamium amplexicaule L. var. orientale (Pacz.) Mennema, comb. nov. – Fig. 16.


Lamium palmatum Smith in Rees, Cycl. 20 (1812) Lamium no. 18. – Type: Pallas s.n., U.S.S.R., the banks of the river Wolga (holo. LINN).

Stem (10-) 15-30 (-35) cm long. Leaves (½-) 1-2 (-2½) cm long, index (0.6-) 0.7-0.9 (-1.1), partite to divided, especially the floral leaves. Verticillasters conspicuous remote, mostly with 10-14 flowers. Corolla usually 1½ cm long, cleistogamous flowers shorter, about 2½ x as long as the calyx. Nutlets small, 2-2½ (-2½) by 1-1¼ mm.

Distribution. South-western and South-eastern division of the U.S.S.R. – Fig. 17.

Habitat. See under the species.

Altitude. No data available.

Variability. Var. orientale is a rather uniform taxon. Plants with cleistogamous flowers are known. Infraspecific taxa lower than the rank of variety are unknown.
Note. *Landmark s.n.* (UPS) belongs to this variety, but is said to be from Thorshang, Oslo, Norway. In view of the natural distribution area of the variety it seems that this must be due to a mix-up of labels.


**Fig. 19. Lamium eriocephalum:** a. habitus (1 x); b. calyx (2 x); c. corolla (2 x).
Fig. 20. Lamium eriocephalum.

Perennial. Rhizome cauliform, woody, very short to about 1 dm long. Stem decumbent or erect, usually branched, (5-) 10 (-20) cm long, 1-2 mm Ø, glabrous or glabrate. Leaves: petiole 1-2 (-3) cm long, always longer than the blade, the upper ones more or less amplexicaul; blade reniform to cordate, the upper ones rhomboid, coarsely crenate to (upper) lobed, moderately pubescent to (upper) densely woolly on both sides; cauline leaves ½ (-1) cm long, index (0.6-) 0.7-0.9 (-1.0); floral leaves (1-) 1½ (-2) cm long, index 0.8 (-1.0). Verticillasters 2-3 (-5), crowded in densely, woolly globes, each with 10 flowers or less. Calyx many-nerved, 1 (-1½) cm long, longer after anthesis, at the base moderately villous, towards the apex densely villous or woolly, especially on the margin, also hairy at the inside of the lobes; teeth c. ¾ x as long as the tube, narrowly triangular, on the margin also with short glandular hairs. Corolla purple (?), (2½-) 3-3½ cm long, tube abruptly dilated, (1½-) 1¾-2½ cm long, exserted from the calyx, glabrous at the base, towards the lips moderately pubescent, no internal ring of hairs; upper lip arched, 6-7 by 4-5 mm, apex truncate, sometimes emarginate, margin entire.

Fig. 21. Distribution of Lamium eriocephalum.
to faintly undulate, outside moderately to densely pubescent or sericeous, inside glabrous; lower lip longer than the upper lip and at a right angle to the latter, glabrous, lateral lobes rounded, 1-¼ (-1 ½) mm long, tooth to ½ mm long, median lobe ³½-4 by 6-7 mm, bipartite, margin undulate. Anterior stamens 9-11 mm long, 3-4 mm longer than the posterior ones and attached 1 ½-2 mm lower; filaments also with glandular hairs; anthers ½-2 by ¾-1 mm, pollen colour unknown. Disc c. 1 ½ mm broad. Style about 3 mm shorter than the corolla, glabrous. Nutlets c. 4 by c. 2 ½ mm.

**Distribution.** S. Turkey and Syria/Lebanon – Fig. 21.

**Habitat.** Among rocks, on screes and instable slopes.

**Altitude.** From 1800 m up to 3200 m.

**Variability.** Lamium eriocephalum is a very rare, well recognizable, perennial species and not an annual one as Boissier (1879) asserted. Infraspecific taxa are unknown.

5. Lamium macrodon Boiss. & Huet ex Boiss. – Figs. 22 and 23.


- Type: Grossheim s.n., U.S.S.R., Mount Soyuck, Nakhichevan, above Ordubad (holo. LE).

**Annual.** Stem decumbent or erect, branched, especially at the base, (5-) 10-20 cm long, 1-1½ (-2) mm Ø, glabrate at the base, pubescent towards the apex, especially on the ribs. Leaves: petiole (1-) 1½-2 (-3) cm long, usually longer than the blade, the floral leaves amplexicaul; blade cordate to rhomboid, the upper ones to ovate-oblong, coarsely crenate to (sometimes the upper ones) lobed, moderately appressed-pubescent on both sides; cauline leaves 1-1½ (-2) cm long, index 1.0-1.1 (-1.4); floral leaves 1½-2½ (-4) cm long, index (1.0-) 1.1-1.2 (-1.3). Verticillasters 2-3 (-4), mostly remote, with (10-) 12-20 flowers. Calyx many-nerved, (¾--) 1 (-1½) cm long, longer after anthesis, hirsute and towards the mouth densely sericeous, also with short glandular hairs; teeth ½-2 x as long as the tube, narrowly triangular. Corolla purple, (1½--) 1½-2 (-2 ½) cm long, tube abruptly dilated, (1-) 1½-1½ (-1 ½) cm long, exserted from the calyx, outside glabrous at the base, towards the lips puberulous, inside with an oblique ring of hairs dorsally at 2-3 mm from the base ventrally pointing back-
wards; upper lip arched, (4-) 5-6 by (3-) 4-5 mm, apex emarginate, margin entire to faintly undulate, outside pubescent to velutinous, inside glabrous; lower lip about as long as the upper lip and at a right angle to the latter, glabrous, lateral lobes rounded, $\frac{3}{4}$–1 mm long, tooth absent or to $\frac{1}{4}$ mm long, median lobe 2–3 by 2–3 mm, bipartite, margin undulate. Anterior stamens 4–5 mm long, c. 1 – 2 mm longer than the posterior ones and attached c. 1 mm lower; filaments also with glandular hairs; anthers $\frac{3}{4}$–1 by c. $\frac{1}{2}$ mm, pollen colour unknown. Disc c. $\frac{3}{4}$ mm broad. Style c. 2–3 mm shorter than the corolla, glabrous. Nutlets (2$\frac{1}{2}$–) 2$\frac{3}{4}$–3 by (1$\frac{1}{4}$–) 1$\frac{1}{2}$ mm.

**Distribution.** E. Turkey, Caucasion division of the U.S.S.R., N. Lebanon, NE. Iraq, W. Iran – Fig. 24.
Fig. 23. Lamium macrodon.

Fig. 24. Distribution of Lamium macrodon.
Habitat. On stony, rocky places, also on screes, in cultivated land, sometimes on walls and in light forests; on calcareous and igneous soils.

Altitude. From 900 m up to 2700 m.

Variability. A very distinct plant, also different from the related *Lamium amplexicaule* s.str. by a later time of flowering. Intraspecific taxa are unknown.

B. Section Lamiotypus Dumort.

Section *Lamiotypus* Dumort., Fl. Belg. (1827) 45. – Type: *Lamium album* L.

*Bracts* present. *Corolla* tube sigmoid, abruptly dilated or ventrally saccate. Upper *leaves* sessile or not, or amplexicaul.

6. *Lamium album* L. – Fig. 25.


*Lamium capitatum* Smith in Rees, Cycl. 20 (1812) *Lamium* no. 7. – Type: Smith s.n., England, Chelsea garden (holo. LINN).


Perennial. *Rhizome* cauliformal, very short and woody to a few dm long and herbaceous, with stolons. *Stem* usually decumbent and simple, (10-) 25-40 (-95) cm long, (1½-) 2-3 (-4) mm Ø, glabrous to glabrate at the base, appressed-pubescent towards the apex. *Leaves*: *petiole* (½-) 1½-5 (-8½) cm long, mostly
Fig. 25. Lamium album.
shorter than the blade, the upper leaves usually not sessile; blade ovate to (upper) ovate-oblong or ovate-lanceolate with a cordate to (upper) attenuate to truncate base and an acute to (upper) slightly tapering-acuminate apex, usually coarsely crenate to (upper) dentate or serrate, sparsely appressed-pubescent on both sides; cauline leaves (2–) 3-7 (–11) cm long, index (1.1–) 1.3–1.7 (–2.5); floral leaves (2–) 3–8 (–12) cm long, index (1.1–) 1.4–1.9 (–3.0). Verticillasters (3–) 4–5 (–7), sometimes conspicuously remote, with (10–) 16–20 (–22) flowers. Bracts (–1) 2–6 (–12) mm long, ½–1 mm broad, hirsute, also with short glandular hairs. Calyx 5 (–10)–nerved, 1–1½ (–2) cm long, longer after anthesis, at the base glabrous, towards the apex sparsely hirsute; teeth longer to shorter than the tube, narrowly triangular, on the margin with short glandular hairs. Corolla white or pink (1¾–) 2–3 (–3½) cm long; tube abruptly dilated, (1–) 1½–2 (–2¼) cm long, usually exserted from the calyx, outside glabrous at the base, dorsally towards the lips puberulous, inside with an oblique ring of hairs dorsally at 4–5 mm from the base ventrally pointing backwards; upper lip (6–) 8–10 (–12) by 5–6 mm, apex rounded to truncate or emarginate, margin usually undulate, outside velutinous, inside glabrous; lower lip about as long as the upper lip and slightly recurved, glabrous, lateral lobes rounded, to 2 mm long, tooth 1–1½ mm long, median lobe 3–5 by 4–8 mm, bilobed, margin undulate. Anterior stamens 9–11 mm long, c. 3 mm longer than the posterior ones and attached c. 1 mm lower; filaments also with short glandular hairs; anthers 1½–2 by ¾–1 mm; pollen light yellow. Disc c. ½ mm broad. Style c. 3–4 mm shorter than the corolla, subglabrous. Nutlets (2¾–) 3–3½ (–4) by (1⅛–) 1½–1¾ (–2) mm.

6.a. Lamium album L. subsp. album – Figs. 26 and 27.


Petiole of the lowermost floral leaves as long as or shorter than the flowers of the same verticillasters; floral leaves (2–) 4–6 (–10) cm long. Bracts (1–) 2–3 (–7) mm long. Calyx 1 (–1½) cm long, the teeth as long as or shorter than the tube. Corolla white, very seldom pink, (1¾–) 2–2½ cm long.

Distribution. Most of Europe, but rare in the area North of 65° N. lat. and in the South, absent from many islands; in E. Turkey, Iraq and Iran, Eastwards in the Asiatic part of the U.S.S.R. to Kamchatka and in China to Mongolia and Manchuria; introduced (and naturalized ?) in Iceland (Löve, 1970), N. America (Britton & Brown, 1913), and New Zealand (Sykes, 1978) – Fig. 23.

Habitat. Roadsides, along ditches and dikes, in grassland, in ruderal places, under hedges, also in thickets and forest, on rocky mountain slopes; on various soils.

Altitude. From sea-level up to 3500 m (NW. Iran).
Fig. 26. *Lamium album* subsp. *album*: a. upper part (1 x); b. uppermost cauline leaf (1 x); c. calyx (2 x); d. corolla (2 x).
Fig. 27. *Lamium album* subsp. *album*, subsp. *barbatum*, and subsp. *crinitum*. 
Variability. Subsp. album is a rather uniform taxon. There is some variability in the shape (lycopifolium) and incisions of the leaves (pietariiifolium and integrifolium versus caudatum and laciniatum) and the colour of the flowers (roseum, rubellum). The lower lip of the corolla incidentally has lateral lobes with a rounded entire margin (splendens) such as Lamium galeobdolon. The varieties and ranks of lower level I found in the literature, are listed below in alphabetical order.

var. acuminatum Opiz, Seznam (1852) 57, nomen nudum.

var. incarnatum Opiz, Seznam (1852) 57, nomen nudum.


var. laciniatum Neuman ex N. Hylander, Uppsala Univ. Årsskr. 1945,7 (1945) 272, nomen illeg., superfluous name.


Fig. 29. *Lamium album* subsp. *barbatum*: a. lowermost verticillaster and floral leaves (1 x); b. calyx (2 x); c. corolla (2 x).

Lamium garganicum Thunb., Fl. Jap. (1784) 246, non Linn. 1763 - Type: Thunberg s.n., Japan (holo. L).


Petiole of the lowermost floral leaves usually longer than the flowers of the same verticillasters; floral leaves (4–) 4½–8 (–12) cm long. Bracts (2–) 3–5 (–7) mm long. Calyx (1–) 1½ (–1½) cm long, the teeth usually longer than the tube. Corolla pink or white, also mixed-coloured populations, (2½–) 3 (–3½) cm long.

Distribution. NE. Asiatic U.S.S.R. (Sikhote Alin and Sakhalin), NE. China, Korea and Japan – Fig. 30.

Habitat. In forests and thickets, in grassland, in ruderal places, on walls, along water.

Fig. 30. Distribution of Lamium album subsp. barbatum.
Altitude. From sea-level up to 2700 m (Szechwan, China).

Variability. Subsp. barbatum is very homogeneous. C.Y. Wu & Hsuan distinguish three varieties, based on differences in hairiness. One specimen has been found with yellow (!) flowers (kitadakense).

var. hirsutum C.Y. Wu & Hsuan in C.Y. Wu et al., Acta Phytotax. Sin. 10 (1965) 156.
var. rigidum C.Y. Wu & Hsuan in C.Y. Wu et al., Acta Phytotax. Sin. 10 (1965) 156.

6.c. Lamium album L. subsp. crinitum (Montbr. & Auch. ex Benth.)

Mennema - Figs. 27 and 31.


Lamium petiolatum Royle ex Benth. in Hook., Bot. Misc. 3 (1833) 381; Benth., Lab. Gen. Spec. (1834) 513; Benth. in DC., Prodr. 12 (1848) 509. - Type: Royle s.n., Himalaya (holo. K).


Lamium oreades Azn., Magyar Bot. Lapok 17 (1919) 22. - Type: Van Dijck Post s.n., Turkey, Mount Ararat (holo. G).


Petiole of the lowermost floral leaves usually as long as or shorter than the flowers of the same verticillasters; floral leaves (2½ -) 3-5½ (-8½) cm long. Bracts (3-) 4-6 (-12) mm long. Calyx (1-) 1½-1½ (-2) cm long, the teeth usually longer than the tube. Corolla white, seldom pink, (2-) 2½-2½ (-3) cm long.

Distribution. Alpine and subalpine region of E. Turkey, N. Iraq, N. Iran (Kurdistan and Elburs), Asiatic U.S.S.R. (Turkmeniya), Afghanistan, Pakistan (Punjab), N. India and Nepal - Fig. 32.

Habitat. In deciduous forests, in thickets, on rocky slopes, along rivulets, mostly shady, on various soils.
Altitude. From 400 m (N. Iran) up to 3750 m (Nepal).

Variability. Subsp. crinitum is rather homogeneous. Infraspecific taxa on a lower rank than subspecies are unknown, except the one mentioned in the synonymy.

Note. In the choice of an infraspecific epithet on the subspecies level I ignored the oldest epithet 'petiolatum' (Lamium petiolatum Royle ex Benth., 1833), because of the fact that the floral leaves of subsp. barbatum are usually much more 'petiolate' than those of subsp. crinitum (Mennema, 1982). The choice of the epithet 'petiolatum' for the subspecies could have continued the misunderstanding,

7. *Lamium galactophyllum* Boiss. & Reuter ex Boiss. – Figs. 33 and 34.


Annual. Stem erect or decumbent, simple or branched at the base, (10–) 20–25 (–30) cm long, 2–3 (–5) mm Ø, glabrate. Leaves: petiole (½ –) 2–3 (–5) cm, usually longer than the blade, the floral leaves amplexicaul; blade reniforme or cordate, the upper usually slightly acuminate, moderately to (upper) coarsely and double crenate or serrate, sparsely appressed-pubescent on both sides; cauline leaves (1½ –)
2–3 (-3½) cm long, index 0.9–1.0 (-1.1); *floral leaves* (1½–) 2 – 3½ (–4) cm long, index 0.7–0.8 (–0.9), the upper ones always with whitish spots at the base. *Verticillasters* (2–) 3–4 (–6), remote, with 16–18 (–20) flowers. *Bracts* 1–2 (–3) mm long, ¼–½ mm broad, hirsute, with short glandular hairs. *Calyx* many-nerved, 1 (–1½) cm long, longer after anthesis, at the base usually glabrous, towards the apex shortly appressed hairy and sparsely hirsute, also with short glandular hairs; teeth 1½–1½ x as long as the tube, narrowly triangular, on the inside puberulous and on the outside on the margin with short glandular hairs. *Corolla* white, sometimes with minute dark-purple spots on the lips, 1½ (–1¾) cm long; tube abruptly dilated, towards the upper lip dorsally crested, 1–1½ cm long, not exserted from the calyx, outside glabrous at the base, towards the lips pubescent, inside with an oblique ring of hairs dorsally at 2½–3½ mm from the base ventrally pointing backwards; upper lip arched, 6–8 mm long and 5–6 mm broad, apex rounded, margin undulate, outside densely sericeous, inside glabrous; lower

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Fig. 33. *Lamium galactophyllum*: a. upper part (1 x); b. calyx (2 x); c. corolla (2 x).
lip longer than the upper lip and at an acute angle to the latter, glabrous, lateral lobes rounded, 1½ mm long, tooth c. 1 mm long, median lobe 4–5 mm long and 6–7 mm broad, bipartite, margin undulate. Anterior stamens 7–8 mm long, c. 3 mm longer than the posterior ones and attached c. 1–1½ mm lower; filaments also with short glandular hairs; anthers 1½–1¾ by ½–1 mm; pollen colour unknown. Disc c. 1 mm broad. Style c. 1½ mm shorter than the corolla, glabrous. Nutlets (2 ½−) 2¼ (−3) by 1¼–1½ mm.

Distribution. Endemic in the mountains of NE. Turkey – Fig. 35.

Habitat. Among rocks, on screes and unstable slopes.

Altitude. From 1400 m up to 2550 m.

Variability. In the Hooker herbarium there is a fragment from Erzurum, Turkey, only with variegated floral leaves such as of Lamium galactophyllum and
flowers; the corollas of the latters are 2 3/4–3 cm long, exserted from the calyx, which has the normal length of that of Lamium galactophyllum, viz. 1–1 1/4 cm. For the rest the material is very homogeneous; infraspecific taxa are unknown.

8. Lamium maculatum (L.) L. – Fig. 36.


Lamium laevigatum L., Sp. Pl. 2, ed.2 (1763) 808. – Lamium maculatum (L.) L. var. laevigatum (L.) Mutel, Fl. Fr. Herb. 3 (1836) 24. – Type: Linn. 733/7 (holo. LINN).

Lamium melissifolium Miller, Gard. Dict. ed. 8 (1768) Lamium nr. 5. – Type: Miller, Fig. Pl. Gard. Dict. (1760) tab. 158.

Fig. 36. *Lamium maculatum.*
Lamium mutabile Dumort., Fl. Belg. (1827) 45. - Type: Dumortier s.n., Belgium, Freyr, Anseremme, Waulsort, Falmagne, very common (holo. BR).


Lamium gundelsheimeri K. Koch, Linnaea 17 (1843) 297; Benth. in DC., Prodr. 12 (1848) 510; K. Koch, Linnaea 21 (1848) 679; Boiss., Fl. Orient. 4 (1879) 763; R. Mill in P. Davis, Fl. Turk. 7 (1982) 142. - Type: Gundelsheimeri s.n., Armenia and Cappadocia (holo. B, destroyed). - Neotype according to R. Mill in P. Davis, Fl. Turk. 7 (1982) 143: Tournefort s.n., Orients, Lamium orientale, nunc moschatum, magnò flore (holo. BM), but that must be an error, as this is the type specimen of Lamium moschatum Mill.


Lamium elegantissimum Schur, Enum. Pl. Transs. (1866) 535, nomen illeg., superfluous name and nomen nudum.


Lamium urticifolium Schur, Enum. Pl. Transs. (1866) 535, non Weihe 1825, nomen illeg.

Perennial. Rhizome cauliform, very short and wooly to a few dm long and herbaceous, with stolons. Stem usually decumbent and branched, (15-) 25-60 (-90) cm long, (1-) 2-3 (-4) mm Ø, mostly hirsute. Leaves: petiole (½-) 2-4½ (-6) cm long, shorter than the blade, the upper usually not sessile; blade cordate to (upper) ovate or ovate-oblong with an attenuate to truncate base and a slightly acuminate apex, usually coarsely, sometimes irregularly crenate to crenate-serrate to (upper) serrate, sparsely appressed-pubescent hairy on both sides, sometimes, especially in winter, with a whitish central band. Cauline leaves (1½-) 2-5½ (-9½) cm long, index (1.0-) 1.1-1.5 (-2.1); floral leaves (1½-) 3-7 (-9½) cm long, index (1.0-) 1.1-1.7 (-2.0). Verticillasters (3-) 4-5 (-7), conspicuously remote, with (6-) 10-12 (->20) flowers. Bracts (≤½-) 1-2 (-4) mm long, c. ¼ mm broad, hirsute, also with short glandular hairs. Calyx usually indistinctly 10-nerved, (¾-) 1 (-1¼) cm long, longer after anthesis, sparsely hirsute, especially on the nerves; teeth usually shorter, sometimes as long as or longer than the tube, very narrowly triangular, on the margin with short glandular hairs. Corolla purple, rarely white, with dark purple markings, (1¼-) 2-2½ (-3½) cm long; tube gradually dilated, (1¼-) 1½-1¾ (-2) cm long, exserted from the calyx, outside glabrous at the base,
towards the lips puberulous, inside with a perpendicular ring of hairs dorsally at 2–3 mm from the base, upper lip arched, (8–) 9–10 (–12) by 6–8 mm, apex rounded to truncate, margin usually undulate, outside velutinous, inside glabrous; lower lip about as long as upper lip and at a right angle to the latter, glabrous, lateral lobes rounded, to 2 mm long, tooth 1–2 mm long, also a minute rounded, second protuberance, median lobe 4–6 by 7–8 mm, bilobed, margin undulate. Anterior stamens 10–12 mm long, c. 3–4 mm longer than the posterior ones and attached c. 1–2 mm lower; filaments also with short glandular hairs; anthers 2–2½ by 1–1½ mm; pollen orange. Disc c. ½ mm broad. Style 2–3 mm shorter than the corolla, subglabrous. Nutlets (2½–) 3–3¼ (–4¼) by (1½–) 1½ (–2) mm.

Distribution. Europe northwards to c. 55° N. lat. in Germany and c. 60° N. lat. in U.S.S.R., but absent from most of the islands, scattered in SW. Balkan, Turkey, Syria and Lebanon; escaped from gardens in Scandinavia (Hultén, 1950; Lid, 1963), introduced in Great-Britain (Clapham et al. 1987), and in New Zealand (Sykes, 1978), escaped from gardens in Canada and U.S.A. (Britton & Brown, 1913) – Fig. 37.

Habitat. In mixed and deciduous forests, in thickets and hedges, roadsides and banks of streams, rocky places and walls, in (mountain) pastures and fields, prefers shade and calcareous soil.

Altitude. From sea-level up to 2000 m (Switzerland and Italy).

Variability. Lamium maculatum is a very variable species, as is manifest from the long list of synonyms. In some parts of the area forms as cupreum and truncatum are well recognizable, but I arrived at the same opinion as P.W. Ball (1972): ‘It does not at the moment seem possible to recognize subspecies, as although there seems to be a good correlation of characters in some areas this is not maintained elsewhere’.

Especially the shape (macrophyllum, truncatum, rhombifolium) and toothing of the leaves (nemorale), the length of the calyx teeth (brevidens, longearistatum), the length (cupreum) and colour of the corolla (albiflora, carneum, pallidiflorum), and the indumentum (foliosum, hirsutum) can vary highly, even in one population.

The infraspecific taxa I found in the literature, not mentioned in the list of synonyms, are listed below in alphabetic order.

var. albiflorum Opiz, Seznam (1852) 57, nomen nudum.
Fig. 37. Distribution of *Lamium maculatum*, without the introductions and the specimens, escaped from gardens.

var. *fasciatum* Gaudin, Fl. Helv. 4 (1829) 47.

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var. *parvifolium* Gaudin, Fl. Helv. 4 (1829) 47.


9. *Lamium moschatum* Miller – **Fig. 28.**


? Annual. Stem decumbent or erect, branched (5-) 20–40 (~60) cm long, 3–5 (~7) mm Ø, glabrous, towards the apex sparsely puberulous. Leaves: *petiole* (1½-) 3–4 (~9) cm, usually about as long as the blade or longer, the upper leaves sessile; *blade* cordate, slightly to (upper) more acuminate, the upper leaves also ovate with an attenuate to truncate base, moderately crenate or double-crenate, the upper leaves also serrate, moderately pubescent on both sides; *cauline leaves* (1-) 3–5 (~7½) cm long, index (1.0-) 1.1–1.4 (~1.6); *floral leaves* (2-) 3½–6 (~8½) cm, index (1.0-) 1.1–1.4 (~1.7), the upper leaves usually with whitish or pinkish spots at the base. *Verticillasters* (3-) 5–6 (~8), remote, with (6-) 12–20 (~28) flowers. *Bracts* (2-) 3–4 (~6) mm long, ½–¾ mm broad, hirsute, with short glandular hairs. *Calyx* 10-nerved, 1–1½ (~1¾) cm long, (much) longer after anthesis, glabrous at the base, towards the apex shortly appressed hairy and especially on the nerves and
Fig. 38. Lamium moschatum.
margin sparsely hirsute, also with short glandular hairs; teeth $1\frac{1}{2}-1\frac{1}{2}$ (-2) $\times$ as long as the tube, narrowly triangular, on the inside puberulous, on the outside especially on the margin with short glandular hairs. Corolla white, $(1\frac{1}{4}-) 1\frac{1}{2}-2$ (-2 $\frac{3}{4}$) cm long; tube abruptly dilated, $\frac{3}{4}-1$ cm long, not exserted from the calyx, outside glabrous at the base, towards the lips especially dorsally pubescent, inside with an oblique ring of hairs dorsally at 3-4 mm from the base ventrally pointing backwards; upper lip arched, carinate, (6-) 10-12 by 7-9 mm, apex truncate and margin entire, outside densely sericeous, inside glabrous; lower lip longer than the upper lip and at a right angle to the latter, glabrous, lateral lobes oblique-ovate, 6-7 by 3-3 $\frac{1}{2}$ mm, without teeth, sinuous margin, median lobe 6-7 by 9-10 mm, bipartite, sinuous margin. Anterior stamens 9-11 mm long, c. 3-4 mm longer than the posterior ones and attached c. 1$\frac{1}{2}$-2 mm lower; filaments also with glandular hairs; anthers 2-2$\frac{1}{2}$ by 1-1$\frac{3}{4}$ mm; pollen colour unknown. Disc c. 1$\frac{1}{2}$ mm broad. Style c. 2$\frac{1}{2}$ by 1$\frac{1}{4}$-2 (-2$\frac{1}{4}$) mm.

Notes. 1. In spite of Miller’s (1768) statement that ‘this is an annual plant’, I am not quite sure about that. Various specimens were collected without the subterranean parts of the plant in a way suggesting the difficulty to gather the rhizome too. Aucher-Eloy 1686 and Reese s.n. collected specimens with subterranean parts, which could be called rhizomes. On the other hand 66% of the studied specimens had ripe fruits which points to the fact that Lamium moschatum is perhaps still an annual plant (see pag. 12).

2. It is remarkable that only once the label mentioned the scent: “Plante à odeur de sauge et de Ballota foetida” (Berton 68). Recent collectors I asked about the scent of the plants, could not remember a specific smell, as Miller (1768) had observed.

3. The differences, formerly mentioned by Boissier (1879), between the specimens of the Western and the Eastern part of the area (Fig. 39), seem not to be of great importance. However, their existence in combination with the geographical disjunction and discrepancy in habitat induce to distinguish two subspecies.

4. As Miller (1768) mentioned, that Lamium moschatum ‘grows naturally in the Archipelago’, there is no doubt about the fact, that subsp. moschatum is the typical subspecies, despite the fact that Miller’s collections have been lost.

9.a. Lamium moschatum Miller subsp. micranthum (Boiss.) Mennema, comb. nov. – Fig. 38.


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Stem (5–) 20–30 (-60) cm long. Bracts (2–) 3–4 (-5) mm long. Calyx 1 (-1½) cm long, longer after anthesis. Corolla (1¼–) 1½ (-1¾) cm long.

Distribution. E. Turkey, Cyprus, W. Syria, Lebanon, Israel and W. Jordan - Fig. 39.

Habitat. Damp, shady places, cultivated land and rarely on stony places, roadsides, waste ground and slopes.

Altitude. From sea-level up to 1000 m.

Variability. Subsp. micranthum is very homogeneous, but can vary in indumentum, probably in relation to the habitat; infraspecific taxa on a lower level are unknown.

9.b. Lamium moschatum Miller subsp. moschatum - Figs. 38 and 40.

Fig. 40. Herbarium specimen of *Lamium moschatum* subsp. *moschatum*.
Stem (20–) 30–40 (–60) cm long. Bracts (2–) 3–6 mm long. Calyx (1–) 1¼–1½ (–1¾) cm long, much longer after anthesis. Corolla (1½–) 1¾–2 (–2¼) cm long.

Distribution. S. Bulgaria, E. Greece, W. and SW. coast of Turkey – Fig. 39.

Habitat. Open stony places, roadsides, rarely on waste ground, less in hedges and at shady places.

Altitude. From sea-level up to 600 m.

Variability. Subsp. moschatum is very homogeneous. Besides the variety mentioned in the synonymy, only one form with variegated leaves (pictum) is recorded in the literature.


10. Lamium tomentosum Willd. – Fig. 41.


Perennial. Rhizome cauliform, woody, very short to about 1 dm long. Stem decumbent, usually branched, (5–) 10–25 (–40) cm long, 1–3 mm Ø, glabrate to very densely patently hairy, especially at the top. Leaves: petiole (½–) 1–2½ (–4½) cm long, the lower ones mostly longer than the blade, the upper ones often sessile; blade cordate or reniform, the upper ones also ovate with a truncate or cuneate base and an acute apex, crenate, crenate-serrate or double-crenate, sparsely

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appressed-pubescent to very densely tomentose or woolly on both sides; cauline leaves (½–) 1–2½ (–3½) cm long, index (0.7–) 0.9–1.3 (–1.5); floral leaves (½–) 1½–2½ (–4) cm long, index (0.7–) 0.9–1.3 (–1.0). Verticillasters 2–3 (–6), crowded or remote, with 6–14 flowers. Bracts (2–) 3–5 (–10) mm long, (¼–) ½ – 1 mm broad, moderately to very densely hirsute, glandular hairs not seen. Calyx with
10 distinct nerves, \((\frac{3}{4}-) 1 (-1\frac{1}{2}) \text{ cm long, longer after anthesis, usually very densely tomentose or woolly, especially the lobes, seldom sparsely appressed hairy; teeth usually } 2 \times \text{ as long as the tube, narrowly triangular, glandular hairs not seen. Corolla white, } (1\frac{3}{4}-) 2-2\frac{1}{2} \text{ cm long, tube ventrally saccate, } 1\frac{3}{4}-1\frac{1}{2} \text{ cm long, exserted from the calyx, outside glabrous at the base, towards the lips puberulous, inside with an oblique ring of hairs dorsally } 4-5 \text{ mm from the base ventrally pointing backwards; upper lip arched, } 8-10 \text{ by } 6-7 \text{ mm, apex emarginate, margin undulate, outside usually densely velutinous or woolly, inside glabrous; lower lip about as long as the upper lip and laid back, glabrous, lateral lobes rounded, to } 1 \text{ mm long, tooth } 1-1\frac{1}{4} \text{ mm long, median lobe } 4-5 \text{ by } 7-8 \text{ mm, bipartite, margin undulate. Anterior stamens } 9-10 \text{ mm long, c. } 3 \text{ mm longer than the posterior ones and attached c. } 1-1\frac{1}{2} \text{ mm lower; filaments with short glandular hairs; anthers } 1\frac{3}{4}-2 \text{ by } \frac{3}{4}-1 \text{ mm; pollen light yellow. Disc c. } 1\frac{1}{2} \text{ mm broad. Style about } 3 \text{ mm shorter than the corolla, glabrous. Nutlets not seen. }$

Distribution. E. Turkey, Caucasian division of the U.S.S.R., N. Iraq and N. Iran – Fig. 42.
Habitat. Among rocks, on volcanic, calcareous and non-calcareous screes, unstable slopes and in mountain meadows up to the snow-line.

Altitude. From 1300 m (Turkey) up to 4800 m (N. Iran).

Variability. Lamium tomentosum is a rather rare and nevertheless a heterogeneous species, very variable in hairiness and length and index of the leaves, probably due to the variable ecological factors of the habitat. Constant characters are the ventrally saccate tube of the corolla with the oblique internal ring of hairs, the rather long and broad bracts, very often the tomentose or woolly calyx teeth and the densely velutinous or woolly upper lip of the corolla, also in bud. Apart from the varieties mentioned in the synonymy, infraspecific taxa are unknown.

C. Section Lamium

Section Lamiopsis Dumort., Fl. Belg. (1827) 45. – Section Pollichia (Willd.) Briq. in Engler & Prantl, Nat. Pflanzenfam. 4,3a (1897) 254, nomen illeg. – Type: Lamium purpureum L.

Bracts present. Corolla tube straight. Upper leaves sessile, not amplexicaul.

Notes. 1. Briquet (1897) incorrectly ascribed the authorship of the taxon Pollichia to Willdenow (1787). Willdenow rightly referred in the synonymy to Schrank (1782) as the author of the name Pollichia.

2. Schrank (1782) described the new genus Pollichia exclusively based on and referring to Galeopsis galeobdolon L. Since the latter one—as Lamium galeobdolon—was inserted by Briquet in the subgenus Galeobdolon, the name of Briquet’s section Pollichia in subgenus Eulamium is incorrect; besides, the section name Pollichia is illegitimate since Briquet referred in the synonymy to the older section name Lamiopsis Dumort.

11. Lamium bifidum Cirillo – Figs. 43 and 44.


Lamium panormitanum Lojac., Fl. Sic. 2 (1907) 234. – Type: Parlatore s.n., Italy, Sicilia, Bosco di Renda (not found in PAL).

Annual. Stem decumbent, branched at the base, (10–) 15–30 (–50) cm long, 1–2
(–3) mm Ø, glabrate. Leaves: petiole (½–) 1½–3 (–5½) cm, about as long as the
blade or longer, the upper leaves sessile; blade cordate or (lower) reniform, slightly
to (upper) more acuminate, crenate, crenate-serrate or double-crenate to (upper)
irregularly incised, appressed-pubescent to strigose on both sides, very often with
a white central band; cauline leaves (½–) 1½–3 (–6) cm long, index (1.0–) 1.2–1.4
(–1.6). Floral leaves (1–) 1½–3 (–6) cm long, index (1.0–) 1.1–1.4 (–1.6). Verticil-
lasters (2–) 3–4 (–6), usually crowded, with mostly 20 or more flowers. Bracts (1–)
2–3 (–4) mm long, ¼–½ mm broad, hirsute and with short glandular hairs. Calyx

Fig. 43. Lamium bifidum; a. upper part (1 ×); b. uppermost cauline leaf (1 ×); c. calyx and corolla
(2 ×).
usually with 5 distinct nerves, $\frac{3}{4}$ (-1) cm long, longer after anthesis, hirsute; teeth $\frac{1}{2}$-$\frac{3}{4}$ x as long as the tube, triangular, on the margin with short glandular hairs. Corolla white, rarely pink or purple, (1½-) 2-2½ (-2½) cm long, cleistogamous flowers c. $\frac{1}{2}$ cm long; tube abruptly dilated, (1½-) 1½-1¾ cm long, exserted from the calyx, glabrous at the base, towards the lips puberulous to pubescent, no internal ring of hairs; upper lip arched, 5-6 (-8) by 4-5 (-6) mm, apex bifid, margin entire, outside pubescent to hirsute, inside glabrous; lower lip about as long as upper lip and at a right angle to the latter, glabrous, lateral lobes rounded, to 1 mm long, tooth to $\frac{1}{2}$ mm long, median lobe 2½-½ by 5-6 mm, bilobed, margin undulate. Anterior stamens 11-12 mm long, c. 4½ mm longer than the posterior ones and attached c. 3 mm lower; filaments with short glandular hairs; anthers 1-1½ by $\frac{1}{2}$-½ mm; pollen colour unknown. Disc c. $\frac{1}{2}$ mm broad. Style 3-4 mm shorter than the corolla, subglabrous. Nutlets (2-) 2½-2½ by (1-) 1¼ (-1½) mm.

**Distribution.** C. Portugal, C. Spain, Corse (France), C. and S. Italy, Sardegna and Sicilia, Jugoslavia, Albania, Greece, S. Romania (Grintescu, 1963), Bulgaria and Algeria - Fig. 45.
Habitat. Roadsides, waste places, on arable land, on walls and rocks, in mountain forests, on stony and grassy mountain slopes.

Altitude. Up to 1700 m (Greece).

Variability. *Lamium bifidum* is a uniform, well recognizable species, and closely related to *Lamium purpureum*. Plants with cleistogamous flowers are known (*clandestinum*, *cryphantum*). Subsp. *balcanicum* seems to be ‘distinguished’ mainly by purple flowers.

Notes. 1. The annotations on the colour of the corolla in specimens collected by Hawker *s.n.* ‘flower yellow’ and van Royen 2738 ‘corolla white to light yellow’ very probably have been made some time after drying the plants, not at the moment of collecting. Bondi *s.n.*, Gavvols *s.n.* and Podlech 9/33 have collected plants with yellow flowers, when dry, without any annotation.

2. The hairs on the filament of the stamen, illustrated by Grintescu (1963, tab. 28, fig. 1 c) are viscid hairs.
3. Lamium bifidum subsp. albimontanum appeared to be Lamium purpureum var. incisum. The locality Kriti, Greece (Ball, 1972) very probably has to be left out.

12. Lamium confertum Fries – Figs. 46 and 47.


Annual. Stem decumbent or erect, simple or branched, (15-) 20-40 (-70) cm long, 2–3 mm Ø, glabrous to glabrate. Leaves: petiole (½-) 1–2½ (-4) cm long, usually about as long as the blade, the upper sessile; blade reniform to cordate, the upper seldom rhomboid, deeply coarsely crenate or double-crenate, seldom irregularly incised, pubescent on both sides; cauline leaves (1-) 2–3½ (-6½) cm long, index (0.6-) 0.8–0.9 (-1.0); floral leaves (1-) 2–4 (-6½) cm long, index (0.6-) 0.8–0.9 (-1.0). Verticillasters 3–4 (-5), crowded, but the lower one(s) remote, with (8-) 10–14 (-20) flowers. Bracts (2-) 3–4 (-6) mm long, c. ½ mm broad, hirsute, also with short glandular hairs. Calyx many-nerved, the main nerves often purple, (¾-) 1 (-1¼) cm long, much longer after anthesis, subglabrous or sparsely appressed-puberulous or strigose, towards the apex sometimes less scarcely pubescent or strigose; teeth always longer than the tube, narrowly triangular, also with short glandular hairs. Corolla red-purpure, (1½-) 2 (-2½) cm long, in cleistogamous flowers c. ½ cm long; tube abruptly dilated, (1-) 1¼–1½ (-1¾) cm long, exserted from the calyx, outside glabrous at the base, towards the lips puberulous, no internal ring of hairs; upper lip arched, (3-) 4–5 (-6) mm long and broad, apex rounded, margin entire to faintly undulate, outside pubescent, inside glabrous; lower lip about as long as the upper lip or longer and at a right angle to the latter, glabrous, lateral lobes rounded, ¾–1¼ mm long, tooth c. ½
Fig. 46. Lamium confertum: a. upper part (1 ×); b. uppermost cauline leaf (1 ×); c. calyx (3 ×); d. corolla (3 ×).
Fig. 47. Lamium confertum.
mm long, median lobe 3–4 by 4–5 mm, bipartite, margin undulate. Anterior stamens 6–7 mm long, c. 1–2 mm longer than the posterior ones and attached c. 1 mm lower; filaments without short glandular hairs; anthers 1–1¼ by c. ½ mm; pollen colour unknown. Disc c. ¼ mm broad. Style c. 3 mm shorter than the corolla, glabrous. Nutlets (2½–) 2¾–3 by 1½ (–1¾) mm.

Distribution. C. and S. Scandinavia, Orkney and Scotland (Great-Britain), Netherlands, N. Germany, Northern and Baltic division of the U.S.S.R., Portugal and Sicilia (Italy); introduced on Greenland (Böcher et al, 1968) and on Iceland and the Faeroer (Ostenfeld & Grøntved, 1934) – Fig. 48.

Habitat. Cultivated land, in gardens, roadsides.

Altitude. No data available; a low-land taxon.

Variability. The influence of the season on the total shape and the various details of Lamium confertum is, just as with Lamium amplexicaule s. str. and Lamium purpureum s. str., very well perceptible. To show the seasonal influence I investigated the length of the lowermost floral leaves of 159 specimens of Lamium confertum, collected in the whole area, except Portugal. Although ‘May 1873’ in Finland is hardly to compare with ‘May 1930’ in the Netherlands, there is a convincing difference in length of the small floral leaves in spring and the larger ones in late summer and early autumn.

Sowing experiments by Müntzing (1932) proved that the seasonal dimorphism of Lamium confertum, and also of Lamium amplexicaule s. str., is purely based on a modification. So it is incorrect to attach taxonomical value to these seasonal differences as Neuman (1901) did: Lamium intermedium f. verna and f. aestivale.

Lamium intermedium Fries f. aestivale Neuman, Sv. Fl. (1901) 173.
Lamium intermedium Fries f. subdissectum Neuman, Sv. Fl. (1901) 173.
Lamium intermedium Fries f. verna Neuman, Sv. Fl. (1901) 173.

Notes. 1. In 1819 Fries described and named Lamium moluccellifolium. For a long time no attention was paid to the protologue comprising the basionym ‘L. purpureum β Schum. Saell. I’. The correct author citation must be: Lamium moluccellifolium (Schum.) Fr.

The change of the name Lamium moluccellifolium by the same author (Fries, 1823) into Lamium intermedium without any argumentation—‘Lamium moluccellae-folium dicendum est: L. intermedium’—means irrevocably, that according to the rules of nomenclature the name Lamium intermedium is superfluous and consequently illegitimate.

Probably the reason for Fries’ new name is quite simple, viz. that he had come to the conviction that Lamium purpureum L. β moluccellifolium Schum. (1801) is a
different taxon, which it is in my opinion too. The consequence of the illegitimate name is, that *Lamium moluccellifolium* in recent flora’s has to change name again.

Fries described *Lamium confertum* in 1846, supposing—erroneously—this new taxon to be closely related to *Lamium incisum* Willd. The specimen in the herbarium of Fries, named *Lamium confertum*, with in his own handwriting the addi-
tion ‘Ubi primus distinxi’, is without any doubt \textit{Lamium moluccellifolium} sensu Fr. (= \textit{Lamium intermedium} Fr.). This specimen, lectotypified by me, is not very typical because of the irregular incisions of the leaves, but all other characters show that the correct name for \textit{Lamium moluccellifolium} Fr. (= \textit{Lamium intermedium} Fr.) is \textit{Lamium confertum} Fr.

13. \textit{Lamium garganicum} L. – Fig. 49.


\textit{Lamium pallidum} Salisb., Prodr. (1796) nomen illeg., superfluous name.

Perennial. \textit{Rhizome} cauliform, woody, very short to about 1 dm, with stolons. \textit{Stem} usually decumbent and simple, 5-40 (-70) cm long, (1-) 1½-2½ (-4) mm Ø, totally glabrous to glabrate or at the base moderately, to the apex more densely, patently hirsute or bristly hairy. \textit{Leaves}: \textit{petiole} (14-) 1½-3 (-7) cm, usually shorter than the blade; \textit{blade} reniform or cordate to (upper) ovate-oblong with a cordate to truncate base and an acute apex, coarsely and partly double-crenate to (upper) sometimes dentate, glabrate to rather densely pubescent to sericeous on both sides; \textit{cauline leaves} \leq ½-5 (-9½) cm long, index 0.7-1.5 (-1.8); \textit{floral leaves} 1½-4 (-8½) cm long, index 0.7-1.5 (-2.0). \textit{Verticillasters} 2-4 (-6), usually remote, with 2-16 (-20) flowers. \textit{Bracts} 1-10 (-13) mm long, ½-1 (-1½) mm broad, usually hirsute to bristly hairy and especially on the margin with short glandular hairs. \textit{Calyx} 5 - 10-nerved, ¾-1½ (-2) cm long, longer after anthesis, at the base glabrate to densely hirsute to velutinous or sericeous, towards the apex moderately to densely hirsute to velutinous or sericeous; teeth usually much shorter than the tube, triangular to narrowly triangular, on the margin with short glandular hairs. \textit{Corolla} pink to purple, rarely white, 1½-4 (-4½) cm long, tube abruptly dilated, 1-2½ (-3½) cm long, exserted from the calyx, outside glabrous at the base, towards the lips pubescent, usually no internal ring of hairs; upper lip arched, 4-12 (-15) by 3-8 (-10) mm, apex usually bifid, margin faintly undulate, outside usually moderately sericeous, inside glabrous; lower lip about as long and at a right angle to the latter, glabrous, lateral lobes rounded, 1-2 mm long, tooth, if present, usually minute, to ¼ mm long, median lobe 2-6 by 3-9 mm, bilobed to bipartite, margin undulate. Anterior \textit{stamens} 6-14 mm long, 3-5 mm longer than the posterior ones and attached 1½-3½ mm lower; filaments especially towards the apex with short glandular hairs; anthers 1 - 2 by ½-1¼ mm; pollen yellowish white. \textit{Disc} c. ¾ mm broad. \textit{Style} c. 1½-5 mm shorter than the corolla, glabrous. \textit{Nutlets} 2½-4½ by 1½-2½ mm.
Fig. 49. *Lamium garganicum*.
Fig. 49. *Lamium garganicum* (continued).
Variability. *Lamium garganicum* is a very variable species, which can be observed not only in the same collection-number, but also sometimes within one specimen. Briquet *s.n.* collected 9 flowers of one specimen and arranged them in order of size from 24–43 mm! Greuter 4117 noted on his label: “Oberlippe variiert von ausgerandet bis tief 2-, 3- oder 4-spaltig”; this phenomenon can also be observed in specimens in my garden.

This variability makes an infraspecific classification very difficult. I propose to distinguish besides the typical subspecies only the well recognizable subsp. *corsicum* and subsp. *striatum*, mainly based on the characters of the shape and the size of the leaves and the number of flowers in each verticillaster. Subsp. *striatum* can be divided in a number of varieties.

It seems to me that in general there is also a difference in distribution area, altitude and habitat between subsp. *garganicum* and subsp. *striatum*. Subsp. *garganicum* occupies the Western part of the area, usually at subalpine altitude and in shady places; subsp. *striatum* has been found mainly in the Eastern part of the area, usually at alpine altitude and in more open places.

As there are obvious overlaps, field research in areas of overlap and cultural experiments of both subspecies under similar circumstances are needed to test the taxonomic status of both subspecies. It seems to me that in *Lamium garganicum* the

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**Fig. 49. Lamium garganicum (continued).**
habitat has more influence on the characters of the plant than in other taxa of the genus. Therefore I do not consider the hairiness of the plants as taxonomically important, as Ball (1972) did in separating subsp. *laevigatum* and subsp. *garganicum*.


*Lamium longiflorum minus* Moris, Fl. Sard. 3 (1858-1859) 310, nomen illeg. – *Lamium garganicum* L. var. *minus* (Moris) Cesati, Passer. & Gibelli, Comp. Fl. It. 2 (1874) 320. – Type: not seen.

Stem (20–) 25–30 (–35) cm long, glabrous to glabrate. Blade cordate, glabrate; cauline leaves (1 1/2–) 2 (–3) cm long, index (1.2–) 1.3–1.4 (–1.5); floral leaves 1 1/2–2 (–3) cm long, index 1.2–1.3 (–1.6). Verticillasters (2–) 3–4 with (6–) 10–12 (–14) flowers. Bracts 1–2 mm long, sometimes lacking (!). Calyx 3/4 (–1) cm long. Corolla

Fig. 50. *Lamium garganicum* subsp. *corsicum*: a. upper part (1 x); b. uppermost cauline leaf (1 x) c. calyx (2 x); d. corolla (2 x).
1½ (-2) cm long; tube c. 1 cm long; upper lip 4-5 by 3-4 mm, bifid; lateral lobes of the lower lip to 1 mm long, median lobe c. 2 by 2-3 mm. Anterior stamens c. 6 mm long, c. 3 mm longer than the posterior ones and attached lower 1½–2 mm; anthers 1-1¼ by ½–¾ mm. Style 1-1¼ mm shorter than the corolla. Nutlets 2½ (-2¾) by 1¼ (-1½) mm.

Distribution. Corse (France) and Sardegna (Italy) – Fig. 51.

Habitat. On rocks and scree; prefers calcareous soils.

Altitude. From 1000 m up to above 2000 m (Corse; Briquet, 1955: to 2500 m).

Variability. See under the species. Intraspecific taxa lower than the rank of subspecies have not been described, except those mentioned in the synonomy.

13.b. Lamium garganicum L. subsp. garganicum – Figs. 49 and 52.

Fig. 52. Herbarium specimen of *Lamium garganicum* subsp. *garganicum*.


**Lamium pedemontanum** Reichlb., Fl. Germ. Exc. (1831) 322. – Type: Reichenbach s.n., Italy, Col de Tenda (holo. BM).


**Lamium garganicum** L. var. *genuinum* Cardel in Parl.-Cardel, Fl. It. 4 (1884) 208, nomen inval.

**Lamium scardicum** Wettstein, Biblioth. Bot. 26 (1892) 82. – Type: Dörfler s.n., Albania, Scardus, Kobilica Mountains, in rock crevice (holo. W, iso. WU).

**Lamium garganicum** L. var. *typicum* Hall., Conspl. Fl. Gr. 2 (1902) 511, nomen inval.

**Lamium reisieri** Degen, Magyar Bot. Lapok 4 (1905) 130. – Type: Reiser s.n., Jugoslavia, Lisac, S. of Zagubica (not found in BP).


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**Stem** (20-) 30–40 (–70) cm long, glabrous to glabrate. **Blade** cordate, glabrate; **cauline leaves** (1½-) 3½-5 (–9½) cm long, index (1.0-) 1.2–1.5 (-1.8); **floral leaves** (2-) 3–4 (–8½) cm long, index (1.0-) 1.2–1.5 (-2.0). **Verticillasters** 3–4 (–6) with (8-) 10–16 (–20) flowers. **Bracts** (1-) 2–7 (–10) mm long; **Calyx** (1-) 1½–1½ (–2) cm long. **Corolla** (2½-) 2¼–4 (–4½) cm long; tube (1½-) 2–2½ (–3½) cm long; upper lip (–8) 10–12 (–15) by 7–8 (–10) mm, usually bifid; lateral lobes of the lower lip 1½–2 mm long; median lobe c. 2 by 2–3 mm. **Anterior stamens** 12–13 mm long, 4–5 mm longer than the posterior ones and attached lower 3–3½ mm; anthers 1½–2 by ¾–1¼ mm. **Style** c. 3–5 mm shorter than the corolla. **Nutlets** (2½-) 3–3¼ (–3⅓) by (1¼-) 1½ (–2) mm.
Distribution. S. France and Corse, N. Spain, W., C. and S. Italy, the Balkan from C. Jugoslavia and S. Romania as far as Athens in Greece, W. Turkey and scattered in E. Turkey, Cyprus, Syria, Lebanon and Israel; also in N. Algeria and N. Tunisia – Fig. 53.

Habitat. Between stones, on rocks, on mountain-slopes of mainly Northern and Western exposure, and on screes, especially in shaded places, also in light (deciduous) forests and in thickets and hedges; prefers calcareous soils.

Altitude. From 50 m up to 2250 m (C. Italy, Algeria).

Variability. See under the species. Infraspecific taxa lower than the rank of subspecies, not mentioned in the synonymy, are listed here in alphabetical order.

f. glabrescens Heldr. ex Hal., Consp. Fl. Gr. 2 (1902) 512.

f. hymettium Heldr. ex Hal., Consp. Fl. Gr. 2 (1902) 512.

var. laeigatum Car. in Parl.-Caruel, Fl. Ital. 4 (1884) 208.

Fig. 53. Distribution of Lamium garganicum subsp. garganicum, without the specimens, escaped from gardens in Denmark and Switzerland and the adventitious records in Germany.

13.c. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek

Stem 5–30 (–35) cm long, glabrate to hirsute or bristly hairy. Blade mostly reniform, sometimes cordate or rhomboid, glabrate to pubescent or sericeous; cauline leaves ≤ ½–2½ (–4½) cm long, index 0.7–1.1 (–1.3); floral leaves ½–2½ (–4½) cm long, index 0 7–1 1 (–1 3). Verticillasters 2–4 (–5) with 2–10 (–16) flowers. Bracts (1–) 3–10 (–4) mm long. Calyx (½–) 1–1½ (–1¾) cm long; Corolla (2½–) 3–3½ (–4½) cm long; tube (1½–) 2–2½ (–3½) cm long; upper lip (8–) 10–12 (–15) by 7–8 (–10) mm; lateral lobes of the lower lip ½–2 mm long; median lobe c. 2 by 2–3 mm. Anterior stamens 12–13 mm long, 4–5 mm longer than the posterior ones and attached lower 3–3½ mm; anthers 1½–2 by ¾–1¼ mm. Style c. 3–5 mm shorter than the corolla. Nutlets 2¾–4¾ by 1½–2½ mm.

13.c.1. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek var. armenum (Boiss.) Mennema, comb. nov. – Fig. 49.


Rhizome to about 1 dm. Stem 10–15 (–20) cm long. Blade reniform, the upper rhomboid and decurrent on the petiole, irregularly crenate; cauline leaves ½–1 cm long, index 0 8–0 9 (–1 0). Floral leaves 1 (–1½) cm long, index 0 8–0 9. Verticillasters 3–4 (–5), crowded, with (–4) 6 (–10) flowers. Bracts 3–5 mm long. Upper lip corolla usually truncate. Nutlets 4½–4¾ by 2½–2½ mm, without greyish spots.

Distribution. Very rare and scattered in mountains in N. Turkey and the Caucasian division of the U.S.S.R. – Fig. 54.

Habitat. On rocks and sliding stone screes; on calcareous soil.

Altitude. From 2000 m up to 2800 m.

Variability. See under the species. Infraspecific taxa lower than the rank of variety are unknown. Furse 3820 collected plants with floral leaves with white spots at such as occur in Lamium galactophyllum and Lamium moschatum.
13.c.2. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek var. microphyllum (Boiss.) Mennema, *comb. nov.* - Figs. 49 and 55.


*Rhizome* to about 1 dm. *Stem* 5 (-10) cm long. *Blade* reniform, regularly crenate; *cauline leaves* ≤ $\frac{1}{2}$ (-1) cm long, index 0.7–0.8 (-1.0); *floral leaves* $\frac{1}{2}$–1 (-1½) cm long, index 0.7–0.8 (-1.0). *Verticillasters* 3-4 (-5), crowded, with 2-4 flowers. *Bracts* (3-) 7-10 (-13) mm long. Upper lip *corolla* usually bifid. *Nutlets* 4¼–4¼ by 2¼–2½ mm, without greyish spots.

Fig. 54. Distribution of Lamium garganicum subsp. striatum var. armenum.
Distribution. Very rare and scattered in mountains in Greece, SW. Turkey and Lebanon – Fig. 56.

Habitat. On rocks and stone screes; on calcareous and serpentineous soils.

Altitude. From 1500 m up to 2800 m (Lebanon).

Variability. See under the species. Infraspecific taxa lower than the rank of variety are unknown.
13.c.3. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek var. striatum – Figs. 49 and 57.


Lamium glechomoides Smith in Rees, Cyclop. 20 (1812) Lamium no. 11; Benth., Lab. Gen. Spec. (1835) 738; Benth. in DC., Prodr. 12 (1848) 506. – Type: Tournefort s.n., the Levant (holo. LINN).


Fig. 57. Herbarium specimen of *Lamium garganicum* subsp. *striatum* var. *striatum*. 


**Rhizome** usually short. **Stem** (10–) 15–30 (–35) cm long. **Blade** usually reniform, rarely cordate, regularly crenate; **Cauleine leaves** (1–) 2–2½ (–4½) cm long, index (0.8–) 1.0–1.1 (–1.3); **floral leaves** (1–) 1½–2½ (–4½) cm long, index (0.7–) 0.9–1.1 (–1.3). **Verticillasters** 2–3 (–4), remote, with (4–) 8–10 (–16) flowers. **Bracts** (1–) 5–8 (–11) mm long. Upper lip **corolla** usually bifid. **Nutlets** 2¼–3¼ (–3½) by 1½ (–1¾) mm, with little greyish spots.

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Distribution. C. and S. Italy, S. Jugoslavia, Albania, Greece, Turkey, the Caucasian division of the U.S.S.R. (?), Syria, Lebanon, Israel, Iraq and Iran – Fig. 58.

Habitat. On rocks, amongst stones, on mountain slopes of mainly Southern and Eastern exposure, and on scree incl. dry, open places; also, but less frequent in light (coniferous) forests; prefers calcareous soils.

Altitude. From 400 m up to 3000 m (Turkey).

Variability. See under the species. Furthermore Mill (1980) distinguished at the species level a form with an internal ring of hairs in the tube of the corolla: Lamium cariense, occurring in S. Greece and E. Turkey. Infraspecific taxa lower than the rank of variety, except those mentioned in the synonomy, are unknown.

Note. Haussknecht 800 has been collected ‘in fissur. rup. Terek, 2000 ped.’ on 6. IV.1867. He used the printed label ‘Iter syriaco-armeniacum 1865’, but changed by hand the 5 to 7. As far as I know the name Terek can only refer to a former province of U.S.S.R., N. of the Caucasian Alps. According to Hergt (1904), however, Haussknecht travelled in Mesopotamia in 1867 and did not reach the Caucasus until 1869 after a period of illness. The labels of the
Mesopotamian Mountain-exploration make it clear that this excursion took place in June and July 1867. So it is possible that earlier in that year Haussknecht collected some plants in more temperate areas N. of the Caucasus. Although *Lamium garganicum* has not been mentioned in the Russian flora (Gorshkova, 1954), I marked the Terek-area on the map of *Lamium garganicum* var. *striatum* with an interrogation-mark.


Perennial. *Rhizome* ?. *Stem* decumbent and simple, 20-30 cm long, c. 1½ mm Ø, glabrous. *Leaves*: *petiole* ½-2 cm, the upper leaves sessile; blade reniform, deeply (the upper ones less deep) divided into (3-) 5-lobed segments, glabrous; *cauline leaves* c. 1-1½ cm long, index c. 0-7. *floral leaves* c. 1½ cm long, index ? *Verticillasters* 1-2, remote, with 4-6 flowers. *Bracts* 7-8 mm long, ½-1 mm broad, glabrous, sometimes with some short glandular hairs. *Calyx* 5-nerved, 1½ cm long, longer after anthesis, glabrous; teeth about as half as long as the tube, narrowly triangular, on the margin with short glandular hairs. *Corolla* pink, 3-3½ cm long; tube abruptly dilated, 2-2½ cm long, exserted from the calyx, outside glabrous at the base, dorsally towards the lips pubescent, no internal ring of hairs; upper lip arched, c. 10 by 6-7 mm, apex bilobed, margin faintly undulate, outside pubescent, inside glabrous; lower lip about as long as the upper lip and in a right angle to the latter, glabrous, lateral lobes rounded, to 1½ mm long, tooth less than 1 mm?, median lobe 4-5 by 5-6 mm, bilobed, margin undulate. Anterior *stamens* 10-11 mm long, c. 3-4 mm longer than the posterior ones and attached c. 1-2 mm lower; filaments also with short glandular hairs; anthers c. 2 by ¾-1 mm. Pollen colour unknown. *Disc* c. ¾ mm broad. *Style* c. 3 mm shorter than the corolla, subglabrous. *Nutlets* not ripe.

**Distribution.** Very rare in the Krym (U.S.S.R.).

**Habitat.** ‘Stony screes in the lower cultivated mountain belt and wood margins’ (Gorshkova, 1954).

**Altitude.** No data available.

**Variability.** No data available; see note 1.
Notes. 1. During my visit to the Komarov Botanical Institute in Leningrad in 1975 I separated specimens of this species and asked the curator of the Herbarium to send them on loan. Unfortunately I did not receive them in spite of later letters. The rareness of the species is demonstrated by the absence of specimens in BM, G, P, S, UPS and Z. So I had to base my opinion on a brief inspection of material during my stay in Leningrad and to describe the species (admittedly somewhat incomplete) on the basis of a fragment of one specimen from Berlin, which also has to be the neotype.

2. As Lamium glaberrimum is completely glabrous, except the corolla, the apex of the bracts and calyx lobes are also glabrous. However, there is a conspicuous difference with the glabrous, corneous, yellowish brown aristate apex of the bracts and calyx teeth of the species from the subgenera Galeobdolon and Orula.

3. Although the nutlets of the specimen examined were unripe, the length of the nutlets was about 4 1/2 mm and not 3-3 1/2 mm as mentioned in the Russian Flora (Gorshkova, 1954).

15. Lamium purpureum L. – Fig. 59.


Lamium nudum Crantz, Stirp. Austr. 2, 4, ed. 2 (1769) 259. – Type: unknown.

Lamium molle Aiton, Hort. Kew. 2 (1789) 297; Britten, J. Bot. 37 (1899) 130; Boulger, J. Bot. 41 (1903) 150. – Lamium purpureum L. var. molle (Aiton) Benth., Lab. Gen. Spec. (1834) 512. – Type: Sutherland s.n., cult. 1883 (not seen).


Fig. 59. Lamium purpureum.
Fig. 59. *Lamium purpureum* (continued).
Lamium foetidum Gilib., Excerc. Phyt. 1 (1792) 97, non Garsault 1767, nomen illeg., superfluous name. - Type: Gilibert s.n., 'prope Grodawm' (not seen).

Lamium nudum Moench, Meth. Pl. (1794) 393, non Crantz 1769, nomen illeg., homotypic synonym of Lamium purpureum L.

Annual. Stem erect or decumbent, simple or branched, (5-) 10 - 30 (-55) cm long, 1-2 mm Ø, glabrous to glabrate, rarely densely hairy. Leaves: petiole (½-) 1-4 (-6½) cm long, usually longer than the blade, the upper ones sessile; blade cordate or rhomboid to reniform, the upper ones also ovate or obovate with a cordate or truncate base and an acute apex, faintly crenate to deeply irregularly incised, pubescent to strigose on both sides; cauline leaves (4-) 9-30 (-55) cm long, index 0.8-1.1 (-1.5). Verteicillasters 4-8, crowded or remote, with (4-) 12-18 (-20) flowers. Bracts sometimes hardly to distinguish, (1-) 2-3 (-5) mm long, c. ½ mm broad, hirsute, short glandular hairs not always present. Calyx usually with 10 distinct, sometimes more nerves, the main nerves often purple, ½-¾ (-1) cm long, longer after anthesis, at the base subglabrous, towards the apex more densely pubescent to hirsute; teeth subequal, as long as or shorter than the tube, narrowly triangular, short glandular hairs on the margin not always present. Corolla red-purple, rarely white, (½-) ¾-1¼ (-2) cm long, tube abruptly dilated, (½-) ¾-1 (-1¼) cm long, not always exserted from the calyx, outside glabrous at the base, towards the lips puberulous, inside usually with a perpendicular ring of hairs dorsally at 1-2 mm from the base; upper lip arched, (1-) 2-3 (-4) by (1-) 2-3 mm, apex rounded, margin entire to faintly undulate, outside pubescent, inside glabrous; lower lip about as long as the upper lip and at a right angle to this, glabrous, lateral lobes rounded, ¾-1¼ mm long, tooth c. ½ mm long, median lobe 1½-2½ by 2½-4½ mm, bipartite, margin undulate. Anterior stamens (4-) 5-6 mm long, c. 1-2 mm longer than the posterior ones and attached c. 1 mm lower; filaments usually without glandular hairs; anthers (¾-) 1 - 1¼ by c. ½ mm; pollen orange red. Disc c. ¼ mm broad. Style about as long as the corolla, glabrous. Nutlets 2-3 (-3¼) by (1-) 1¼-1½ (-2) mm.

Distribution, Habitat, Altitude, and Variability: See under the varieties.

15.a. Lamium purpureum L. var. ehrenbergii (Boiss. & Reuter ex Boiss.) Mennema, comb. nov. - Figs. 59 and 60.


Stem (<) 5 (-10) cm long. Blade cordate to (upper) rhomboid, faintly crenate, pubescent on both sides; cauline leaves c. ½ cm long, index 1.0-1.2; floral leaves c. 1 cm long, index 1.2-1.3. Verteicillasters crowded, with mostly cleistogamous
flowers. *Calyx* ½–¾ cm long, teeth 1½–2 × shorter than the tube. *Corolla* of normal flowers c. 1½ cm long, of cleistogamous flowers conspicuously shorter, internal ring of hairs observed. *Nutlets* 1½ (–2¾) by 1¼–1½ mm.

**Distribution.** Very rare in alpine region of SW. Turkey and Syria, less rare in mountains of Lebanon – Fig. 61.

**Habitat.** Rocky slopes, sometimes in grassland.

**Altitude.** From 1700 m up to 2300 m.

**Variability.** Var. *ehrenbergii* is very homogeneous. Infraspecific taxa lower than the rank of variety are unknown.

**Note.** This variety has a great similarity in appearance and habitat to *Lamium amplexicaule* var. *bornmuelleri*. The presence of bracts in the verticillasters of *Lamium purpureum* var. *ehrenbergii* and the length of the calyx tube in proportion to the teeth are the characters to separate both taxa.
15.b. Lamium purpureum L. var. hybridum (Villars) Villars – Figs. 59 and 62.


Stem 10–20 (-25) cm long. Blade cordate or (lower) reniform, deeply irregularly incised, pubescent to strigose on both sides; cauline leaves ½–1½ cm long, index (0.6–) 0.9–1 1 (-1 3). Floral leaves 1–1½ (-2) cm long, index (0.7–) 1 0 (-1 2). Verticillasters crowded. Calyx (½–) ¾ cm long, teeth mostly shorter than the tube. Corolla (½–) ¾–1¾ cm long, the tube usually not exserted from the calyx, internal ring of hairs usually present. Nutlets (2½–) 2½ by 1¼–1½ mm.

Distribution. France S. of the Seine, Switzerland, Portugal, Spain, Italy, Madeira, Morocco and Algeria; also Canary Islands (A. Hansen & Sunding, 1985) – Fig. 63.

Habitat. Cultivated land, roadsides, sea dunes, forest, also in the mountains.

Altitude. No data available.
Fig. 62. Type specimen of *Lamium purpureum* var. *hybridum*.
Variability. Var. hybridum is very homogeneous. Infraspecific taxa lower than the rank of variety are unknown.

15.c. Lamium purpureum L. var. incisum (Willd.) Pers. – Fig. 59.


*Lamium westphalicum* Weihe in Maly, 3. Beil. Flora 1822, 1 (1822) 105. – Type: Weihe s.n., Germany, Bünde, Minden, Steinlake, in a field with *Trifolium* (not found in LZ; probably destroyed in 1943).

Lamium incisum Willd. var. obscurum Dumort., Fl. Belg. (1827) 45, nomen nudum.


Lamium confusum Martrin-Donos, Fl. Tarn. (1864) 561, nomen illeg., homotypic synonym of Lamium decipiens (Sonder ex Koch) Martrin-Donos.


Lamium aestival L. Lojac., Fl. Sic. 2 (1907) 234. – Lectotype (mihi): Lojaono s.n., Italy, Lipari, San Elmo, pumice soil (holo. PAL).

Lamium hybridum auct. non Villars var. commune Rouy, Fl. Fr. 11 (1909) 295, nomen inval.


Stem (10-) 20-30 (55) cm long. Blade cordate to (upper) ovate or obovate, deeply irregularly incised, pubescent on both sides; cauline leaves (1/2-) 1-3 1/2 (-6) cm long, index (0.7-) 0.9-1.1 (-1.3); floral leaves (1-) 1 1/2-4 (-7 1/2) cm long, index (0.8-) 0.9-1.1 (-1.3). Verticillasters crowded. Calyx (1/2-) 3/4 (-1) cm long, teeth as long as or shorter than the tube. Corolla (1-) 1 1/2 (-2) cm long, the tube exerted from the calyx, internal ring of hairs present or absent. Nullets (2 1/2-) 2 3/4-3 (-3 1/2) by (1 1/4-) 1 1/2 (-2) mm.

Distribution. C. and S. Scandinavia, Great-Britain, Netherlands, Belgium, France (incl. Corse), N., W. and S. Germany, Switzerland, Austria, Poland, Portugal, Spain, N. Italy and Sardegna, Baltic and Central division U.S.S.R., scattered in Jugoslavia, Romania, Kriti (Greece), Turkey, Syria and Algeria; introduced (and naturalized?) in Iceland and Faeröer (Ostenf. & Grøntved, 1934), New Zealand (Sykes, 1978), Canada and U.S.A. (Britton & Brown, 1913), Tierra del Fuego (Chile and Argentina; David Moore, 1983) and Falkland Islands (David Moore, 1968) – Fig. 64.
Habitat. Cultivated land, in gardens, roadsides, waste ground, on walls, mountain rocks, in forest.

Altitude. From sea-level up to 2000 m (Algeria).

Variability. Var. incisum is rather variable in shape (urticifolium, westphalicum) and length of the leaves, and their incisions (decipiens, dissectum). The presence or
absence of the internal ring of hairs (exanulatum) in the tube of the corolla is of no taxonomic value, as this character can vary from the absolute absence of hairs via the presence of a couple of hairs to a complete ring of hairs. Very probably the forms, mentioned below by Neuman (1901) are purely based on a modification.


Stem 10–20 (–35) cm long. Blade reniform to cordate, the upper ones rhomboid, coarsely crenate to (upper) deeply, irregularly incised, pubescent on both sides; cauline leaves (½–) 1–1½ (–2) cm long, index (0.8–) 0.9–1.0 (–1.1); floral leaves (1–) 1½–2 (–3) cm long, index (0.7–) 0.8–0.9 (–1.3). *Verticillasters* remote, especially the lower ones. *Calyx* (½–) ¾ (–1) cm long, teeth mostly shorter than the tube. *Corolla* (1–) 1¼–1¾ (–2) cm long, the tube exserted from the calyx, internal ring of hairs usually present. Nutlets 2½–2¾ (–3) by 1¼–1½ mm.

Distribution. C. and S. Scandinavia, Great-Britain, Netherlands, Belgium, France, N. and W. Germany, Switzerland and the Baltic division of the U.S.S.R. – Fig. 66.

Habitat. Cultivated land in the lowlands, in gardens, roadsides, waste ground.

Altitude. No data available.

Variability. Var. *moluccellifolium* is a rather homogeneous taxon. Infraspecific taxa lower than the rank of variety are unknown.

Note. See also *Lamium confertum* (pag. 95) for the incorrect use of the name *Lamium moluccellifolium*

15.e. *Lamium purpureum* L. var. *purpureum* – Fig. 59.


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Fig. 65. Type specimen of *Lamium purpureum* var. *moluccellifolium*. 
Fig. 66. Distribution of Lamium purpureum var. moluccellisfolium.

Lamium purpureum L. var. niveum Schur, Enum. Pl. Transs. (1866) 534. — Type: Not seen. Contrary to the suggestion, Baumgarten did not publish the basionym.
**Lamium purpureum** L. var. typicum Béq. in Fiori & Paol., Fl. Anal. It. 3 (1903) 36, nomen inval.


**Lamium purpureum** L. var. genuinum Stoy. in Stoy. & Stephanow, Fl. Bulg. ed. 3 (1948) 959, nomen inval.

Stem (5-) 15–30 (–40) cm long. Blade cordate to (lower) reniform, the upper ones to ovate or obovate, faintly crenate, pubescent, especially on the upper side; cauline leaves (½-) 1½–2 (–5) cm long, index (0.8-) 1.0–1.1 (–1.5); floral leaves (1-) 1½–2 (–5) cm long, index (0.8-) 0.9–1.3 (–1.5). Verticillasters crowded. Calyx ½–¾ cm long, teeth usually as long as the tube. Corolla (1-) 1¼–1½ (–2) cm long, the tube mostly not exserted from the calyx, internal ring of hairs always present. Nutlets (2-) 2¼–2½ (–2¼) by (1-) 1¼–1½ mm.

**Distribution.** Most of Europe, but rare in the area N. of 60° N. lat. and in the south, absent from the Balearic Islands, Sicilia and Kriti (Greece); scattered in Turkey, Syria, Lebanon and N. Africa (Algeria) including the Açores, Madeira and the Canary Islands; introduced (and naturalized?) in Greenland (Böcher et al., 1968), Iceland and Faeröer (Ostenf. & Grøntved, 1934), Japan (Ohwi, 1953), New Zealand (Sykes, 1978), Canada and U.S.A. (Britton & Brown, 1913), Tierra del Fuego (Chile and Argentina; David Moore, 1983), and Falkland Islands (David Moore, 1968) - Fig. 67.

**Habitat.** In fields, gardens, roadsides, thickets, on waste ground, on walls, on rubbish heaps, on slopes, in open forest; on various soils.

**Altitude.** From sea-level up to 1600 m (Switzerland) and to 1800 m (Turkey).

**Variability.** Var. purpureum is a rather variable taxon. There is divergence in the indumentum (aznavourii), in the length (grandifolium) and the incisions of the leaves (integrum, pseudoincisum), in the length of the calyx teeth (longidens, micromonton) and in the length (majoriflorum, minoriflorum) and the colour of the corolla (albiflorum, niveum, roseum).

In *Lamium purpureum* s. str. there are according to Müntzing (1932) various biotypes with a totally different periodicity: one biotype is an obligatory winter annual, other biotypes are summer or probably facultative winter annuals. Infraspecific taxa lower than the rank of variety, not mentioned in the synonymy, are listed here in alphabetical order.

f. albiflora Gérard, Rev. Bot. 8 (1890) 185.


Lamiopsis purpurea (L.) Opiz var. albiflora Opiz, Seznam (1852) 56, nomen nudum.

III. Subgenus Orvala (L.) Briq.

Subgenus Orvala (L.) Briq. in Engler & Prantl, Nat. Pflanzenfam. 4, 3a (1897) 254. – Type: Lamium orvala L.
Section Orvala Dumort., Fl. Belg. (1827) 45.
Bracts not spreading or reflexed. Bracts and calyx teeth with a very short glabrous hary aristate apex. Anthers glabrous.

16. Lamium orvala L. – Figs. 68 and 69.


*Lamium pannonicum* Scopoli, Fl. Carniol. 1 ed. 2 (1771) 406. – *Type:* Scopoli, Fl. Carniol. 1 ed. 2 (1771) tab. 27.

*Orvala lamioides* DC., Fl. Fr. 3 ed. 3 (1805) 539, nomen illeg., homotypic synonym of *Orvala garganica* L.


*Lamium grandiflorum* Salisb., Prodr. (1796) 81, non Pourret 1788, nomen illeg.

Perennial. *Rhizome* cauliform, woody, short, knotted, without stolons. *Stem* erect, simple or branched, 30–60 cm long, 2½–4 (–6) mm Ø, glabrous to glabrate at the base, mostly sparsely appressed pubescent towards the apex. *Leaves:* *petiole* (1½–) 3½–9 (–11) cm long, mostly shorter than the blade, the upper leaves not sessile; *blade* cordate, the upper ones ovate to ovate-oblong, with an asymmetric or (upper) truncate base and an acuminate apex, coarsely and partly (double-) serrate or crenate, sparsely appressed-pubescent on both sides; *cauline leaves* (2½–) 3½–8½ (–16) cm long, index (1.0–) 1.2–1.3 (–1.4); *floral leaves* (3½–) 9–11 (–16) cm long, index (1.1–) 1.2–1.4 (–1.6). *Verticillasters* (2–) 3–5 (–8), remote, with (8–) 10–16 (–20) flowers. *Bracts* (3–) 5–7 (–8) mm long, ½–1 mm broad, hirsute, without glandular hairs. *Calyx* 10-nerved, (1¼–) 1½–2 (–2½) cm long, longer after anthesis, glabrate to sparsely appressed-pubescent; teeth ½–1 × as long as the tube, narrowly triangular, without glandular hairs, rather short (to ½ mm) aristate apex glabrous. *Corolla* crimson to reddish or brownish purple with purple markings, (3¼–) 3½–4 (–4½) cm long; tube abruptly dilated, 1¾–2 cm long, about as long as the calyx, outside pubescent, glabrous to subglabrous at the base, inside with a perpendicular ring of hairs dorsally at 3–4 mm from the base; upper lip arched, 16–20 by 11–12 mm, truncate apex lacerate, margin faintly undulate, outside sericeous, with long patent stiff hairs on the margin, inside velutinous; lower lip about as long as the upper lip and at an acute angle to the latter, outside sparsely appressed-pubescent to glabrous, inside glabrous, lateral lobes oblique-ovate, 9–10 by 4–5 mm, with several teeth to 2–2½ mm long, median lobe 7–8 by 11–12 mm, bilobed, margin lacerate. Anterior *stamens* 14–15 mm long, c. 3–4
Fig. 68. Herbarium specimen of *Lamium orvala*. 
mm longer than the posterior ones and attached c. 3–4 mm lower; filaments without glandular hairs; anthers 3–3½ by 1¼–1½ mm, glabrous; pollen yellowish. Disc c. 2 mm broad. Style about 5 mm shorter than the corolla, glabrous. Nutlets 4–4¾ (~5) by 1¾–2¼ mm.

Distribution. S. Austria (Kärnten), SW. Hungary, NE. Italy (and Monte Gargano), and N. Jugoslavia; introduced in Germany, Switzerland and Spain – Fig. 70.
Habitat. In coppices, thickets and forests (Fagetum), also in hedges and along rivulets, prefers calcareous soil.

Altitude. From 100 m up to 1800 m (Jugoslavia).

Variability. *Lamium orvala* is a very homogeneous species. There may be some doubt about the main discriminative character of var. *wettsteinii* (*Lamium wettsteinii*), viz. the length of the corolla. Although I could not investigate the type specimen, I investigated a rather large number of plants, named by the author of *Lamium wettsteinii*. Not one of these specimens has the length mentioned in the original description, viz. 20 mm; all specimens have corolla’s with the normal length for *Lamium orvala*, viz. 3½–4 cm.

The species is variable in the colour of the corolla (*albiflorum*, *lividum*, *pallens*) and in the incisions of the leaves (*fissidentatum*). Linneaus’ *Orvala garganica* (*Lamium michelianum*) is a monstrum with very deeply incised leaves and quadrifid corolla’s.

All infraspecific taxa I found in the literature are listed below in alphabetical order.

Note. It was not possible to investigate many ripe fruits, so perhaps the size range of the nutlets as given 4–4 ¾ (–5) mm, is too small. However, the dimension mentioned by Gams (1927), 2½ mm, must be erroneous.

II.5. HYBRIDS

Introduction

Contrary to some other genera of the Labiatae interspecific hybridization in Lamium occurs very rarely. After investigation of the recorded specimens many putative Lamium hybrids appear to belong to one of the taxa mentioned above: Hybrida excludendae. If material is not available it is difficult to reach a positive judgement: Hybrida dubiae.

With certainty only one hybrid can be mentioned, viz.

Lamium × holsaticum E. Krause


More or less intermediate between the parental species, rather variable. Leaves sometimes like those of Lamium album, sometimes more like those of Lamium maculatum. Verticillasters with 6–8 (–10) flowers. Corolla whitish purple. Pollen yellowish white to orange-like, partly abortive.

Distribution. Netherlands, France, Germany, Switzerland, Austria (Janchen, 1958), Poland, Czechoslovakia, Hungary (Gams, 1927), Romania (Grintescu, 1963) and Italy.

Notes. 1. The small number of flowers per verticillaster as well as the great percentage of abortive pollen are good characters to distinguish the hybrid from purple flowered Lamium album and white flowered Lamium maculatum.

2. It looks as if the hybrid particularly can be recorded in the border region of the areas of one of both parents species.
Hybrida excludendae


*Lamium × schroeteri* Gams in Hegi ex Grint. (*Lamium amplexicaule × purpureum*) Fl. Mitt.-Eur. 5, 4 (1927) 2457. Specimen not found in IB.

*Lamium × Schroeteri* Gams in Hegi (Lamium album × purpureum), Ill. Fl. Mitt.-Eur. 5, 4 (1927) 2457. Specimen not found in IB.


II.6 SPECIES ET VARIETATES DUBIAE

*Lamium catharifolium* Schott & Kotschy ex Tchich., Asie Min. 3, 2 (1866) 178, nomen nudum.

*Lamium iranicum* Parsa, Kew Bull. 1948 (1948) 222. – Type: *Stajf s.n.*, Iran, at the foot of the Kuh Bil, in thickets (holo. K).


*Lamium pelasagicum* Heldr. ex Charrel, Oesterr. Bot. Z. 42 (1892) 381, nomen nudum.

*Pollichia longicaulis* Krocker, Suppl. Fl. Sil. 4, 2 (1823) 150. – Type: unknown. Possibly synonym of *Lamium galeobdolon* (L.) L.

II.7. SPECIES EXCLUDENDAE


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Lamium ladanum (L.) Crantz, Stirp. Austr. 2,4 ed. 2 (1769) 260. Synonym of Galeopsis ladanum L.

Lamium moluccella (L) E. Krause, Sturms Fl. Deutschl. 11,2 ed. 2 (1903) 137. Synonym of Moluccella laevis L.


Lamium orientale (Fischer & C. Meyer) E. Krause, Sturms Fl. Deutschl. 11,2 ed. 2 (1903) 137. Synonym of Wiedemannia orientalis Fischer & C. Meyer.


Lamium sibiricum (L.) E. Jacob Cord., Fl. Ilé Réun. (1895) 488. Synonym of Leonurus sibiricus L.


Lamium tetrahit (L.) Crantz, Stirp. Austr. 2,4 ed. 2 (1769) 261. Synonym of Galeopsis tetrahit L.


III. LIST OF COLLECTIONS

For the selection of the cited collections, the spelling of the geographical names, and the abbreviations of the herbaria, see Chapter II.1.

1. Lamium flexuosum Ten.


2.a. Lamium galeobdolon (L.) L. subsp. flavidum (F. Herm.) A. Löve & D. Löve

FRANCE. ISÈRE: Uriage, Oursière cascade, 21.VII.1897, Peyron s.n. (G).


ČESCHOSLOVAKIA. Krkonose Mountains [Riesengebirge], Breitgrund, near Schatzlarn, forest border, c. 500 m, 12.VI.1879, Paz s.n. (BR, G, M, Z). Harta, Fuchshübel, light forest, 430 m, 30.V.1904, von Cyppers s.n. (G). Boubin, Sumava, Pinus-Fagus-forest, 3.VII.1971, Veldkamp 5437 (L). Spišská Magura [Magura Scepusi], VII.1890, Ulětitsch s.n. (G).


JUGOSLAVIA. 'Litorale', 1855, Areschoug s.n. (LD). Trzic, near Loibl pass, c. 1300 m, 8.VII.1965, Veldwerktempio 1965-5485 (LEPS). Between Lesce and Radovljica, c. 500 m, forest margin, V.1979,
2.b. Lamium galeobdolon (L.) L. subsp. galeobdolon


Albania. Vertsho, Fagus-forest, 1100 m, 9.VI.1914, Dörfler 300 (GB).

Greece. Mainland: Peristerie, Kazani ravin, bush, 1200 m, V.1918, Gross s.n. (M). Makhedonia, Pisodarion, damp shady gully in beech-forest, 1350 m, 3.VI.1932, Alston & Sandwith 636 (BM). Above Armosko, grassy slopes among forest, 1350 m, 2.VI.1932, Alston & Sandwith 105 (BM). Bozdag, 20 miles NW. of Drama, beneath hazel trees, 1050 m, 12.V.1959, Statinon 7383 (K).

Bulgaria. Backoba, in forest, 14.V.1899, Stribrny s.n. (P). S. of Varha, hills, 17.IV.1925, Gilliat-Smith 1058 (K). Near Bojana, in the vicinity of Sofia, in bush, VI.1890, Pichler s.n. (BR). Rila Mountain, Borovec, c. 60 km S. of Sofia, c. 1200 m, 14.VI.1973, Mennema 2159 (L). At foot of
Mount Vitosa, in bush, V.1890, Pichler s.n. (G, P). Rila Monastery, Rhodope mountains, in wood, 1080 m, 14.VI.1933, Meinertzshagen s.n. (BM). In the vicinity of Stara Zagora, s.d., Wiedemann s.n. (BR).

Turkey. ISTANBUL: Belgrad forest, 29.IV.1951, Berk s.n. (G). Istanbul, s.d., Olivier & Bruguère s.n. (P).

2.c. Lamium galeobdolon (L.) L. subsp. montanum (Pers.) Hayek

Norway. Oslo, Tarshov (escaped from cultivation? - M.), 1855, Moe s.n. (H).


3.a. Lamium amplexicaule L. var. aleppicum (Boiss. & Hausskn. ex Boiss.) Bornm.

Turkey. Maraş: Ahir Dag above Maraş, near Kandil, in limestone valley, 1100 m, 2.V.1857, Davis & Hedge 27481 (K). GAZIANTEP: Between Gaziantep and Nizip, 15 km from Gaziantep, disturbed steppe, marly soil, 850 m, 14.V.1957, Davis & Hedge 27888 (BM, K). Between Nizip and Birecik, marly vineyards, 450 m, 14.V.1957, Davis & Hedge 27920 (K). URF: Birecik, near Tschiflik, on cultivated ground, 5.IV.1888, Sintenis 209 (JE, K).


Iraq. Arbil, Kuh Safin, near Shaqlawa, 1600 m, 16.V.1893, Bornmueller 1711 (JE). Near Rayat, on gravelly hillside, 30-1800 m, 21.IV.1936, Low 221 (BM). Gweya Dagh, near Sulayama-niyah, Quercus-forest entirely destroyed, limestone, 1100 m, 1936, Gillett & Rawi 10614 (K).


3.b. Lamium amplexicaule L. var. amplexicaule

Icealand. Eyrabakki, 1924, Sambon s.n. (BM).

Norway. Åkershus, Blindern, field, 15.VIII.1936, Aalen s.n. (BM).


Finland. Kokkola, Yksiphilaja, near railway station, under new planted ornamental shrubs, VII.1961, Cygnel s.n. (H). Sauvo, Järvenkylä, W. of Marieke estate, on fallow field, 8.IX.1971,


LUXEMBOURG. Beaufort, along the road to Vogelsmühle, on wall 6.VII.1947, van Ooststroom 9052 (L).


Switzerland. Vaud: In the vicinity of Lausanne, in fields, cultivations and on walls, s.d., Anon. s.n. (L). Wallis: Tourbillon, near Sion, 27.III.1890, Petit s.n. (COI).


Romania. Iaşi, 10.V.1962, Toma s.n. (BM). Moldova, Cristeşti, waste place, c. 40 m, 10.IV.1938, Burdyja 2042a (L). Basarabia, Lapuşa, Italian hills near Chişinau, c. 90 m, 18.IV.1938, Arotat 2042c (L). Racaciuni, near Gheorge Doja, in field, c. 250 m, 16.V.1974, Mititelu et al. 531 (L). Tecuci, near Hanul-Conachi, in sandy grassy place, c. 19 m, 5.V.1939, Forstner 2042b (L).


South-western division: Dublyany, garden weed, VII., Raciborski 78 (L, P). Uman, in field, VII.1867, Golde s.n. (K). Kherson, Odessa, between Adrianowka and Gribowka near Ovidiopol, in garden, 8.V.1900, Kulikowsky 1181 (COI, G [as Kulikowsky 1188]). K. Krym: Yalta, Nikita, waste ground near sea, 5 m, 30.V.1959, Davis 33161 (K). Caucaso: Caucasus, III.1880, Raddle s.n. (K, P).


Malaga: Ronda, roadside, cultivated land, 8.IV.1924, Reese s.n. (BS). Valley Castada de Peria, Sierra de Yunquiera, in alpine region between gravel, 1650-1800 m, 27.IV.1845, Willkomm 831 (COI). Los Ventaquirios, Sierra Tejeda, 1800 m, 9.VI.1845, Willkomm s.n. (COI). Granada: Puerto de la Alazares, S. of Loja, arable field on limestone, 1000 m, 1.V.1951, Alston 10781 (BM).

Sierra Nevada, N.-side, c. 2000 m, 28.V.1936, Reese s.n. (BS).


MALTA. Ghammieri, 27.V.1957, Wheeler 211 (K).

JUGOSLAVIA. Near Vrem, in Reka valley, field, 360 m, Paulin 704 (BM). Split, 15.V.1942, Radermacher 570 (L). Near Mali, cultivated field, V.1898, de Halâcys s.n. (COI).

ALBANIA. Tirana, 19.IV.1925, Rogers s.n. (L).


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Taiwan. Tamsui, 1864, Oldham s.n. (BM, K).


 Açores. Sao Miguel, 1865, Godman s.n. (K).

Madeira. Porto Moniz, Funchal, V.1895, Anon. s.n. (BM).


506a (B). Djebel Senalba, near Djelfa, V.1854, Rebound s.n. (P). Bou Saada, 1860, Rebound s.n. (P).


Ethiopia. Ethiopia, 1853, Schimper 292 (K). Gaffiat, fields, 2460 m, 14.VIII.1863, Schimper 1153 (BM). Tigre, 17 km S. of Maichew, along the road to Dessye, 2600 m, 3.IX.1970, de Wilde et al. 6941 (WAG). Ankober, IX.1842, Rohn s.n. (K).

Zimbabwe. S. Rhodesia, introduced, s.d., Hislop s.n. (K).

Transvaal. Pretoria, at park in garden, 23.IX.1958, Repton 4889 (K).

South-Africa. Cape of Good Hope, Great and Little Brak river, 27.XI.1950, Robertson s.n. (K). Ibid., Grahamstown, cultivated places, 600 m, 25.IX.1976, Bayliss 7620 (WAG). Alice, Battlesden garden, weed, 600 m, 26.VIII.1942, Acocks 8985 (K).


Peru. 1 Km N. of Huancavelica, among limestone boulders, 3700 m, 9.III.1939, Stork & Horton 10819 (K).

Argentina. Bella Vista, Sarmiento, 1.IX.1946, Hunziker 1626 (K). Santa Cruz, Puerto San Julian, 11.XI.1927, Blake 36 (K).


Australia. Queensland: Main Range, between Spring Bluff and Murphy’s Creek, weed on railway track, sandy soil, 240-450 m, 2.VIII.1930, Hubbard 3492 (K). Burnett, Kingaroy,

3.c. Lamium amplexicaule L. var. bornmuelleri Mennema

TURKEY. HATAY: Amuk plain, between Nur Daglari and Kurt Dag, IV.1907, Haradjian 954 (G).
SYRIA. Jebel ash Sharqi, between Dimashq and Zebdani, 6.V.1933, Wall s.n. (S).
JORDAN. Between Bir ad Dabbaghat and Shaubak, roadside, 1500 m, 20.IV.1945, Davis 9132 (K).
IRAQ. Kurdistan, near Penjwin, Sulaymaniya, in bare mountain, 1600 m, 19/20.VI.1957, Rechinger 12272 (W).
IRAN. Near Shahrud, V.1858, de Bunge s.n. (P).

3.d. Lamium amplexicaule L. var. incisum Boiss.

IRAN. Tehran, 15.X.1936, Parsa s.n. (P).

3.e. Lamium amplexicaule L. var. orientale (Pacz.) Mennema


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4. Lamium eriocephalum Benth.


SYRIA/LEBANON. *Syria,* Tharsis-Bayrut-Lebanon, 1838, *Dux de Württemberg s.n.* (M).

5. Lamium macrodon Boiss. & Huet ex Boiss.


LEBANON. Batrun, near Baton, 3.VI.1880, Blanche 86 (G).


IRAN. Kurdistan, above Gilas, hills, near a snow drift, 29.V.1929, Cowan & Darlington 1350 (K). Ser, hills, 2100 m, 16.V.1929, Cowan & Darlington 2230 (K).

6.a. Lamium album L. subsp. album

NORWAY. Oslo, s.d., Blytt s.n. (L).

SWEDEN. Loka, Västmanland, VII.1877, Hamnström s.n. (COI). Årby, near Ramsta, c. 15 km SW. of Uppsala, waste area, 26.VII.1969, Mennema 259 (L). Alside, Uppland, ditch at the road between Kungshamn and the highway bridge at Flottsund, 8.IX.1957, Alm 3007 (COI, ZT). Tullstor, VI. 1866, johnson s.n. (H).


Romania. Brăturoasa, waste place, c. 500 m, 2.VIII.1972, Mititelu & Barabas 456 (L). Near Vîlče, Transylvania, c. 620 m, 30.VIII.1938, Paucu 2040 (L). Sinaia, Monti Carpatii, roadside, 1.VII.1911, Post s.n. (G).


Jugoslavia. Istra, Porec, VI.1866, Marchesetti s.n. (FI). Vetren Gora, near Klisura, upper reaches of rivulet Kameniditsa, swampy place, VII., Anón. 17 (PRC).

Albania. Pejës, near Okol, VI.1883, Schütt s.n. (G). Top of Zrokar, near Kuc, 4.IX.1902, Baldacci 209 (P).


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Findikpinarıköy and Akarea, along rivulet, shaded place, humus soil, 900 m, 20.V.1959, Hennipman et al. 1099 (L, WAG). C. 40 km S. of Pozanti, grey granite rock, crevices with blackish humus, 1100 m, 8.V.1959, Hennipman et al. 979 (K, L, WAG). BITLIS: 18 km SE. of Bitlis, Qor Dagı, 2500 m, 12.VI.1931, Frödin 262 (UPS, W). 10 km SE. of Pelli, 2550 m, Davis & Polunin 22540 (BM, K).

HAKKARI: Çilo Tepe, Rocky slope, 3150 m, 8.VIII.1954, Davis & Polunin 24083 (BM, K).

IRAQ. Penjwin, 1400 m, 23.IV.1947, Rawi 8838 (BM).


U.S.A. NEW YORK: Richfield Springs, adventitious, s.d., Gilbert s.n. (AHW).

6.b Lamium album L. subsp. barbatum (Siebold & Zucc.) Mennema


6.c. Lamium album L. subsp. crinitum (Montbr. & Auch. ex Benth.)

Mennema

nipman et al. 1622 (K, L, WAG). CORUH: Savval Tepesi, above Murgul, igneous, rocky gully, 2700 m, 12.VIII.1957, Davis & Hedge 32323 (K). Kordevan Dag, Yalnızçan Daglari, near Kütüf Yayla, banks in Picea-forest, 2000 m, 28.VI.1957, Davis & Hedge 30247 (K). KARS: Kararugan, grassy banks, 1900 m, 13.VI.1957, Davis & Hedge 29466 (K). SW.-side of Kisir Dagi, between Kars and Ardahan, among volcanic rocks, 2200 m, 16.VI.1957, Davis & Hedge 29628 (K). AGRI: Büyük Agri Dagi, c. 2700 m, 11.VIII.1910, van DJick Post s.n. (G). BtuLIS: Tatvan to Kucukcü, deciduous oak scrub, 1750 m, 19.V.1966, Davis 44310 (K). SIRT: Sasun Daglari, Halkis Dag Massif, slopes above Sason, 1600-1850 m, 21.V.1966, Albury et al. 1222 (K). HAKKARI: Kara Dag, above Gölemerik, 2700 m, 13.VIII.1954, Davis & Polunin 24318 (BM, K). Cilo Dag, below Cilo Yayla, 2700 m, 10.VIII.1954, Davis & Polunin 24230 (BM, K). Samdi Dag, dry unstable soil, 2700 m, VII.1965, Rix 59 (K).


**AFGHANISTAN.** Nuristan, between Nishei and Ningalam, 14.VIII.1951, Neubauer 791 (W). At Ashpi Pass, 17.VII.1951, Neubauer 1051 (W).

**PAKISTAN.** Chitral, Drosh, dry streambed, 3150 m, 11.VII.1958, Bowes Lyon 184 (BM). Chitral, Ziarat, 2200 m, VI/VII.1908, Toppin 435 (K). Ibid., amongst shrubs, 2400 m, 2.VI.1958, Stainion 2562 (BM). Chitral, Bromaluus, 3300 m, VI.1909, Toppin 835 (K). Swat, Utro, near Kalam, siliceous soil, 2200 m, 6.VI.1965, Rechinger 30805 (W). Ibid., Ushu, granitic soil, 2000-2200 m, 5.VI.1965, Rechinger 30776 (W). Nathia gali, grassy hill, 2700 m, 17.V.1959, Jafri & Ali 3202A (K).


7. Lamium galactophyllum Boiss. & Reuter ex Boiss.


8. Lamium maculatum (L.) L.


France. 62 Collections in all. 


Cher: Aubigny, in hedge, 100-200 m, VII-VIII., Fuglar s.n. (ZT). Doubs: Morre, near Besançon, VII.1856, Badoux 433 bis (G, P, WAG). 


**GERMANY.** 44 Collections in all. 


**SWITZERLAND.** 28 Collections in all. 


**AUSTRIA.** 33 Collections in all. 


HUNGARY. ? Tematin, in Neutzen Comit, 1.V.1872, Holuby 6716 (P).


ALBANIA: Malecija, gully of Rapsa, sources, c. 750 m, 13.V.1914, Dörfler 106 (W). Peshkopi, serpentine, 1290 m, V.1918, Bourcart s.n. (P). Mal’i Thatë, serpentine region, V., Bourcart s.n. (P).

GREECE. 12 Collections in all. MAINLAND: Kozani, Pieria Mountain, above Kataphyigion, near mountain rivulet, siliceous soil, 1600-1900 m, 9/12.V.1956, Rechinger 17892 (W). Kotos Mountains, 15 km SE. of Thessaloniki, VIII.1918, Ramsbottom s.n. (BM). Leila Mountain, near Nomos Serron, siliceous soil, 1500 m, 12.VII.1936, Rechinger & Rechinger 10874 (W). Boz Dag, 15 km N. of Drama, edge of wheat field, 300 m, Stinton 7321 (K). Between Xanthi and Shahin, along highway among brushwood of rocky places, 60 m, 17.IV.1930, Tedd 204 (K). Kalithea Mountain, Boukate Dagh, 10 km N. of Esimi, Nomos Evros, Quercus-forest, 800-900 m, 5/28.VI.1965, Bauer & Spitsbergen 1826 (W). Malevos Mountains, near Alyos Petros, in shadow, 900 m, 26.IV/8.V.1857, Fl. Græc. Ess. 543 (COI, P). Thasos: in orchard, s.d., Grisebach s.n. (GOET).

BULGARIA: Stara Plowna, near Petrokhanski Prokhd, among rocks, calcareous soil, VII.1887, Velensowsky s.n. (PRC). Eminska Plana, c. 5 km W. of Banya, c. 400 m, 11.VI.1973, Mennema 2035 (L). Golo Burdo, near Slajev, in orchard, calcareous soil, 2.XI.1968, Vihdevsky s.n. (PR). Between Sofia and Samakov, c. 20 km S. of Sofia, along road, c. 600 m, 14.VI.1973, Mennema 21991 (L). Between Samokov and Rila Monastery, in wood, 2.IX.1912, van der Post s.n. (G). Beglika, Rhodope Mountain, c. 25 km SE. of Velingrad, c. 1500 m, 13.VI.1973, Mennema 2157 (L). Backovo Monastery, c. 10 km S. of阿森ovgrad, 800-100 m, 12.VI.1973, Mennema 2108 (L). Near Belovo, 1871, Dingler s.n. (JE).

TURKEY. 36 Collections in all. İSTANBUL: Büyükderde, earthy slopes, 100 m, 17.III.1956, Davis & Polunin 25115b (E, K). KASTAMONU: Ilkaz Dag, in open pasture, 1830 m, 6.VI.1954, Davis 21584
sand-m., stream at Ghazir, Kizilcadag, 1957, m., and in 26585 (K).
L, Pentadaktylos, Haradjian Rogers Dag, on ledge m., rocky castle, Ikizdere, near Merton 1370 (G, clefts places, (JE, 1957, (G, pass, 1093 (K).
subsp. P).
km 17.V.1960, Near and 1894, Korkuteli near m, Sinlenis m, V. M, (G, in Halab, cliffs Ayn Haruniye, m, in (G, (K).
Buyiik V.1880, Farayya, Haradjian Faytroun, limestone Ibid., (LD).
23.Ill. Senky, roadside, mixed 7.VI. and Synge ridge, 2064 shady in Syngrassides 1341 (K).
Lefka, grassland, rocky cliffs, 1821 (G, 2.IX. VI.
ANTALYA: Antioch, in Dinsmore (MPU). Esiroglu, Dag, BM).
shaded 5417 near boulders, Hedge moist near (G).
s.n.
50 limestone Collections in 1959, Ahir all.
Km VI. (S, shady in Sintenis fields, the Iskenderun, Antakya 150-300 al <Pat clearings m, cultivated 1006 1000 Banks, hedges 4.VI. m, 1941, and 5 above mixed TRABZON:
Antakya, W).
shady bis & in ANKARA: 1945, limestone 12 1900 3640 cultivated 30.X. (E, (K).
P). of & 125 c.
IGEL:
13.VIII. Davis N.-side 11.V.1882, (K).
JE, land, (G, loamy 1100- SSW. Casey (P).
banks, 8.
23.III. in 4117 Daglari, (K).
s.n.
Waste Korkuteli, 3708 orchard, Peyron (K).
s.n.
(BM).
Banyas, 1350 Belen, m, 1938, (K).
Bird Kasrawan, planta-
church, of & 125 c.
Kolossi Picea-Fagus-
Km Nu?ayriyah, Km in Sintenis fields, the Iskenderun, Antakya 150-300 al
of humid Hilarion, m, rocky thickets, 1821 (G, 2.IX. VI.
Polyergus, hedge bank, 1006 1000 Banks, hedges 4.VI. m, 1941, and 5 above mixed TRABZON:
Antakya, W).
shady bis & in ANKARA: 1945, limestone 12 1900 3640 cultivated 30.X. (E, (K).
P). of & 125 c.
IGEL:
13.VIII. Davis N.-side 11.V.1882, (K).
JE, land, (G, loamy 1100- SSW. Casey (P).
banks, 8.
23.III. in 4117 Daglari, (K).
s.n.
Waste Korkuteli, 3708 orchard, Peyron (K).
s.n.
(BM).
Banyas, 1350 Belen, m, 1938, (K).
Bird Kasrawan, planta-
church, of & 125 c.
Kolossi Picea-Fagus-
Km Nu?ayriyah, Km in Sintenis fields, the Iskenderun, Antakya 150-300 al
of humid Hilarion, m, rocky thickets, 1821 (G, 2.IX. VI.
Polyergus, hedge bank, 1006 1000 Banks, hedges 4.VI. m, 1941, and 5 above mixed TRABZON:
Antakya, W).
shady bis & in ANKARA: 1945, limestone 12 1900 3640 cultivated 30.X. (E, (K).
P). of & 125 c.
IGEL:
13.VIII. Davis N.-side 11.V.1882, (K).
JE, land, (G, loamy 1100- SSW. Casey (P).
banks, 8.
23.III. in 4117 Daglari, (K).
s.n.
Waste Korkuteli, 3708 orchard, Peyron (K).
s.n.
(BM).
Banyas, 1350 Belen, m, 1938, (K).
Bird Kasrawan, planta-
church, of & 125 c.
Kolossi Picea-Fagus-
Km Nu?ayriyah, Km in Sintenis fields, the Iskenderun, Antakya 150-300 al
of humid Hilarion, m, rocky thicket...
SYRIA: Bernit, IV.1846, Post s.n. (BM). Jabal an Nuṣay-riyāh, Bahamra, 15 miles E. of Al Ladhitiqiyah, c. 300 m, IV.1909, Haradjian 2043 (K). Baniyas, 210-300 m, III.1943, Norris s.n. (BM).


9.b. Lamium moschatum Miller subsp. moschatum

BULGARIA. Dobrostan, in thicket, IV.1908, Stirbnyi s.n. (GB).


17.IV.1974, van Ooststroom 25220 (L). MUGLA: Marmaris, between Cunali and Cnidus, fallow fields, under tree, 50-100 m, 17.IV.1965, Davis 41262 (K). Bozburun harbour, limestone sea cliffs, 50-100 m, 8.VI.1962, Davis 35474 (E).

10. Lamium tomentosum Willd.


IRAQ. NE. of Qandil, on mountainside, 2800-3100 m, 26.VIII.1957, Rawi & Serhang 24412 (K). Qandil Mountain, E. of Qala Diza, 1800-3000 m, 11.VII.1951, Theisinger 1166 (W). Top of Qandil Mountain, 3000 m, 29.VIII.1957, Rawi & Serhang 24594 (K). Algird Dagh, among rocks, 3600 m, 22.VII.1932, Guest 2885 (K). Ibid., stady alpine rocks, 3500 m, Gillet 12342 (K). Ser Kurawa, crannies in metamorphic rocks, 3000 m, Gillet 9733 (K).

11. Lamium bifidum Cirillo


ALBANIA. Between Mikra Karaburun and Kapipilar, 24.IV.1918, Rambottom s.n. (BM).


BULGARIA. Yulin Mountain, near Kujajevo, 26.VI.1929, Stojanoff s.n. (K). Zemen, on dry, calcareous hill, in thicket, 700-1000 m, 15.IV.1934, Achtaroff s.n. (PR).

12. Lamium confertum Fries

FAERÖER. Sandø, cultivated ground, 3.VIII.1937, Vetev & Evans 135 (BM). Syderø, Kvalbø, VIII.1867, Feilberg & Rostrup s.n. (GB).


Loimaa, Fappinen, inner court, 4.VII.1973, Suominen 2675 (H). Mellilä, 0.5 km W. of station, garden, 4.VII.1973, Suominen 2669 (H). Ypäjä, along ditch near beet-field, 2.VIII.1962, Kantele s.n. (H).


ITALY. SICILIA: Sicilia, 1888, Johnson s.n. (GB).

13.a. Lamium garganicum L. subsp. corsicum (Gren. & Godron) Mennema

FRANCE. CORSE: Monte Cinto, summit, above 2000 m, 1843, Bernard s.n. (P). Ibid., rocks, VIII.1901, Soulié s.n. (G). Ibid., shepherd's cot Pulella, 10.VII.1910, Jacquet s.n. (Z). Ibid., near shepherd's cot, VI.1911, Burdon s.n. (BM). Col de Bocca Buona, between Corscia and Asco, 1400 m, 28.VIII.1908, Rotges s.n. (G). Monte San Pietro, summit, 1833, Sidard s.n. (P). Bastelica, Monte Renoso, shepherd's cot Pasture, 1160-1200 m, Simon 7271 (BAS).


13.b. Lamium garganicum L. subsp. garganicum


SWITZERLAND. Neuchâtel, among stones in lake, accidentally, 10.VI.1885 Jäggi s.n. (ZT). Ibid., among rocks under the former Botanical Garden, probably escaped, V.1886, Sire s.n. (ZT).


SPAIN: San Juan de la Pena, IV.1908, Payo s.n. (GB).


ALBANIA. Mal i dep, meadows, 1800 m, 22.VI.1930, Gjuseppi 27 (K). Lumës ravine, near Podbreg, rocks, 22.V.1918, Dörfler 530 (GB, WU). Smollik ravine, near Xhyrë, boulders, c. 500 m, 29.V.1918, Dörfler 595 (GB, W). Këllëry between Prëntet and Tepelenë, Vijosëve valley, rocks, 23.V.1932, Mueller s.n. (Z). Gjinokastër, limestone cliff, 300 m, 7.VI.1933, Aston & Sandwith 1441 (K).


CYPRUS. Korns mountain, N.-slope, limestone rock in forest, 600 m, 9.III.1951, Merton 219 (K). Kyparissouvo, N.-side, in cleft of limestone rocks, slight shade, 990 m, 1.IV.1962, Mickle
2427 (K). Moutoullas, on wet field border on dry stone terrace, 900 m, 23.IV.1937, Syngnathidae 1551 (K). Pedioulas, hedges, stones, banks, 28.III.1932, Syngnathidae 51 (K). Ibid., on damp walls, 960 m, 29.V.1955, Morton 2363 (K).

SYRIA. Above Jayyid, shady banks and rocky places, 900-1200 m, 14.III.1943, Davis 5401 (K).


13.c.1. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek var. armenum (Boiss.) Mennema


U.S.S.R. CAUCASUS: S. part of Khulo, Yalil Cirikhi, alpine rocks, 28.VII.1951, Anon. s.n. (LE).

13.c.2. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek var. microphyllum (Boiss.) Mennema

GREECE. MAINLAND: Timfristos Oros, above Karpenision, between shingles, c. 2300 m, 16.VII.1938, Grebenechikofo s.n. (K). Parnassos, above Dhipotamo, alpine region, 6.VIII.1852, de Heldreich 2753 (FI, G, W). Ibid., shady rocks, 1800 m, 2.VIII.1938 Davis 320 (K). Lakonias,


Lebanon. Jabal al Makmal, Dahr-el-Kodib, stony soil, c. 2600-2800 m, 27.VI.1931, Zarny s.n. (W).

13.c.3. Lamium garganicum L. subsp. striatum (Sibth. & Smith) Hayek var. striatum


Iugoslavia. Above Fusa Rudnices, mobile scree, c. 1900 m, 16.VII.1914, Dörfler 458 (B, G, GB, Z). Majam, summit, alpine stones, at the snow, 11.VIII.1892, Baldacci 309 (FI). Korab, Mavrovi Anovi, c. 2400 m, 21.VII.1934, Behr s.n. (W). Galicia, above Oteosevo, open limestone ridge, in crevices of rocks, c. 1900 m, 8.VII.1979, Touw 21405 (L). Ibid., c. 5 km of the pass height of the highway Trpezica-Oteosevo, forest edge, 23.VI.1980, Erben s.n. (M).

Albania. Above Abat, scree, c. 1800 m, 7.VIII.1918, Dörfler 380 (GB). Above Tiranië, slope down Dajti range, 600 m, 28.V.1934, Pennington 123 (K). Nëmërçkë Mountains, Draçovë, near Përmet, alpine mobile scree, 22.VII.1894, Baldacci 101 (FI, P, TO).


SYRIA. Tall Hüsavern, Harmal, among rocks, 1140 m, 24.IV.1943, Davis 5801 (K). Falita, 'Jalarah House', 1950-2250 m, 22.VI.1943, Davis 6631a (K). Above Bludan, at foot of rocks, shady, 1800 m, 6.VI.1855, Kotschy 55 (G, P, UPS). Ibid., Ayn Ansur, among rocks, 1950 m, 6.VI.1943, Davis 6166a (K).


ISRAEL. Naherzet, 1858, Roth 313 (M). Between Nablus and Bethel, 31.V.1881, Letourneux s.n. (FI).

IRAQ. 30 Collections in all. N. of Rust, limestone, 2400-3000 m, 19.V.1951, Thesiger 949 (BM). Karokh Mountain, E.-side, between Sir Waka and Dangala, slope of stony mountain, 1600-2000 m, 11.VI.1951, Kass & Nuri 27610 (K). Sakhi Sakran Mountain, near Rawandiz, alpine region,


14. Lamium glaberrimum (K. Koch) Taliev
U.S.S.R. KRYM: Kozmo-Demian Monastery, on rubble slope, 6.VI.1900, Bogosharov s.n. (B). [The Russian handwritten label makes it impossible to give more information].

15.a. Lamium purpureum L. var. ehrenbergii (Boiss. & Reuter ex Boiss.) Mennema
SYRIA. Ainette, 1660 m, 1858, Anon. s.n. (W). Near Halab, in field, calcareous soil, 15.III.1865, Haussknecht 244 p.p. (JE). Makmal Mountains, near the snow, VII.1822, Ehrenberg 326 (G). Heights of Bludan, 23.IV.1878, Post s.n. (K). Jabal ash Shaykh, 8 or 9 km NE. of summit, to the ridge, 2150 m, 15.V.1927, Berton 370 (P).

15.b. Lamium purpureum L. var. hybridum (Villars) Villars

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ITALY. Abruzzi: Monte dei Fiori, s.d., Orsini s.n. (TO). Puglia: Barletta, Brunì, 1869, de Candolle s.n. (G).

MADEIRA. Santo da Serra, cultivated ground near the church, 5.IV.1973, Hansen 500 (C).

MOROCCO. Tanger, dunes, III.1883, Kersten 79 (JE). In the vicinity of Rabat, III.1970, Andreas & Schotsman s.n. (WAG).


15.c. Lamium purpureum L. var. incisum (Wild.) Pers.

ICELAND. Bessastadir, 30.VIII.1947, Whitaker s.n. (BM).


SWITZERLAND. Near Valdivière, cultivated ground, 8.IV., Anon. s.n. (M). VAUD: In the vicinity of Michède, near Payerne, cultivated ground, s.d., Chavins s.n. (L). In the vicinity of Bex, in field, s.d., Anon. 66 (H, M). Bains de Lavey, IV., Anon. s.n. (M). GENEVE: Banks of the river Arve, VI.1860, Berton s.n. (H). Compesières, garden, II.1854, Chavins 1743 (BM, P, WAG).

AUSTRIA. Tirol: Near Kitzbühel, c. 1850, Traunsteiner 1478 (WAG).


JUGOSLAVIA. Serbia, Zeleniska Stena, on rocks, V.1868, Pancic s.n. (GOET).

ROMANIA. Baile Herculane, summit of Suscubii, limestone rocks, 1300 m, 24.V.I.1905, Lindberg s.n. (H).


TURKEY. BILECIK: Boz Dag, s.d., Bernström 82 (K). IÇEL: Anamour, IV.1872, Pérouin s.n. (K).

SYRIA. [][and in orchard, III.1867, Hausknecht s.n. (K p.p., P).

ALGERIA. Ain Caya, 1899, Battandier s.n. (P). Saida, cultivated ground, 12.II.1872, Warvey s.n. (K). Djebel el Asa, glade in Quercus-forest, c. 2000 m, 19.V.1901, Hochreutiner 383 (P). In the vicinity of Anfa, St. Eugène, Dimanechis, Banks, 15.II.1853, Isere Sôcis c.p.p. (F). Bône, road of Ste Anne to the orphanage of Ste Monique, 6.III.1890, Luizet s.n. (P).

FALKLAND ISLANDS. East Falkland, Stanley garden, s.d., Sladen 119/1 (BM).
15.d. Lamium purpureum L. var. moluccellifolium Schum.

**Sweden.** Närke, Hjersta, VI.1900, Bägenholm s.n. (BM). Östergotland, Skänninge, s.d., Goey s.n. (UPS). Kallestäck, V.1905, Palmér s.n. (UPS).


**Belgium.** OOST-VLAANDEREN: Munte, V.1881, Schammel s.n. (AWH).


**Switzerland.** Genève: Jardins de Plainpalais, VI.1876, Sandoz 34 (L).


15.e. Lamium purpureum L. var. purpureum

**Iceland.** Vestmannaeyjar, Kaupstadur, Heimaey, British Vice Consuls’ potato patch, 15 m, 2 IX.1950, Crosby-Browne s.n. (BM).

**Norway.** Nordland, Vesterålen, Hadseløy, Onstad, cultivated field, 14.VIII.1966, Smith 4775 (BM).


Romania. Lapusna, near Cojusna, in field, c. 50 m, 3.V.1937, Arat 2043 (L). Tirlddeni Mari, 1840, Gay s.n. (K). Sibiu, shady, IV.1849, Schur 3204 (P). Yrecosthi, uncultivated field, c. 130 m, 25.IV.1971, Sava 266 (L).


Spain. Gerona: Notre Sierra de la Salud, field, 1000 m, 16.IX.1920, Sennen s.n. (MPU).


Jugoslavija. Novo Mesto, in field, 200 m, IV., Zupanecis 705 (BM). Bosna, 1848, de Candolle s.n. (G). Near Rudare, 1891, Ilic s.n. (W).

16. Lamium orvala L.


**Syria.** Ḥalab, in orchard, III.1867, Hausskneth s.n. (BM, K, P). El Ashara, s.d., Bernström 84 (K). Damascus, waste land, 600 m, II.1945, Norris s.n. (BM).

**Lebanon.** Tripoli, bank of a ditch, 1.V.1894, Blanche 1377 (P).

**Madeira.** Porto Moniz, mountain, V.1892, Anon., s.n. (BM).

**Canary Islands.** Mount Church, roadside, 10.VI.1831, Lowe s.n. (BM).

**Algeria.** In the vicinity of Algiers, Djebel Mouzaia, forest, 19.V.1859, Durando s.n. (MPU).

**Japan.** Miyagi, Sendai-shi, Kawauchi, in wet and slightly sunny place, 10.V.1971, Ohba 71502 (WAG). Tokyo, Setagaya, Soshigaya, on the margin of a field, 22.IV.1970, Tateishi 704001 (BM, K, WAG).

**New Zealand.** Auckland, Remuera, garden weed, 2.VII.1972, Goddington 323 (K).

**Canada.** Cape Breton Island, North Sydney, on ballast heaps, 11.VII.1883, Macoun 1796 (BM). Newfoundland, old garden site near Mauve Bay, 12.VIII.1915, Fernald et al. 28958 (K). Avalon Peninsula, shores of Conception Bay, dry roadsides, carbonear, 6/7.VIII.1911, Fernald & Wingand 6118 (K).


**Falklands Islands.** East Falkland, Teal inlet, garden weed, 13.V.1949, Sladen 117/3 (BM).

HUNGARY. 'Schaffer', s.d., *Aeppli s.n. (Z).* Near Lendawa, s.d., Bartling s.n. (LD). Keszthely Mountain, in humid shidy forest, VII.1853, Schur s.n. (P).

SPAIN. Gallocia, Castello de Neçıeda, in mountain coppice, VI.1917, Pajol s.n. (L, Z).


s.d., Boller s.n. (M). Velebit Planina, Karlobag, VII.1907, Sagorski s.n. (L). Between Mali Radic and Bihac, 5.V.1897, Fiala s.n. (G, JE).

Hybrid Lamium × holsaticum


Germany. Thüringen: Dornburg, near Jena, s.d., Anon. s.n. (L).


Poland. Szczecin [Stettin], V.1910, Paul s.n. (L).


Italy. Lombardia: Bergamasker Alpen, Val Membrana, Valle Mezeno, c. 1590 m, with parents, 27.VI.1964, Hess & Landolt s.n. (ZT).
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SUMMARY

The present study deals with the systematics and taxonomy of the genus Lamium (Lamiaceae). The taxonomic revision is mainly based on the study of herbarium collections, and to a smaller degree on field observations and abstracts from literature. The research was done at the Rijksherbarium, Leyden, while many other Herbaria were shortly visited.

As the genus Lamium was never before monographed, a short survey is given of the taxonomic history of Lamium, which goes back as far as Linnaeus (1753). In this short survey of the taxonomic history of the genus Lamium the general history of taxonomy and its changing emphasis on different geographical regions can be recognized.

It is difficult to give a definition of Lamium in which it stands out from related genera by means of one or preferably two characters. As with so many genera, Lamium can only be defined polythetically: no single character suffices. An important character is the chromosome number: the base number $x = 9$ is rather uncommon in other genera of the Stachyioideae to which Lamium belongs.

As morphological outline of the genus Lamium can be given: annual or perennial herbs, usually not higher than about $\frac{1}{2}$ m, with cordate or reniform, shallow incised leaves; flowers in verticillasters in the axils of the uppermost (= floral) leaves; calyx campanulate with an oblique mouth and with subequal teeth; corolla 2-lipped, the tube straight or sigmoid, the lower lip usually with two rounded lateral lobes, each with one or two teeth; nutlets obovoid with a truncate apex and in cross-section trigonous with one convex and two flat sides.

The genus is divided into 3 subgenera; one subgenus (Lamium) is divided into 3 sections, of which one section (Amplexicaule) is new. A number of 162 names of Lamium species and a more or less equal number of names of infraspecific taxa were known. In this revision 16 Lamium species, 11 subspecies, and 13 varieties are accepted, and also one hybrid. 9 New combinations are made. Type specimens are recorded for all taxa and an identification key to all taxa is given.

In all c. 10,000 collections were examined. The most important quantitative characters were measured in 2700 collections, representing specimens from the entire distribution area of individual taxa. To show the variability of these quantitative characters diagrams are added, as diagrams give more information than minimum, average and maximum values. The percentage of ripe fruits appears to vary strongly in herbarium specimens of Lamium: all species with a percentage of ripe fruits higher than 55% are annuals, and all species with a percentage of ripe fruits lower than 20% are perennials. Random studies in other genera led
to the same result: the ripening of fruits of annual species takes place in a shorter period than the ripening of fruits of perennial species.

Distribution maps of all *Lamium* taxa are given. The distribution of the genus *Lamium* may be characterized as temperate Eurasiatic (holarctic), but the centre of diversity is obviously found in the Irano-Turanian and the Mediterranean regions.

The habitats of the taxa of the genus *Lamium* roughly can be listed under two categories: forests on the one hand and rocky mountain slopes/cultivated fields on the other.

The differences in habitats and also in distribution areas were the starting point for an intuitive phylogenetic reconstruction of the genus *Lamium*, in which *Lamium galeobdolon* is included, in spite of a number of deviating morphological and chemical characters.