

## Comparative botanical studies on some lamiaceous plants in Egypt.

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### Abstract

This study is conducted on 8 genera belonging to Lamiaceae. The samples are collected from different areas in Egypt. The study is done on the morphological characters of roots, stems, leaves or leaflets, flowers, inflorescences and fruits. Also the anatomical characters of roots, stems and leaves are studied. The results are recorded in the form of comparison among the examined plants. Most of the examined plants are herbs as in *Moluccella laevis* but *Vitex agnus-castus* is shrub and *Tectonia grandis* is tree. The aerial stems are present in all examined plants, while the rhizomatous subterranean stems are present in *Mentha piperata*. The anatomical study shows that the outline shape of cross section is 4- angular in all stems of the examined plants except *Teucrium polium* is rounded.

**Key words:** Morphology - Anatomy – Lamiaceae - *Salvia* - *Mentha*.

### Introduction

Lamiaceae contains around 250 genera and 7000 species (Chakeret al 2011). Members of this family are used as medicinal, ornamental and aromatic plants. Lamiaceae are perennial or annual herbs, shrubs and rarely trees Migahid and Hammouda (1974) and Watson and Dallwitz (1992). Lamiaceae have taproots and fibrous adventitious roots Kotb (1985) and Baran and Ozdemir (2006). The stems are erect or rhizomes, branched, quadrangular, hairy and woody or herbaceous Kotb (1985) and Boulos (2002). The leaves are simple, hairy to glabrous, petiolate or sessile, decussate, exstipulate, ovate, lanceolate, obovate and oblong, lamina margins entire, crenate and serrate, the venation is reticulate Tackholm (1974), Hickey and King (1981) and Celepet al (2011). Flowers of Lamiaceae are aggregated in inflorescences usually in verticils or in spikes or in panicles; terminal or axillary. The bracteoles are present or absent Watson and Dallwitz (1992). The calyx of Lamiaceae is 5 sepals, united into a campanulate or funnel form tube, sometimes 2- lipped, persistent in fruit Hickey and King (1981) and Waly and EL-gayed (2012). The corolla is bilabiate with 2- lips or limb regular of 4- almost equal lobes or bilabiate with only lower lip developed Tackholm (1974). The stamens of Lamiaceae are usually 4 or 2, equal or unequal Watson and Dallwitz (1992). The gynoecium is usually consists of two united carpels, terminal or gynobasic style and a more or less deeply bifid stigma, equal or unequal. EL-Gazzar and Watson (1970) and Wendy (1994). The fruit is usually a group of 4 nutlets, sometimes a drupe Hickey and King (1981). The cortex of the root is parenchymatous or parenchymatous and

sclerenchmatous cells Akcin et al (2006) and Baran et al (2008). Stems in many genera are quadrangular in transverse section with groups of collenchyma in the 4 angles, collenchyma absent from the cortex in species and the vascular bundles are bigger in corner Metcalfe and Chalk (1950) and Akcin et al (2006). Ozdemir and Senel (1998) and Satil and Kaya (2007) discussed the anatomical features of the leaf of Lamiaceae.

**Taxonomically,** Cronquist (1981) mentioned that *Tectonia grandis* L. And *Vitex agnus-castus* Linn. were belonged to the Verbanaceae but Chase et al (2003) recorded that *Tectonia grandis* L. And *Vitex agnus-castus* Linn. were belonging to the Lamiaceae according to morphological and chemical features.

The present investigation discusses the similarity of 8 genera belonging to Lamiaceae according to the morphological and anatomical characters of roots, stems and leaves or leaflets.

### Materials and Methods

The samples are contained eight species belonging to eight genera of Lamiaceae collected from various regions in Egypt. The identification of the collected plants was achieved by comparing their morphological characters with the characters of previously identified plants as published by Bailey (1951), Tackholm (1974), and Boulos (2002). Specimens from tested plants were fixed in (F.A.A) for a minimum period of 48 hours. Specimens were prepared according to Sass (1958). All photomicrographs were prepared by Pentacon Camera on Olympus microscope B H 2 and Stereomicroscope Carl Zeiss Jena (Citoval 2).

**Table 1.** Alphabetical list of (8) genera belonging to Lamiaceae together with their sources.  
S = Santekatreen, N= Nasr city, N.C = North coastal and D = El Doki

NO.	Species	Sources	NO.	Species	Sources
1-	<i>Coleus blumei</i> Benth.	N	5-	<i>Salvia farinacea</i> Benth.	N
2-	<i>Lavandulapubesans</i> Decne.	S	6-	<i>Tectoniagrandis</i> L.	D
3-	<i>Menthapiprata</i> L.	S	7-	<i>Teucriumpolium</i> L.	N.C
4-	<i>Moluccellalaevis</i> L.	N	8-	<i>Vitexagnus-castus</i> Linn.	D

### Abbreviations

Aerenchyma..... Ae.	Prismatic crystals.....Cr.
Amorphous inclusions ..... Am.	Sclerenchyma tissue.....S.
Cortex..... Co.	Sclerenchyma sheath..... Sh.
Epidermis.....E.	Secretory cavities..... Sk.
Fiber sheth.....Fs.	Secretory cells.....Sc.
Periderm..... Pe.	Spongy tissue.....St.
Lower epidermis..... Le.	Tyloses..... T.
Palisade tissue..... Pt.	Upper epidermis.....Ue.
Pericycle..... P.	Vascular bundle..... Vb.
Pith..... Ph.	Xylem..... X.

## Results and Discussion

### 1-Morphological characters

**Habit:** The examined plants of Lamiaceae are perennial herbs as in *Menthapiprata* or annual herbs as in *Moluccellalaevis* but *Vitexagnus – castus* is shrub, and *Tectoniagrandis* is tree. These results are in agreement with those obtained by Migahid and Hammouda (1974) and Watson and Dallwitz (1992) who recorded that the plants of Lamiaceae were annual or perennial herbs, shrubs and rarely trees.

**Roots:** The roots are mostly tap as in *Salvia farinacea* (Fig.1) while some taxa have adventitious fibrous root as in *Menthapiprata* (Fig.2). Similar results are reported by Kotb (1985) and Baran and Ozdemir (2006) who reported that the roots of Lamiaceae were tap and also have adventitious fibrous root.

**Stem:** The stem is aerial in all examined plants except in *Menthapiprata* which has both aerial and rhizome stems (Fig.2). The stem is branched in all examined plants except in *Moluccellalaevis* unbranched (Fig.3). These results are in agreement with those obtained by Kotb (1985) and Boulos (2002) who observed that the stem of Lamiaceae is erect or rhizomes, branched, quadrangular, hairy and woody or fleshy.

**Leaf or leaflets:** The leaves or leaflets are exstipulate; opposite decussate in all the examined plants. The leaves are usually simple while *Vitexagnus – castus* has compound palmate leaves (Fig.4). The leaves or leaflets varies greatly in the shape, They are ovate as in *Coleus blumei* (Fig.5), lanceolate as in *Salvia farinacea* (Fig.6), palmately-lobed as in *Moluccellalaevis* (Fig.7), pinnately-lobed

as in *Lavandulapubesans* (Fig.8). Lamina is green in the examined plants except *Coleus blumei* which has color leaves (Fig.5). The apex of the leaves or leaflets is acute in all the examined plants except in *Coleus blumei* is obtuse (Fig.5). The venation is generally reticulate pinnate as in *Coleus blumei* (Fig.5) and reticulate palmate as in *Moluccellalaevis* only (Fig.7). These results are in agreement with Tackholm (1974), Hickey and King (1981) and Celep *et al* (2011), who recorded that the lamiaceae of plants were the leaves. Simple (ovate, lanceolate, obovate), pinnately or palmately dissected and compound exstipulate, opposite, the venation was reticulate.

**Flower and inflorescence:** The flowers are hermaphrodite and petiolate in all examined plants except in *Lavandulapubesans* which has sessile flowers. The inflorescences are terminal as in *Lavandulapubesans* (Fig.9), but *Moluccellalaevis* has axillary inflorescences (Fig.3). The inflorescence usually are verticillate as in *Moluccellalaevis* (Fig.3) except in *Lavandulapubesans* only (Fig.9) which has simple spike and compound racemes as in *Tectoniagrandis* only (Fig.10). Such results are reported by Watson and Dallwitz (1992) and Yetisen (2014) who stated that the flowers of Lamiaceae were hermaphrodite and the inflorescence was verticillate usually. These terminal, or axillary, forming spikes, heads, racemes or panicles.

**I- Calyx:** Calyx consists of five sepals in the investigated plants except in *Tectoniagrandis* are six sepals. The sepals are glabrous in mostly the investigated plants but some plants are hairy as in *Vitexagnus – castus*. These results are in agreement with Hickey and King (1981) and Waly and EL-

**gayed (2012)** who observed that the calyx was glabrous or hairy.

**II - Corolla:** Corolla shape is bilabiate as in *Salvia farinacea* (Fig.11), 4 almost equal lobes as in *Menthapiprata* (Fig.12) and 6 almost equal lobes as in *Tectoniagrandsis* (Fig.13). Corolla usually consists of five petals in all the investigated plants except in *Tectoniagrandsis* consists of six petals (Fig.13). Corolla is glabrous in all investigated plants except in *Salvia farinacea* is hairy. Such results were strengthened by **Tackholm (1974)** who pointed out that corolla, usually 5 petals bilabiate with 2 distinct lips or 4 almost equal lobes.

**III - Androecium:** The androecium consists of 4 stamens as in *Moluccellalaavis* (Fig.14), 2 stamens as in *Salvia farinacea* (Fig.15) and 6 stamens as in *Tectoniagrandsis* (Fig. 13). The stamens in some examined plants are unequal as in *Moluccellalaavis* (Fig.14), but some other plants have equal stamens as in *Vitexagnus - castus*. The filament glabrous in all examined plants but is hairy in *Moluccellalaavis* only. These results are in agreement with those obtained by **Watson and Dallwitz (1992)** who reported that the androecium was consisted 2 and 4 stamens, equal or unequal.

**IV- Gynoecium:** The gynoecium consists of 2 carpels in all of the examined plants. The stigma is linear in all of the examined plants (Fig. 16) and in *Lavandulapubesans* only capitate (Fig.17), The styles are united in all the investigated plants, It is gynobasic in all of the examined plants as in *Moluccellalaavis* (Fig.18) except in *Tectoniagrandsis* and *Vitexagnus - castus* is terminal (Fig.19). The ovary shape oblong in all of the examined plants except in *Tectoniagrandsis* and *Vitexagnus - castus* is rounded (Fig.19). It is glabrous in all of the examined plants except in *Tectoniagrandsis* is hairy (Table 3). These results were in agreement with those obtained by **EL-Gazzar and Watson (1970) and Wendy (1994)**, who recorded that the gynoecium was usually consists of two united carpels, terminal or gynobasic style and a more or less deeply bifid stigma, equal or unequal.

**Fruit:** The fruits are nutlets in all examined plants (Fig. 20) except in *Tectoniagrandsis* and *Vitexagnus - castus* are drupe (Fig.21). The fruits are in all examined plants persistent calyx. These results were in agreement with those obtained by **Hickey and King (1981) and Badamtsetseg (2016)**, who observed that the fruit was usually group of 4 nutlets, sometimes a drupe, enclosed by the calyx.

## 2 -Anatomical characters

**Root:** The cortical layer consists of parenchymatous cells in most of examined plants as in *Menthapiprata*, but some plants have both parenchymatous and sclerenchymatous cells as in *Teucriumpolium* (Fig.23), aerenchyma are noticed

in the cortex of *Menthapiprata* only (Fig.24). Pericycle consists of parenchymatous cells in mostly of the examined plants except in *Salvia farinacea* are have parenchymatous and sclerenchymatous cells (Fig. 25). Tyloses are noticed in *Coleus blumei* only (Fig.26). Similar results are reported **Akcinet al(2006) and Baranet al(2008)** who found that the cortex was parenchyma, aerenchyma or sclerenchyma in Lamiaceae.

**Stem:** The stem varies in the external shape. It is 4-angular in all the examined plants except *Teucriumpolium* is rounded (Fig.27). Secretory cells are observed in some plants in the epidermal cells as in *Teucriumpolium* (Fig.27). Secretory cavities are observed in the cortex as in *Teucriumpolium* (Fig.28). Amorphous inclusions are present in the cortical cells in *Moluccellalaavis* (Fig.29). Pericycle is consist of parenchymatous cells in some observed plants as in *Moluccellalaavis* (Fig.29) and it is consist of sclerenchymatous and parenchymatous cells in other plants as in *Salvia farinacea* (Fig.30). Amorphous inclusions are present in *Moluccellalaavis* (Fig.29). The vascular bundle is bicollateral in some of examined plants as in *Salvia farinacea* (Fig.30). but it is collateral in some examined plants as in *Moluccellalaavis* (Fig.29). The main vascular bundle is present in corners in all of examined plants except in *Teucriumpolium* (Fig.27) is arranged in ring shape. Tyloses are present in *Tectoniagrandsis* (Fig.31). The stem is solid in all of taxa except in *Moluccellalaavis* (Fig.29) is hollow. This result is in agreement with **Metcalf and Chalk (1950) and Akcin et al (2006)** the stems in many genera quadrangular in transverse section with groups of collenchyma in the 4 angles, collenchyma absent from the cortex in species and the vascular bundles were bigger in corners.

**Leaf or leaflets:** Secretory cells and amorphous inclusions are noticed in few the examined plants in epidermis as in *Teucriumpolium* (Fig.32) Secretory cells are shown only in *Teucriumpolium* in mesophyll (Fig.32). Upper epidermis shape in the midrib region is concave in all of the examined plants except in *Tectoniagrandsis* (Fig.33) is convex. The vascular bundles are single in all of the examined taxa except in *Tectoniagrandsis* (Fig.33) in groups. Sclerenchymatous bundle sheath showed in *Tectoniagrandsis* only (Fig.33). Secretory cells and secretory cavities are shown in some plants as in *Salvia farinacea* (Fig.35). Crystals are also noticed in two shapes, rosette crystals, as in *Vitexagnus - castus* (Fig.36), prismatic crystals as in *Tectoniagrandsis* (Fig.34). Such results were strengthened by **Ozdemir and Senel (1998) and Satil and Kaya (2007)**. Who pointed out that the adaxial surface was flat to concave and the abaxial surface was convex shaped vascular bundles were collateral. there was one large vascular bundle in the center.



(Fig 1) (Fig 2) (Fig 3)

**Figures: (1 and 2)** Show root types:

(Fig1) Tap root in *Salvia farinacea* Benth. and (Fig 2) Fibrous roots in *Menthapirata* L.

**(Figure3)** unbranched stem in *Moluccellalaervis* L.



(Fig. 4) (Fig. 5) (Fig. 6) (Fig. 7) (Fig. 8)

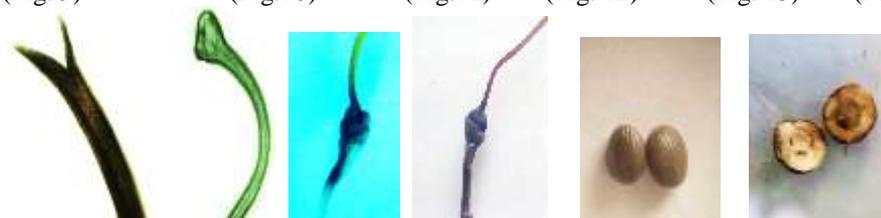
**Figures: (4 - 8)** Show leaf types:

(Fig. 4) compound palmate in *Vitexagnus - castus* Linn., (Fig. 5) ovate in *Coleus blumei* Benth., (Fig. 6)

lanceolate in *Salvia farinacea* Benth., (Fig. 7) Palmately-lobed in *Moluccellalaervis* L. and (Fig. 8) Pinnately-lobed in *Lavandulapubesans* Decne



(Fig. 9) (Fig.10) (Fig.11) (Fig. 12) (Fig. 13) (Fig.14) (Fig. 15)



(Fig.16) (Fig. 17) (Fig. 18) (Fig. 19) (Fig. 20) (Fig. 21)

**Figures: (9 and 10)** Show inflorescence types: (Fig. 9) simple spike in *Lavandulapubesans* Decne. and (Fig. 10) compound raceme in *Tectoniagrandis* L.

**Figures: (11 - 13)** Show corolla types:

(Fig. 11) bilabiate in *Salvia farinacea* Benth., (Fig.12) 4 equal lobes 2 in *Menthapirata* L. and (Fig.13) 6 equal lobes in *Tectoniagrandis* L.

**Figures: (14 and 15)** Show stamen number:

(Fig .14) 4 stamens in *Moluccellalaervis* L. and (Fig. 15) 2 stamens in *Salvia farinacea* Benth.

**Figures: (16 and 17)** Show the stigmas shape :

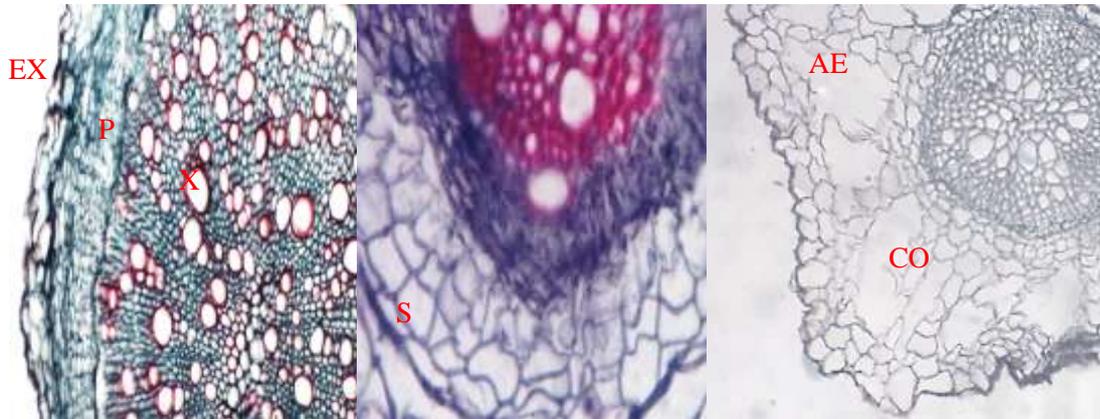
(Fig .16) Linear in *Moluccellalaervis* L. and (Fig.17) capitate in *Lavandulapubesans* Decne.

**Figures : (18 and19)** Show style position in:

(Fig.19) gynobasic in *Moluccella laevis* L. and (Fig.20) ungyobasic in *Vitex agnus – castus* L.

**Figures : (20 and 21)** Show fruit types in:

(Fig.20) nutlets in *Moluccella laevis* L. and (Fig.21) droup in *Vitex agnus – castus* Linn.

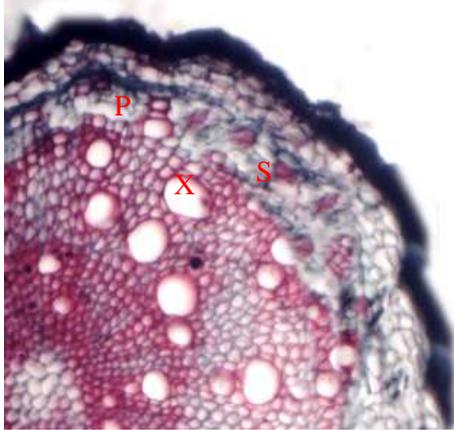


(Fig.22)

(Fig.23)

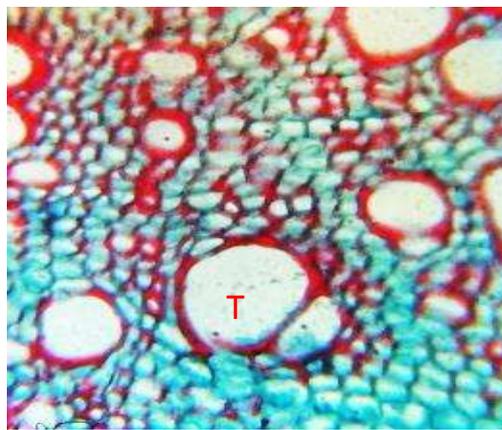
(Fig. 24)

**Figures : (22 - 26)** Cross section in root of : (Fig. 22) *Moluccella laevis* L. (X 400), (Fig. 23) *Teucrium polium* L. (X 400), (Fig. 24) *Mentha piperata* L. (X 100)



(Fig.25)

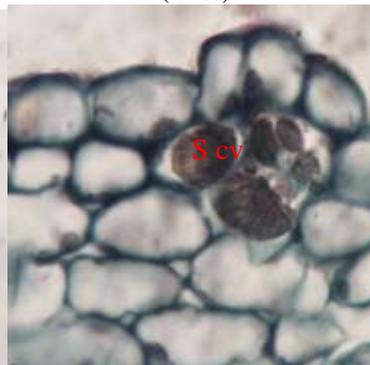
(Fig. 25) *Salvia farinacea* Benth. (X 100) and (Fig. 26) *Coleus blumei* Benth. (X 400).



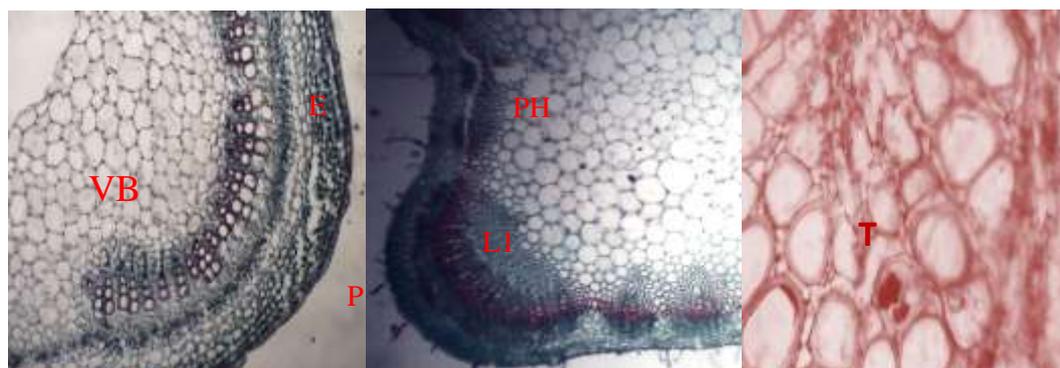
(Fig. 26)



(Fig.27)



(Fig.28)



(Fig. 29)

(Fig.30)

(Fig.31)

**Figures: (27 - 31)** Cross section in stem of: (Fig. 27) *Teucrium polium* L. (X 100), (Fig.28) *Teucrium polium* L. (X 400), (Fig. 29) *Moluccella laevis* L. (X 100), (Fig. 30) *Salvia farinacea* Benth. (X 100) and (Fig. 31) *Tectoniagrandis* L. (X 400).



(Fig.32)

(Fig. 33)

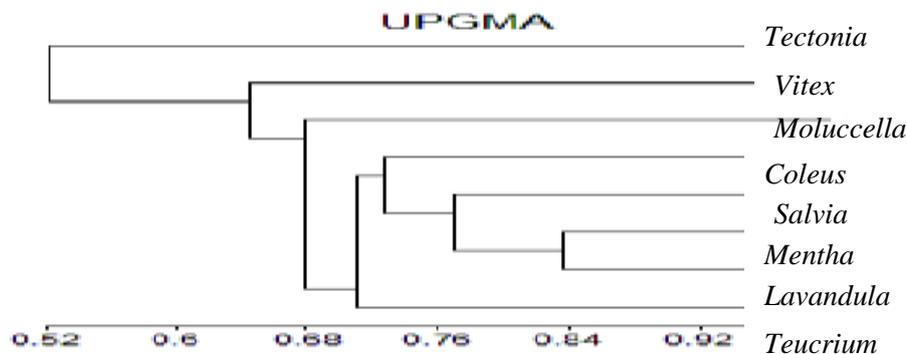
(Fig.34)

(Fig.35)

(Fig.36)

**Figures: (32 - 36)** Vertical section in leaf of: (Fig.32) *Teucrium polium* L. (X 100), (Fig. 33) *Tectoniagrandis* L. (X 40), (Fig.34) *Tectoniagrandis* L. (X 400), (Fig.35) *Salvia farinacea* Benth. (X 100) and (Fig.36) *Vitexagnus – castus* Linn. (X 400).

From the analysis of the collected results by using the program (MVSP), We can agree on attaching *Vitexagnus – castus* to Lamiaceae, while not can agree on attaching *Tectoniagrandis* to Lamiaceae. (MVSP) Multi variate statistical package



**(Figure 37)** Dendrogram represent the relationships of similarity among 8 genera of Lamiaceae.

**Key of genera**

- Annul.....1
- perennial.....2
- 1- I-Stem unbranched; Leaves palmate lobed; Calyx empanulate.....*Moluccella*
- II-Stem branched; a leaves ovate, crenate, colored..... *Coleus*
- 2- Corolla labiatae .....3
- Corolla consist of equal lobes .....4
- 3- Corolla labiatae with lower lip only.....*Teucrium*
- Corolla bilabiatae with 2 lips.....5
- 4- Corolla consist of 4 equal lobes, stamens 4 unequal .....*Mentha*.
- Corolla consist of 6 equal lobes, stamens 6 equal..... *Tectonia*
- 5- Simple leaves .....6
- Compound leaves; stamens 4 equal ..... *Vitex*
- 6- Leaves pinnately- loped; stamens 4; Stigma capitate .....*Lavandula*
- Leaves lanceolate; stamens 2.....*Salvia*

**Table 2.** List of (50) characters recorded comparatively for (8) genera belonging to *Lamiaceae*. The characters were distinguished into (44) qualitative, (4) multistate and (2) quantitative.**Qualitative characters:****Morphological characters:**

<b>Habit:</b>	1-	perennial	(+) /	annual	(-).
<b>Root :</b>	2-	tap	(+) /	adventitious	(-).
<b>Stem :</b>	3-	branched	(+) /	unbranched	(-)
	4-	aerial	(+) /	rhizome	(-)
<b>Leaf :</b>	5-	simple	(+) /	compound	(-)
<b>Leaf or leaf lets :</b>	6-	the venation			
		reticulate pinnate	(+) /	reticulate palmate	(-)
	7-	lamina apex	acute (+) /	obtuse	(-)
	8-	lamina color	green (+) /	not so	(-)
<b>Inflorescence:</b>	9-	inflorescence	terminal (+) /	axillary	(-)
<b>Flowers :</b>	10-	petiolate	(+) /	sessile	(-)
<b>Calyx:</b>					
<b>sepals:</b>	11-	number of sepals			
		five sepals	(+) /	six sepals	(-)
	12-	glabrous	(+) /	hairy	(-)
<b>Corolla :</b>					
<b>Petals:</b>	13-	number of petals			
		five petals	(+) /	six petals	(-)
	14-	glabrous	(+) /	hairy	(-)
<b>Androecium :</b>					
<b>Stamens:</b>	15-	equal	(+) /	unequal	(-)
	16-	filament	glabrous (+) /	hairy	(-)
<b>Gynoecium :</b>					
<b>Stigma:</b>	17-	linear	(+) /	capitate	(-)
<b>Style:</b>	18-	gynobasic	(+) /	ungynobasic	(-)
<b>Ovary:</b>	19-	glabrous	(+) /	hairy	(-)
	20-	shape	oblong(+) /	rounded	(-)
<b>Fruit:</b>	21-	nutlets	(+) /	droup	(-)
<b>Anatomical characters :</b>					
<b>1-Root :</b>					
<b>Cortex :</b>	22-	sclerenchyma	present (+) /	absent	(-)
	23-		aerenchyma present (+) /	absent	(-)
<b>Pericycle :</b>	24-	sclerenchyma	present (+) /	absent	(-)
<b>Xylem:</b>	25-	tyloses	present (+) /	absent	(-)
<b>2-Stem :</b>					
	26-	outline stem	square (+) /	rounded	(-)
<b>Epidermies :</b>	27-	secretory cells	present (+) /	absent	(-)
<b>Cortex :</b>	28-	secretory cavities	present (+) /	absent	(-)
	29-	amorphous inclusions	present (+) /	absent	(-)
<b>Pericycle :</b>	30-	sclerenchyma	present (+) /	absent	(-)
	31-	amorphous inclusions	present(+) /	absent	(-)
<b>The vascular bundle</b>					
	32-	the main of vascular bundles			
		in the angles	(+) /	not so	(-)
<b>Xylem :</b>	33-	tyloses	present (+) /	absent	(-)
<b>Pith:</b>	34-		soled (+) /	hollow	(-)
<b>3-Leaf or leaflets:</b>					
<b>Epidermis :</b>	35-	secretory cells	present (+) /	absent	(-)
	36-	amorphous inclusions	present (+) /	absent	(-)
<b>Mesophyll :</b>	37-	secretory cells	present (+) /	absent	(-)

<b>Midrib region:</b>			
38-	upper epidermis	concave (+) /	convex (-)
39-	the vascular bundles in midrib region,	one (+) /	more than (-)
40-	fibers sheath	present (+) /	absent (-)
41-	secretory cells	present (+) /	absent(-)
42-	secretory cavities	present (+) /	absent(-)
43-	druses crystals	present (+) /	absent(-)
44-	prismatic crystals	present (+) /	absent(-)

**Multistate characters:****Morphological characters:****Habit:**

45- (3 categories), herbs, 1; shrubs, 2 and trees, 3.

**Leaf or leaflets:**

46- leaves shape (5 categories), ovate,1; lanceolate,2; Palmately  
Palmately-lobed,3; Pinnately- lobed ,4 and compound palmate, 5.

**Inflorescences**

47- (3 categories), verticillate,1; simple spike ,2 and compound raceme,3.

**Flower:****Corolla :**

48-(3categories), bilabiate, 1 ; limb regular of 4 almost equal lobes 2 and  
limb regular of 6 almost equal lobes.

**Quantitative characters****Androecium :**

49- number of stamens.

**Gynoecium**

50- length of style in mm .

**Table 3.** List of (50) characters recorded comparatively for (8) genera belonging to *Lamiaceae*.The characters were distinguished into (44) qualitative, (4) multistate and (2) quantitative.

Ch	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P																				
1	-	-	+	+	+	+	-	-	+	+	+	+	+	+	-	+	+	+	-	-
2	+	+	+	+	+	+	+	+	+	-	+	+	+	+	-	+	-	+	-	-
3	+	-	+	±	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-	-
4	-	+	-	+	+	-	+	+	-	+	+	+	+	+	-	-	+	+	-	-
5	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	-	-
6	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	-	+	+
7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-	-
8	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	+	-	-	+

Ch	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
P																			
1	+	-	-	-	+	+	-	-	-	-	-	+	-	+	+	+	-	+	+
2	+	-	-	-	-	+	-	-	-	-	-	+	-	+	-	-	-	-	+
3	+	-	+	-	-	+	-	-	-	-	-	+	-	+	-	-	-	-	+
4	+	-	-	-	-	+	+	-	+	-	+	+	-	-	-	-	-	-	+
5	+	-	-	+	-	+	-	-	-	+	-	+	-	+	-	-	-	-	+
6	-	-	-	-	+	+	-	-	-	+	-	+	+	+	-	-	-	-	-
7	+	+	-	-	-	-	+	+	+	-	-	-	-	+	+	+	+	+	+
8	-	-	-	+	-	+	-	-	-	+	-	+	-	+	-	-	-	-	+

Ch	40	41	42	43	44	45	46	47	48	49	50
P											
1	-	+	-	-	-	1	1	1	1	4	1
2	-	-	-	-	-	1	4	2	1	4	3
3	-	-	-	-	-	1	2	1	2	4	3
4	-	-	-	-	-	1	3	1	1	4	8

5	-	+	+	-	-	1	2	1	1	2	3
6	+	-	-	-	+	3	1	3	3	6	3
7	-	-	-	-	-	1	3	1	1	4	4
8	-	-	-	+	-	2	5	1	1	4	5

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### دراسات نباتية مقارنة علي بعض النباتات الشفوية في مصر

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#### الملخص العربي

أجريت هذه الدراسة علي 8 أجناس تتبع الفصيله الشفويه . تم تجميع عينات الاجناس من مناطق مختلفة في مصر . اجريت الدراسة علي الصفات المورفولوجيه للجذور والسوق والاوراق و الازهار والنورات . كما درست الصفات التشريحية لكل من الجذور و السوق و الاوراق . وقد سجلت النتائج بطريقة مقارنة بين النباتات محل الدراسة . وأظهرت النتائج أن اغلب النباتات محل الدراسة أعشاب معمره كما في *Menthapiprata* وبعضها حولي كما في *Moluccellalaevis* بالإضافة إلى أن *Vitexagnus - castus* كان شجيري أيضا *Tectoniagrandi* كان أشجار . وجدت السيقان الهوائية في كل النباتات المدروسة في حين وجدت السيقان الارضية الريزومه بالإضافة لوجود السيقان الهوائية كما في *Menthapiprata*. الأوراق بسيطة في كل العينات محل الدراسة ما عدا *Vitexagnus - castus* كانت مركبه راحيه. الأسيديه كانت 4 أسديه في معظم النباتات ما عدا *Salvia farinacea* كانت سداتين ، *Tectoniagrandis* كانت 6 أسديه. و اوضحت الدراسة التشريحية ان المقطع العرضي للساق مربع في كل النباتات ما عدا *Teucriumpolium* كان مستدير . ومنتحليل النتائج المتحصل عليها من الدراسة باستخدام برنامج (MVSP) نستخلص أنه يمكن الإتفاق مع (Chase et al 2003) على ضم *Vitexagnus - castus* إلى الفصيله الشفويهينما يجب إعادة النظر في ضم *Tectoniagrandis*