

## Contributions to the Leaf Anatomy and Taxonomy of Thai Myrtaceae

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**ABSTRACT.**– Leaf anatomical studies of 28 taxa in 12 genera of Thai Myrtaceae were investigated to determine their taxonomic relevance. Fourteen characteristics could be used for the species identification: unifacial or bifacial leaves, shape of the midrib; margin and petiole, presence or absence of trichomes, hypodermis, stomatal types, epidermal cell wall, number of spongy layers, presence or absence of bundle sheath extension, shape of vascular bundle at midrib and petiole, presence or absence of sclereid at midrib and crystal types. Leaf anatomical data support morphological evidence for separating taxa at the generic level except for *Cleistocalyx* and *Syzygium*.

**KEY WORDS:** leaf anatomy; taxonomy; Myrtaceae

### INTRODUCTION

The family Myrtaceae with its *ca.* 100 genera and 3,000 species is distributed mainly in the tropics and subtropics. Fourteen genera and 115 species have been enumerated in Thailand (Parnell & Chantaranothai, 2002).

Anatomical studies for various genera in Myrtaceae have been carried out by many workers, including Metcalfe & Chalk (1957), Carr & Carr (1969), Wilson & Waterhouse (1982), Hussin *et al.* (1992) and Haron & Moore (1996). Metcalfe &

Chalk (1957) recognized four stomatal types in Myrtaceae: anomocytic, anisocytic, cyclocytic and paracytic. Most species have unicellular uniseriate trichomes. Hussin *et al.* (1992) studied leaf anatomy of *Eugenia* from the Malay Peninsula and concluded that the following characteristics were useful for species identification: stomatal type, leaf shape in transverse section (TS), shape of midrib bundle, sclerenchyma sheath, cutinization of the outer wall, presence or absence of sclereid, idioblast, hypodermis, columnar epidermal cells, solitary crystals, number of palisade layers, shape of vascular strand, sclerenchyma sheath and sclereid in ground tissue of the petiole. The aims of the present paper are to describe the comparative leaf anatomy of the Thai

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Myrtaceae and to assess the taxonomic value of these characteristics.

## MATERIALS AND METHODS

Fresh leaves of 28 taxa of 12 genera were collected. The specimens were fixed in 70% alcohol or 70% FAA, dehydrated in tertiary butyl alcohol series, sectioned on a rotary microtome and stained in safranin and fast green. TS of midribs, leaf margins and the middle parts between the midrib and margin of the lamina were made. For epidermal studies, samples were prepared by mechanical scraping at the midway between the base and apex of the lamina, stained in safranin and then mounted in DePeX artificial mounting medium. The leaf anatomical data of the taxa examined are compiled and presented in Tables 1 and 2, Figures 1 to 3 and Keys. Photographs were taken with the aid of an Olympus BH<sub>2</sub> light microscopy.

## RESULTS

### General leaf anatomical description

#### Lamina

**Epidermal cells:** in surface view epidermal cells on both surfaces are circular, ovate, square, triangular to polygonal; anticlinal walls of adaxial and abaxial cells are straight (Figs. 1A, 1B), curved (Fig. 1C) and undulate (Fig. 1D), adaxial cells larger than abaxial cells and variable shape in TS.

**Stomata:** occurring on both surfaces or confined to abaxial surface: anomocytic (Fig. 1E), paracytic (Figs. 1F, 1G) and anisocytic (Fig. 1H).

**Trichomes:** absent in all species except unicellular, uniseriate trichomes present in

*D. parviflorum* var. *parviflorum*, *M. cajuputi*, *P. guajava*, *R. dumetorum*, *Rh. tomentosa* and *T. burmanica* var. *rufescens*.

**Hypodermis:** absent in all species but present in adaxial with 1-3 rows and the third row often becoming palisade-like (Figs. 2D, 2F) in *P. guajava*, *S. cumini*, *S. malaccense* and *S. ripicola*.

**Mesophyll:** palisade cells and spongy cells different in shape: palisade cells 1 - 3 layers; spongy cells 3 - 15 layers (Fig. 2G). Palisade and spongy cells have similar shape in *B. frutescens* and *E. camaldulensis*. Sclereid cells present only in *S. jambos*, *S. malaccense* and *S. samarangense* var. *samarangense*. Oil cavities located close to both surfaces, globular, and lined with epithelial-like cells (Figs. 2E, 2F).

**Vascular bundle:** collateral bundles without bundle sheath extension except (Figs. 2B, 2F) in *E. camaldulensis*, *Eu. uniflora*, *Rh. tomentosa*, *S. cumini* and *S. ripicola*. Fibre caps with only fibre cells present in all species except in *S. aqum*, *S. aromaticum*, *S. formosum*, *S. jambos*, *S. malaccense*, *S. megacarpum*, *S. samarangense* var. *samarangense* and *S. siamense* which have both fibre cells and sclereid cells.

**Crystals:** all species present druses (Fig. 2H) and prisms only in mesophyll except *S. ripicola* has druses in hypodermis and mesophyll.

**Midrib TS:** outline in adaxial surface concave, flat or convex. Abaxial surface convex to keeled. Vascular bundle is circular, heart-shaped or U-shaped, arms incurved or straight; bundle sheath with fibre or parenchyma (Figs. 3A-3D). Crystals: druses and prisms present in ground tissue.

TABLE 1. Leaf epidermal characters of the studied taxa.

| Species                                                | Stomatal type | Surface view      |   |   |                   |   |   | Trichome |
|--------------------------------------------------------|---------------|-------------------|---|---|-------------------|---|---|----------|
|                                                        |               | Adaxial cell wall |   |   | Abaxial cell wall |   |   |          |
|                                                        |               | S                 | C | U | S                 | C | U |          |
| <i>Baeckea frutescens</i>                              | PA            | +                 | + | - | +                 | + | - | -        |
| <i>Callistemon citrinus</i>                            | AN            | +                 | + | - | +                 | - | - | -        |
| <i>Cleistocalyx nervosum</i> var. <i>nervosum</i>      | PA            | -                 | - | + | -                 | - | + | -        |
| <i>Decaspermum parviflorum</i> var. <i>parviflorum</i> | AN            | -                 | - | + | -                 | - | + | +        |
| <i>Eucalyptus camaldulensis</i>                        | AN            | +                 | - | - | +                 | - | - | -        |
| <i>Eugenia uniflora</i>                                | AN            | -                 | + | - | -                 | + | - | -        |
| <i>Melaleuca cajuputi</i>                              | AN            | +                 | - | - | +                 | - | - | +        |
| <i>Psidium guajava</i>                                 | AN            | +                 | - | - | -                 | + | - | +        |
| <i>Rhodamnia dumetorum</i>                             | AN            | -                 | - | + | +                 | + | - | +        |
| <i>Rhodomyrtus tomentosa</i>                           | AN            | +                 | - | - | +                 | - | - | +        |
| <i>Syzygium albiflorum</i>                             | AN            | -                 | - | + | -                 | - | + | -        |
| <i>S. aqeum</i>                                        | PA            | -                 | - | + | -                 | - | + | -        |
| <i>S. aromaticum</i>                                   | AN            | -                 | - | + | -                 | + | - | -        |
| <i>S. cinereum</i>                                     | AN            | -                 | - | + | -                 | - | + | -        |
| <i>S. claviflorum</i>                                  | AN            | -                 | + | - | -                 | + | - | -        |
| <i>S. cumini</i>                                       | ANI, PA       | -                 | - | + | -                 | - | + | -        |
| <i>S. diospyrifolium</i>                               | AN            | -                 | - | + | -                 | - | + | -        |
| <i>S. formosum</i>                                     | PA            | -                 | - | + | -                 | - | + | -        |
| <i>S. jambos</i>                                       | PA            | -                 | - | + | -                 | - | + | -        |
| <i>S. laetum</i> subsp. <i>jugorum</i>                 | ANI, PA       | +                 | + | - | -                 | + | - | -        |
| <i>S. malaccense</i>                                   | PA            | -                 | + | - | -                 | + | + | -        |
| <i>S. megacarpum</i>                                   | PA            | -                 | + | - | -                 | - | + | -        |
| <i>S. ripicola</i>                                     | ANI, PA       | -                 | + | - | -                 | - | + | -        |
| <i>S. samarangense</i> var. <i>samarangense</i>        | PA            | -                 | - | + | -                 | - | + | -        |
| <i>S. siamense</i>                                     | PA            | -                 | - | + | -                 | - | + | -        |
| <i>S. winitii</i>                                      | PA            | -                 | + | - | -                 | - | + | -        |
| <i>S. zimmermanii</i>                                  | PA            | -                 | - | + | -                 | - | + | -        |
| <i>Tristaniaopsis burmanica</i> var. <i>rufescens</i>  | AN            | -                 | + | - | +                 | + | - | +        |

AN = anomocytic, ANI = anisocytic, C = curved, PA = paracytic, S = straight, U = undulate, + = present, - = absent

### Petiole TS

**Outline:** adaxial of petiole in TS flat, concave (Fig. 3E), convex or V-shaped (Fig. 3F). Abaxial surface circular or ovate.

**Ground tissue:** collenchyma present below epidermis with some oil cavities; parenchyma present mainly in ground tissue.

**Trichome:** unicellular, uniseriate trichomes present only in *D. parviflorum* var. *parviflorum*, *M. cajuputi*, *P. guajava*, *R. dumetorum*, *Rh. tomentosa* and *T. burmanica* var. *rufescens*.

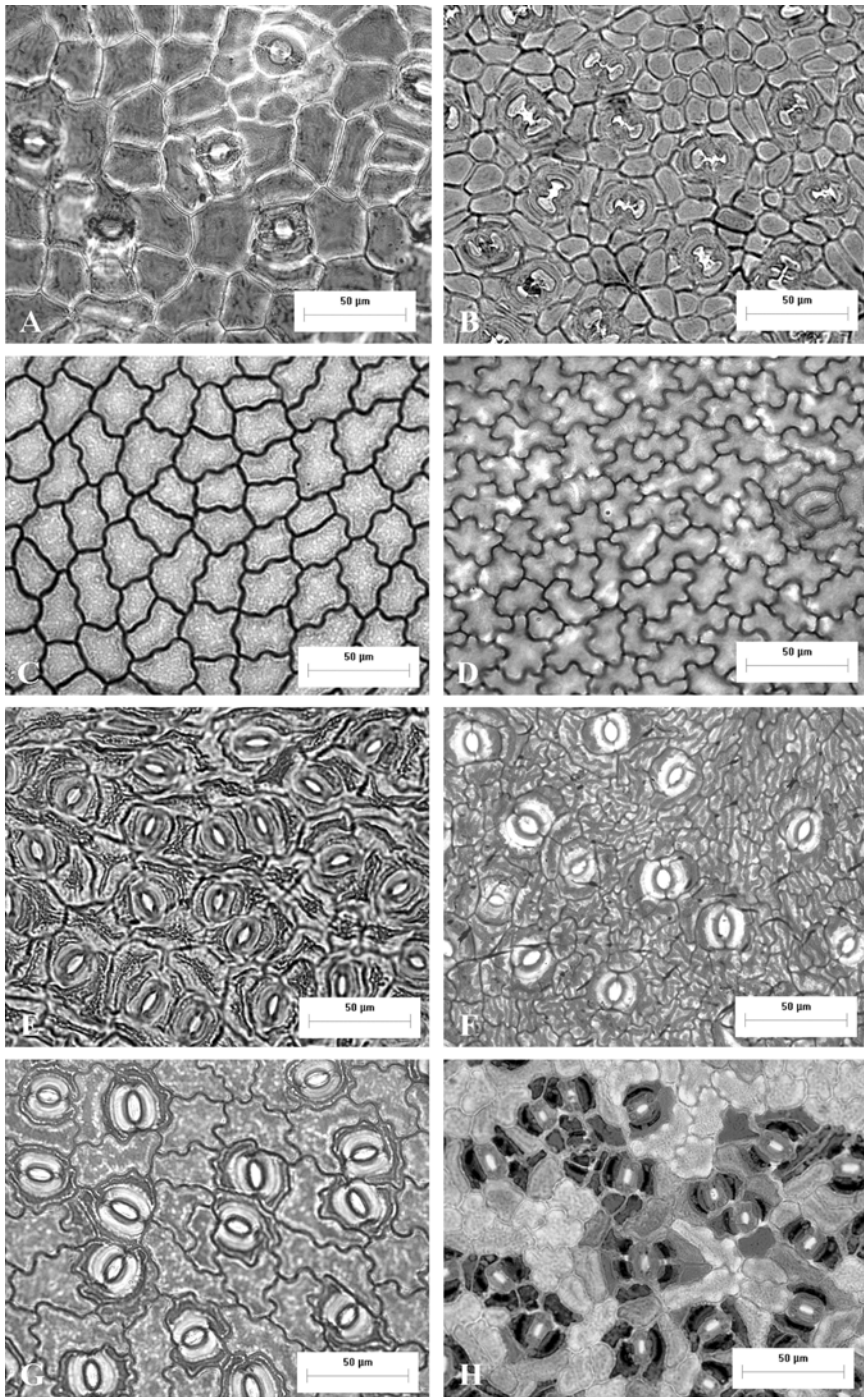
**Vascular bundle:** collateral with circular or ovate, heart-shaped or U-

shaped; bundle sheath cells with fibre or parenchyma.

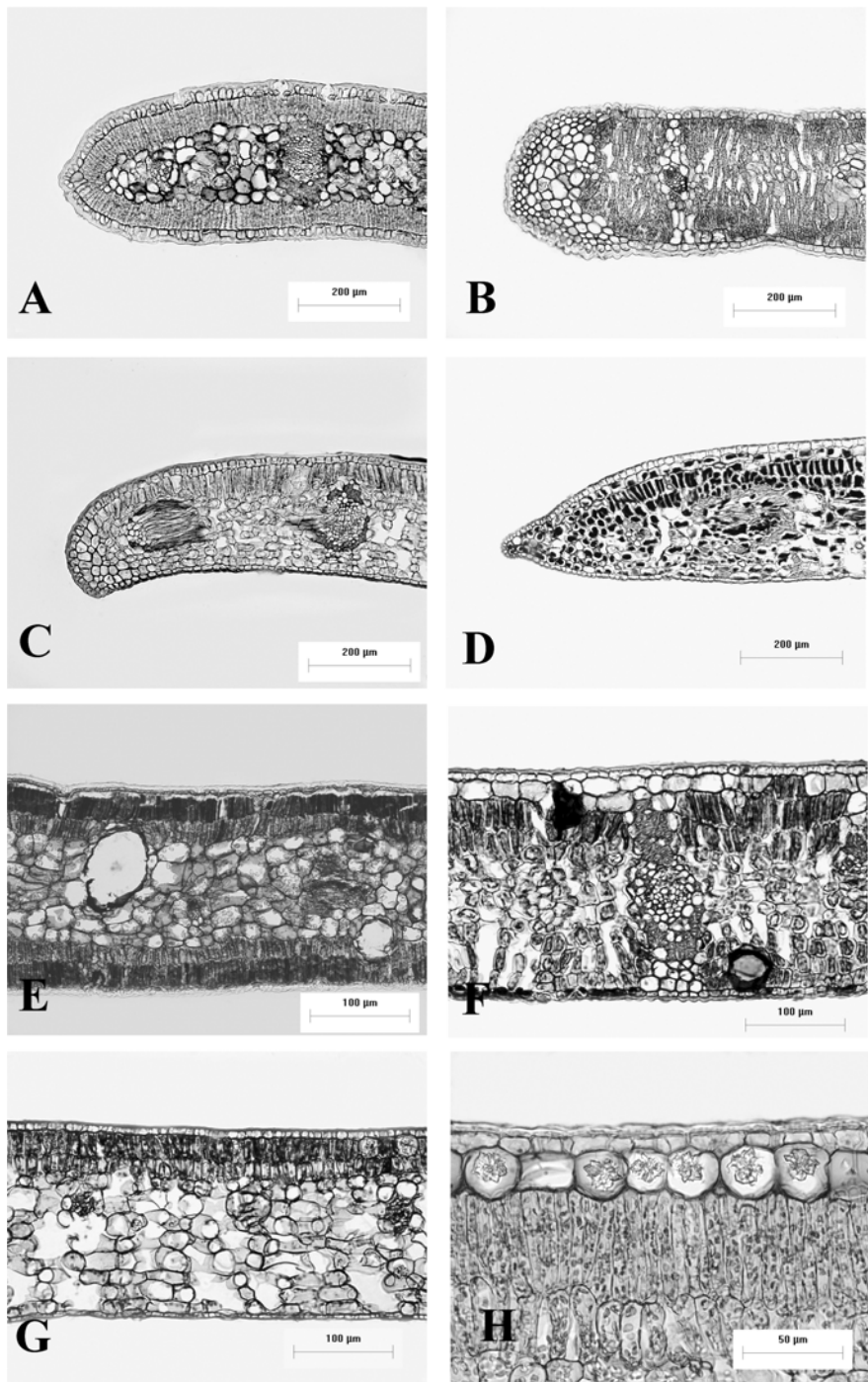
**Crystals:** Idioblast present in ground tissue underneath epidermal cells. Phloem parenchyma cells with druses or prisms (Fig. 3G).

### Key to Genera Based on Anatomy of Lamina and Petiole

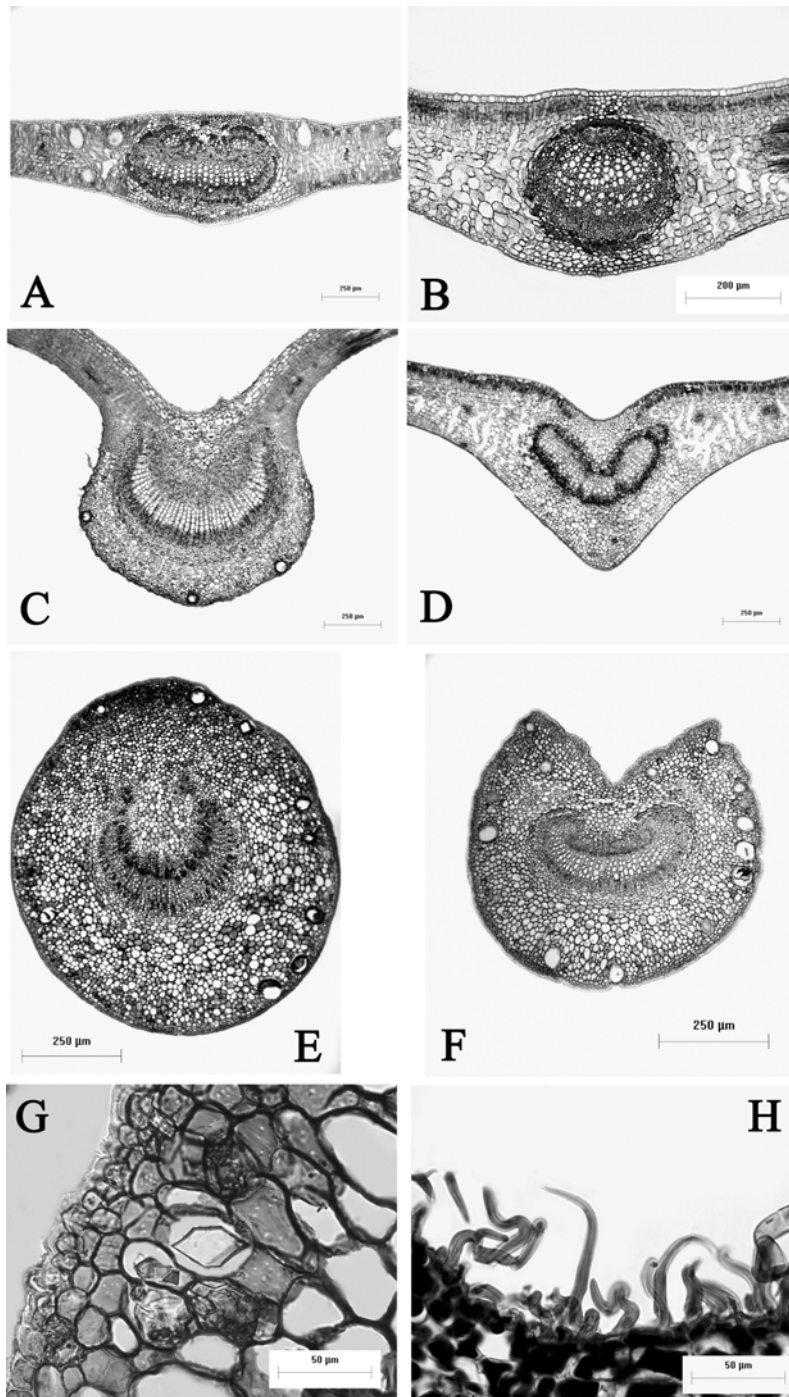
1. Leaves unifacial..... 2
- Leaves bifacial..... 5
2. Trichomes on the abaxial surface of lamina present..... *Melaleuca*
- Trichomes on both surfaces of lamina absent..... 3



**FIGURE 1.** Adaxial (A-D) and abaxial (E-H) surfaces view. A) *B. frutescens*, B) *M. cajuputi*, C) *S. jambos*, D) *S. laetum* subsp. *jugorum*, E) *S. albiflorum*, F) *S. formosum*, G) *S. jambos*, H) *S. ripicola*.



**FIGURE 2.** Transverse section of margin and lamina. A) *C. citrinus*, B) *E. camaldulensis*, C) *S. laetum* subsp. *jugorum*, D) *S. malaccense*, E) *M. cajuputi*, F) *S. cumini*, G) *S. diospyrifolium*, H) druses in hypodermis of *S. ripicola*.



**FIGURE 3.** Transverse section of midrib and petiole. A) *E. camaldulensis*, B) *Eu. uniflora*, C) *P. guajava*, D) *S. winitii*, E) *S. aromaticum*, F) *S. claviflorum*, G) prism in *M. cajuputi*, H) trichomes in *M. cajuputi*.

3. Vascular bundle in midrib heart-shaped. Stomata in the abaxial surface present... *Eucalyptus*
- Vascular bundle in midrib circular or ovate. Stomata in the both surfaces present..... 4
4. Stomata anomocytic..... *Callistemon*
- Stomata paracytic..... *Baeckea*
5. Trichomes present..... 6
- Trichomes absent..... 10
6. Hypodermis present..... *Psidium*
- Hypodermis absent..... 7
7. Bundle sheath extension in collateral bundle of lamina present.. *Rhodomyrtus*
- Bundle sheath extension in collateral bundle of lamina absent..... 8
8. Anticlinal walls in abaxial surface deeply undulate..... *Decaspermum*
- Anticlinal walls in abaxial surface straight or shallowly curved..... 9
9. Druses present. Anticlinal walls in adaxial surface deeply undulate..... *Rhodamnia*
- Druses and prisms present. Anticlinal walls in adaxial surface curved..... *Tristaniaopsis*
10. Vascular bundle in petiole circular..... *Eugenia*
- Vascular bundle in petiole heart-shaped or U-shaped.... *Cleistocalyx* & *Syzygium*
- Outline of petiole in adaxial surface not V-shaped..... 4
4. Stomata anomocytic..... 5
- Stomata paracytic or paracytic and anisocytic..... 8
5. Anticlinal walls in abaxial surface curved..... *S. aromaticum*
- Anticlinal walls in abaxial surface undulate..... 6
6. Vascular bundle in petiole U-shaped ..... *S. albiflorum*
- Vascular bundle in petiole heart-shaped.. 7
7. Vascular bundle in midrib U-shaped..... *S. cinereum*
- Vascular bundle in midrib heart-shaped ..... *S. diospyrifolium*
8. Hypodermis present..... *S. malaccense*
- Hypodermis absent..... 9
9. Stone cells in vascular bundle of midrib present..... 10
- Stone cells in vascular bundle of midrib absent..... 15
10. Outline of midrib in adaxial surface concave..... 11
- Outline of midrib in adaxial surface flat ..... 13
11. Druses present. Anticlinal walls in adaxial surface shallowly curved..... *S. megacarpum*
- Druses and prisms present. Anticlinal walls in adaxial surface deeply undulate ..... 12
12. Vascular bundle in midrib U-shaped.... *S. aqeum*
- Vascular bundle in midrib heart-shaped ..... *S. samarangense*
13. Spongy cells arranged in less than 10 layers..... 14
- Spongy cells arranged in more than 10 layers..... *S. formosum*
14. Outline of petiole in adaxial surface convex..... *S. siamense*

### Key to Species Based on Anatomy of Lamina and Petiole of *Syzygium*

1. Bundle sheath extension present..... 2
- Bundle sheath extension absent..... 3
2. Outline of midrib in adaxial surface concave..... *S. cumini*
- Outline of midrib in adaxial surface flat ..... *S. ripicola*
3. Outline of petiole in adaxial surface V-shaped..... *S. claviflorum*

- Outline of petiole in adaxial surface concave..... *S. jambos*
- 15. Anticlinal walls in adaxial surface straight or shallowly curved..... 16
- Anticlinal walls in adaxial surface deeply undulate..... *S. winitii*
- 16. Druses present. Anticlinal walls in abaxial surface curved.....  
.....*S. laetum* subsp. *jugorum*
- Druses and prisms present. Anticlinal walls in abaxial surface undulate.....  
..... *S. zimmermanii*

## DISCUSSION AND CONCLUSIONS

The Myrtaceous plants uniquely share a suit of morphological and leaf anatomical features. Tables 1 and 2 show that certain characteristics have been useful in the identification of the Thai Myrtaceae. Three types of stomata are observed as in the work of Hussin *et al.* (1992): anomocytic, paracytic and anisocytic. Haron & Moore (1966) show the anomocytic and paracytic types for the majority of Myrtaceae. The anomocytic or paracytic type was found to be the most common occurring in all

TABLE 2. Anatomical characters of the studied species in transverse section.

| Species                                                | Lamina    |          | Number of<br>hypodermis<br>layer | Midrib<br>Vascular<br>bundle shape | Petiole<br>Vascular<br>bundle shape | Crystal<br>type |
|--------------------------------------------------------|-----------|----------|----------------------------------|------------------------------------|-------------------------------------|-----------------|
|                                                        | Unifacial | Bifacial |                                  |                                    |                                     |                 |
| <i>Baeckea frutescens</i>                              | +         | +        | -                                | 1                                  | 1                                   | D,P             |
| <i>Callistemon citrinus</i>                            | +         | +        | -                                | 1                                  | 1                                   | D,P             |
| <i>Cleistocalyx nervosum</i> var. <i>nervosum</i>      | -         | +        | -                                | 3                                  | 3                                   | D               |
| <i>Decaspermum parviflorum</i> var. <i>parviflorum</i> | -         | +        | -                                | 2                                  | 3                                   | D               |
| <i>Eucalyptus camaldulensis</i>                        | +         | -        | -                                | 2                                  | 2                                   | D,P             |
| <i>Eugenia uniflora</i>                                | -         | +        | -                                | 1                                  | 1                                   | D,P             |
| <i>Melaleuca cajuputi</i>                              | +         | -        | -                                | 1                                  | 1                                   | P               |
| <i>Psidium guajava</i>                                 | -         | +        | + (2)                            | 3                                  | 3                                   | D               |
| <i>Rhodamnia dumetorum</i>                             | -         | +        | -                                | 2                                  | 3                                   | D               |
| <i>Rhodomyrtus tomentosa</i>                           | -         | +        | -                                | 3                                  | 3                                   | D               |
| <i>Syzygium albiflorum</i>                             | -         | +        | -                                | 1                                  | 3                                   | D               |
| <i>S. ageum</i>                                        | -         | +        | -                                | 3                                  | 2                                   | D,P             |
| <i>S. aromaticum</i>                                   | -         | +        | -                                | 3                                  | 3                                   | D               |
| <i>S. cinereum</i>                                     | -         | +        | -                                | 3                                  | 2                                   | D               |
| <i>S. claviflorum</i>                                  | -         | +        | -                                | 2                                  | 2                                   | P               |
| <i>S. cumini</i>                                       | -         | +        | + (1)                            | 2                                  | 3                                   | D               |
| <i>S. diospyrifolium</i>                               | -         | +        | -                                | 2                                  | 2                                   | D               |
| <i>S. formosum</i>                                     | -         | +        | -                                | 2                                  | 2                                   | D,P             |
| <i>S. jambos</i>                                       | -         | +        | -                                | 2                                  | 3                                   | D,P             |
| <i>S. laetum</i> subsp. <i>jugorum</i>                 | -         | +        | -                                | 2                                  | 3                                   | D               |
| <i>S. malaccense</i>                                   | -         | +        | + (2-3)                          | 3                                  | 2                                   | D               |
| <i>S. megacarpum</i>                                   | -         | +        | -                                | 3                                  | 3                                   | D               |
| <i>S. ripicola</i>                                     | -         | +        | + (1)                            | 2                                  | 3                                   | D               |
| <i>S. samarangense</i> var. <i>samarangense</i>        | -         | +        | -                                | 2                                  | 2                                   | D,P             |
| <i>S. siamense</i>                                     | -         | +        | -                                | 2                                  | 3                                   | D               |
| <i>S. winitii</i>                                      | -         | +        | -                                | 2                                  | 3                                   | D               |
| <i>S. zimmermanii</i>                                  | -         | +        | -                                | 2                                  | 3                                   | D,P             |
| <i>Tristaniaopsis burmanica</i> var. <i>rufescens</i>  | -         | +        | -                                | 2                                  | 3                                   | D,P             |

1 = circular & ovate, 2 = heart-shaped, 3 = U-shaped, D = druse, P = prism, + = present, - = absent

studied taxa except in *S. cumini*, *S. laetum* subsp. *jugorum* and *S. ripicola* which have both anisocytic and paracytic stomata in the same leaf.

The stomatal complex are dispersed randomly over the abaxial surface, except in *B. frutescens*, *C. citrinus* and *M. cajuputi*. Only *C. citrinus* and *M. cajuputi* have a stomatal type with a non-prominent T-piece cutinization at the pole of the guard cell. Haron & Moore (1999) suggested a non-prominent T-piece cutinization type was found in the New World species. Epidermal cells in TS are circular or square-like in shape. Hypodermis is presented in four species: *P. guajava*, *S. cumini*, *S. malaccense* and *S. ripicola*. The anticlinal walls of both adaxial and abaxial epidermal cells as seen in surface view vary from straight to undulate. Cutin occurs on the leaf surfaces, the form of which varies from species to species being more distinct in *B. frutescens*, *C. citrinus* and *E. camaldulensis*. All species have globular oil cavities in mesophyll that are underneath both epidermis in agreement with the study of Carr & Carr (1969). The outline of midrib in TS in the adaxial surface ranges from flat, convex or concave while the abaxial one varies from convex to obtuse, angled to keeled. This is consistent with the work of Hussin *et al.* (1992). The leaf margin in TS is straight, directed downwards or re-curved, and the tip is acute, obtuse or acuminate. The shape of the midrib and petiole vascular strand is circular, heart-shaped or U-shaped but the ends of the strand in *Cl. nervosum* var. *nervosum* and *S. malaccense* are deflexed and broken into smaller bundles. The bundle sheath extension in the lamina appears in five species: *E. camaldulensis*, *Eu. uniflora*, *Rh. tomentosa*, *S. cumini* and

*S. ripicola*. Fibre cap in lateral veins occur in all species. Sclereids are observed in *S. aqeum*, *S. aromaticum*, *S. formosum*, *S. jambos*, *S. malaccense*, *S. megacarpum*, *S. samarangense* var. *samarengense* and *S. siamense*. They are at the midrib and petiole vascular bundle which Hussin *et al.* (1992) observed only in *E. helferi* (*S. helferi*). Druses and prisms occur in the ground tissue of the lamina and petiole, especially *S. ripicola* present druses in hypodermis and ground tissue. Metcalfe & Chalk (1957) and Hussin *et al.* (1992) reported only druses in the majority of the Myrtaceous plant. The occurrence of unifacial and bifacial leaf types appears to be a good diagnostic characteristic for the generic level. Most of them are bifacial leaf, but the unifacial leaf is found in *B. frutescens*, *C. citrinus*, *E. camaldulensis* and *M. cajuputi*.

Using a combination of anatomical characteristics, it is possible to construct a key to study the species. Only two genera, *Cleistocalyx* and *Syzygium*, could not be separated. Both are morphologically different, especially in flower, the former has a fused calyx while the latter has free sepals (Parnell and Chantaranonthai 2002). Further study is needed to elucidate their status.

Comparative leaf anatomical characteristics of the closely related species show that these characters are particularly important in discrimination the genus *Syzygium*, especially in the following pairs of species:

*Syzygium albiflorum* and *S. zimmermanii*: the former has anomocytic stomatal type, druses present only in mesophyll, tip of leaf margin is obtuse and adaxial surface of petiole is flat. The latter has paracytic stomatal type, druses and prisms present in

mesophyll, tip of leaf margin is acute and adaxial surface of petiole is concave.

*Syzygium aqeum* differs from *S. samarangense* var. *samarangense* in its acute tip of leaf margin, outline of petiole in adaxial is concave; vascular bundle in midrib is U-shaped. The tip of leaf margin in *S. samarangense* var. *samarangense* is obtuse, outline of petiole in adaxial is slightly convex, vascular bundle in midrib is heart-shaped.

*Syzygium diospyrifolium* and *S. formosum*: *S. diospyrifolium* has anomocytic stomatal type, only druses present in mesophyll, two layers of palisade cells, 8 - 10 layers of spongy cells, outline of midrib in adaxial is concave and sclereid absent. *S. formosum* has paracytic stomatal type, druses and prisms present in mesophyll, one layer of palisade cells, 11 - 15 layers of spongy cells, outline of petiole in adaxial is flat and sclereid present.

*Syzygium jambos* and *S. siamense*: the former has both druses and prisms in mesophyll and outline of petiole in adaxial is concave. The latter has only druses and outline of petiole in adaxial is convex.

*Syzygium ripicola* and *S. winitii*: *S. ripicola* has both paracytic and anisocytic stomatal types, one layer of hypodermis, bundle sheath extension present, tip of leaf margin is acute, outline of midrib in adaxial is flat and petiole is V-shaped. The *S. winitii* has paracytic, stomatal type, hypodermis and bundle sheath extension absent, tip of leaf margin is obtuse and outline of midrib and petiole in adaxial are concave.

The leaf anatomy features alone are insufficient for the delimitation of some generic groups. In general, it can be supported that the features have considerable systematic value and give additional

support to the distinctness of the species. However, like all other taxonomic evidence, leaf anatomical characteristics must be interpreted with circumspection.

#### SPECIMENS EXAMINED

All specimens examined are deposited at KCU (Khon Kaen University Herbarium); *Baeckea frutescens* L., C. Kantachot 43. – *Callistemon citrinus* (Curtis) Skeels, C. Kantachot 213. – *Cleistocalyx nervosum* (DC.) Kesterm. var. *nervosum*, C. Kantachot 190. – *Decaspermum parviflorum* (Lam.) A.J.Scott var. *parviflorum*, C. Kantachot 159. – *Eucalyptus camaldulensis* Dehnh., C. Kantachot 166. – *Eugenia uniflora* L., C. Kantachot 120. – *Melaleuca cajuputi* Powell, C. Kantachot 72. – *Psidium guajava* L., C. Kantachot 132. – *Rhodamnia dumetorum* (Poir) Merr. & L.M.Perry, C. Kantachot 15. – *Rhodomyrtus tomentosa* (Aiton) Hassk., C. Kantachot 49. – *Syzygium albiflorum* (Duthie & Kurz) Behadur & R.C.Guar, C. Kantachot 105. – *S. aqeum* (Burm.f.) Alston, C. Kantachot 202. – *S. aromaticum* (L.) Merr. & L.M.Perry, C. Kantachot 194. – *S. cinereum* (Kurz) Merr & L.n.Perry, C. Kantachot 185. – *S. claviflorum* (Roxb.) A.M.Cowan & Cowan, C. Kantachot 152. – *S. cumini* (L.) Skeels, C. Kantachot 29. – *S. diospyrifolium* (Wall. ex Duthie) S.N.Mitra, C. Kantachot 117. – *S. formosum* (Wall.) Masam., C. Kantachot 22 & C. Kantachot 34. – *S. jambos* (L.) Alston, C. Kantachot 207. – *S. laetum* (Buch.-Ham.) Grandhi subsp. *jugorum* (Craib) Chantar. & J.Parn., C. Kantachot 203. – *S. malaccense* (L.) Merr. & L.M.Perry, C. Kantachot 58. – *S. megacarpum* (Craib) Rathakr. & N.C.Nair, C. Kantachot 65. – *S. ripicola* (Craib) Merr.

& L.M.Perry, *C. Kantachot* 21. – *S. samarangense* (Blume) Merr. & L.M.Perry var. *samarangense*, *C. Kantachot* 195. – *S. siamense* (Craib) Chantar. & J.Parn., *C. Kantachot* 106. – *S. winitii* (Craib) Merr. & L.M.Perry, *C. Kantachot* 119. – *S. zimmermanii* (Warb.) Merr. & L.M.Perry, *C. Kantachot* 204. – *Tristaniopsis burmanica* (Griff.) Peter G.Wilson & J.T.Waterh. var. *rufescens* J.Parn. & Nic Luhadha, *C. Kantachot* 23.

#### ACKNOWLEDGEMENTS

We would like to thank Dr. David A. Simpson and Dr. Kenneth Courtenay for assistance with English language. This work was supported by the TFR/BIOTEC Special Program for Biodiversity Research and Training grant BRT T\_145029.

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Received: 22 November 2006

Accepted: 11 May 2007