DISCUSSION
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The taxonomic position of Agapetes within the tribe Vaccinieae remains uncertain because the morphological criteria for the circumscription of genera among the tribe and their direction of evolution are still questioned (Kron, 2002a,b; Stevens, 2004a,b).

The present study found the following correlation among the taxa within this tribe, as well as within the genus Agapetes.

Firstly it seems that Agapetes is closely related to Vaccinium via ser. Agapetes subser. Parviflorae and the supposed differences between the genera must now be questioned. The major differences which separate the genera are: 1. Inflorescence less than 15-flowered in Agapetes (more than 15-flowered in Vaccinium), 2. flowers in corymbs, fascicles, sometimes solitary but very rarely in racemes in A. saligna, A. lobbii, A. muttallii (as in most Vaccinium), 3. Corolla red, maroon, mauve, pink, yellow but very rarely white, greenish white, lemon green or green in A. serpens var. alba, A. affinis, A. subvinacea, A. miniata, A. mannii (they are common in most of Vaccinium), 4. Corolla more than 1 cm long in Agapetes (less than 1 cm long in Vaccinium), 5. Corolla tubular, tubular-urceolate, very rarely urceolate in A. nana, A. acuminata, A. praestigiosa (urceolate in Vaccinium) and 6. Stamens with filaments obscure or 1:4 to 1:17 in length to anthers, very rarely 1:1 to 2:1 in length to anthers in ser. Longifiles (stamens with filaments 1:1 to 2:1 in length to anthers in most Vaccinium).

Secondly Agapetes is also closely allied to Paphia (Kron, 2002; Stevens, 2004). The major features which separate the genera are: 1. Stem phellogen superficial below epidermis in Agapetes (stem phellogen deep seated, inside ring of fibres, surrounding the phloem in Paphia), 2. Thickening and lignification of pith cells regular in Agapetes (thickening and lignification of pith cells irregular in Paphia), 3. Glandular spots basal to lamina margin in Agapetes (short black glandular hairs beneath leaves and leaf margin in Paphia), 4. Leaf hypodermis absent in Agapetes (Leaf hypodermis present and often lignified in Paphia), 5. Corolla mostly reticulate in Agapetes, rarely curved only in A. buxifolia, A. setigera, A. moorei, A. macrostemon, A. lobbii and A. muttallii (corolla reticulate, mostly curved in Paphia) and 6. Ovary falsely 10-locular in Agapetes (ovary 5-locular in Paphia).
Thirdly, certain features of *Agapetes* are also similar to the other allied genus *Dimorphanthera* such as, filaments united at base in *A. miniata, A. linearifolia, A. griffithii* and *A. variegata*.

Therefore, a few examples given above reiterate the parallel development and reticulate nature of generic relationships within this tribe. Different genera of this tribe are based upon combinations of characters and the importance of various combinations depend upon personal opinion.

The genus *Agapetes* is subdivided into 2 sections viz., section *Agapetes* and *Pseudagapetes*. The section *Agapetes* again is subdivided into four series viz., *Agapetes, Graciles, Longifiles, Pteryganthae* and c. 100 species of this section are distributed in Eastern Himalayas, North East India, adjacent Bangladesh, China, Myanmar, Vietnam and Thailand. The section *Pseudagapetes* has only one species, *A. scortechinii*, distributed in Malay Peninsula. The genus is studied and collected from throughout its distributional range and 37 were collected out of 58 species occurring in India. It was found that there are groups of closely related species which were recognized under different series and subseries and few groups show intermixing of characters and hence were merged.

The sections can easily be distinguished by morphological, anatomical characters as well as by geographical distribution. Section *Agapetes* differs from sect. *Pseudagapetes* in having calyx articulated at base with the pedicel, generally free filaments in stamens and absence of hypodermis in leaves which are very constant characters. On the other hand all the series and subseries under section *Agapetes* are distinguished by a combination of characters.

Several characters were used to establish a series viz., type of stem, arrangement of leaves, shape, margin and texture of leaves, type of inflorescence, calyx, corolla and stamens. Relationships within and among series are discussed under their respective groups in the text.

Parallelisms and reticulate evolution are present among these infrageneric taxa and between the allied genera *Agapetes* and *Vaccinium*. Certain species, therefore do not always possess all of the characters which distinguish their taxonomic group (or sometimes herbarium material is insufficient to determine all of the taxonomic characters). In these cases weightage has been given to a taxonomic character
consistently occurring within the overall system and full importance is given to the additional material which sometimes help in realignment of few taxa. Some of the more prominent examples of parallel development are listed below along their infrageneric distributions:


Though the relationships of each section, series and subseries were discussed in the Systematics chapter, the study also found the following interrelationships among the series, subseries of the genus Agapetes and with the allied genus Vaccinium (Table 12).

<table>
<thead>
<tr>
<th>Name of the taxon</th>
<th>Linking Characters</th>
<th>Linked taxa</th>
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<tbody>
<tr>
<td>Vaccinium</td>
<td>Urceolate or campanulate to subcampanulate corolla, less than 1 cm long</td>
<td>subser. Parviflorae (A. acuminata), subser. Agapetes (A. nana), subser. Graciles (A. leucocarpa, A. subansirica),</td>
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Table 12. Interrelationships in Agapetes and Vaccinium.
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<tr>
<td></td>
<td>Filaments obscure or shorter than anthers</td>
<td>ser. Pteryganthae, Graciles, Longifiles (A. pilifera and A. obovata).</td>
</tr>
<tr>
<td>subser. Parvifoliæ</td>
<td>Slender stem, densely 2-3-stichous leaves (internodes less than 1 cm long), ecalcarate anthers.</td>
<td>ser. Pteryganthae (A. kingdomis, A. smithiana, A. miranda, A. serpens).</td>
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Ser. Longifiles | Slender stem with various indumentum (glandular, hirtellous, puberulous, pilose).
---|---

Sect. Pseudagapetes | Winged calyx, ecalcarate anthers.

The present work showed that the subser. Parviflorae, Longifiles and Piliferae are more closer to Vaccinium. ser. Pteryganthae is very distantly related to Vaccinium. Relationship of ser. Gracies with Vaccinium is also not very close. The subser. Parvifoliae is linked to both ser. Pteryganthae and Longifiles.

The ser. Agapetes, Pteryganthae, Gracies are nearly homogenous in geographical distribution and morphological characters but ser. Longifiles is heterogenous in geographical distribution and morphological characters.

The approach used in this work is relatively conservative. For example, the following species are found to be conspecific and therefore reduced as synonyms; A. muscorum under A. praestigiosa, A. similis under A. atrosanguinea, A. xizangensis under A. griffithii, A. macrophylla under A. miniata, A. burmanica under A. megacarpa. The following varieties are found to be similar to their nearest species and therefore reduced under them like, A. odontocera var. pulcherrima is reduced under A. odontocera, A. serpens var. stenophylla is reduced under A. serpens.


On the other hand A. variegata and A. setigera two polymorphic species are recognized where there is the same degree of variation within or between local populations. Here however, variations are emphasized and realized that extensive survey and collections are necessary to interpret these variations appropriately.
The following variations found during present study treated as local variations and did not assign any taxonomic rank.

Different populations of *A. affinis* show considerable variations viz., Jairain population (*D. Banik* 27452) shows larger leaves c. 18.5 x 5 cm and Jowai and Pynursla population (*G. Panigrahi* 4141, 4547) show corolla as small as 11 – 13 mm long never reported earlier.


Temi population of *A. saligna* (*C.B. Clarke* 27599D) shows rachis c. 4.8 cm long and 8 – 17-flowered never reported earlier.

The populations of *A. setigera* var. *acuminata* show considerable variations viz., Cherrapunji population (*A. Carlson* 21181) shows pedicels puberulous-hispid; calyx hispid hairy; corolla sparsely hispid hairy on midveins, but *A. Carlson* 21181 (ASSAM) specimen shows pedicel, calyx and corolla glabrous. Another population in Mawmluh forest (*U.N. Kanjilal* 4560) shows glabrous inflorescence, never reported earlier.

The populations of *A. setigera* var. *macrosepala* show considerable variations viz., Khasia hill population (*M. Oldham* s.n. Acc. No. 264044) shows leaves narrowly ob lanceolate, 8.2 - 10.5 x 2.0 - 2.8 cm, cuneate at base never reported earlier.

The populations of *A. setigera* var. *parvijlora* show considerable variations viz., Mawsmai population (*V. Prakash* 15965) shows pedicel hirsute and corolla tube sparsely puberulous or glabrous or with very few hirsute hairs on midveins but Acc. No. 30274 shows pedicel and calyx totally glabrous, corolla finely puberulous.

The populations of *A. setigera* var. *verticillata* show considerable variations viz., Nangkharang Park population (*D. Banik* 27449) shows inflorescences puberulous-hispid in one twig and glabrous in other twig. Tura peak population (*J. B. Kharsyntiew* 14) shows pink corolla, never reported earlier.

West Kameng population of *A. forrestii* (*R.S. Rao* 7473) shows petiole puberulous, larger leaves 4.2 x 1.6 cm, never reported earlier.
Lower Subansiri population of *A. refracta* (A.R.K. Sastry 42131; S. Panda s.n.) show smaller leaves 10 – 17 x 6 – 8 mm, cuneate at base and shorter fruit stalk 6 – 14 mm long, never reported earlier.

The populations of *A. incurvata* show considerable variations viz., Lawlyndoh (P.K. Hajra 51919) and Shillong peak populations (B. Khan s.n.) show glabrous peduncles, 2.1 – 3.0 cm long, and Khasia hill and Shillong populations (J.D. Hooker & T. Thomson s.n., Griffith s.n., G.Mann s.n., Colshan s.n, C.B. Clarke 38628G) show calyx tube sparsely puberulous at the base, never reported earlier.

The populations of *A. serpens* var. *alba* show considerable variations viz., Algarah – Lava population at 2666 m or more (D. Banik 27852, 27853) show white flowers and Gangtok (D. Banik 27851, 27884), Algarah – Lava (D. Banik 27854), Lachen populations (D. Banik 27880) show red flowers at 1830 – 2500 m and relatively shorter length of pedicel 5.5 – 11.0 mm long never reported earlier.