CONCLUSION

Wood microstructure of 95 species belonging to 41 genera has been described of these 71 species has been studied for the first time. Wood microstructure was found to be considerably heterogeneous within the family. Wood microstructure showed following general structural characters: - Vessels diffuse porous, perforation plates exclusively simple, scalariform or both simple and scalariform together. Fibres septate or non-septate libriform or fibre tracheids. Axial parenchyma sparse or frequent diffuse to diffuse-in-aggregate, scanty paratracheal or narrow banded. Rays both uniseriate and multiseriate together or exclusively uniseriate rays, heterocellular or homocellular, relatively narrow, 2-5 (7) cells wide. Crystals, silica bodies, druses and styloids present. Laticifers present in Euphorbiodeae.

The following microscopic features have been reported for the first time in the family-

- Scalariform perforation plates with combination of simple perforation plates in vessels of Hancea subpeltata.
- Crystals in tyloses in vessels of Chaetocarpus castanocarpus.
- Radial laticifers in Macaranga indica and the same have never been reported in Macaranga throughout the world.
- Non-chambered, prismatic/rhomboidal crystals in axial parenchyma of Jatropha curcas and J. gossypiifolia.
- Intrusive cavities in fibres in Triadica sebifera.
- Intrusive cavities in fibres of Bischofia javanica

Systematic relationships within family Euphorbiaceae

Upon comparison of wood microstructure of five subfamilies it was concluded that the Webster (1994) classification is unnatural from microstructure point of view. The wood microstructure is useful to distinguish uniovulate subfamilies (Acalyphoideae, Crotonoideae and Euphorbiodeae) from bi-ovulate subfamilies (Phyllanthoideae and Oldfieldioideae). However, bi-ovulate and uni-ovulate subfamilies share few wood anatomical characteristics but separable by most of wood anatomical features such as presence of exclusively libriform, septate fibres, relatively wide rays, sheath cells, absence of disjunctive ray parenchyma, axial parenchyma relatively less frequent, ray cellular composition, absence of radial laticifers and vessel ray pits generally two.
Conclusion

distinct type or rounded to elliptical in bi-ovulate subfamilies unlike uniovulate subfamilies.

Within subfamily Phyllanthoideae, some taxa are wood anatomically makes this subfamily a heterogeneous group i.e. tribe Drypeteae (Drypetes and Putranjiva) Scepeae (Aporosa and Baccaurea), Bridelieae (Cliestanthus).

In recent studies, tribe Drypeteae has been seperated as family Putranjivaceae (APG III, 2009) and present study also supports the segregation. Rest of Phyllanthoideae (excluding Drypeteae) has been considered as new family Phyllanthaceae and our study also supports this.

The present study reflects that wood anatomy is not useful in separation of the uni-ovulate subfamilies (Acalyphoideae, Crotonoideae and Euphorbiodeae) from each other due to lack of distinguishing wood anatomical features.

Within subfamily Acalyphoideae the genus Chaetocarpus showed unique autapomorphies in wood anatomical features. Wurdack and Davis (2009) proposed a new family Peraceae and placed five genera segregated from Acalyphoideae including Chaetocarpus. Wood of Chaetocarpus shares some anatomical characters with woods of family Pandaceae and some characters with rest of genera of family Peraceae. The present study reflects that although Chaetocarpus is close relative to Peraceae but there is no wood anatomical signal of significant relationship to place it in family Peraceae.

Within subfamily Crotonoideae, studied taxa showed large heterogeneity in wood anatomical features.

Within subfamily Euphorbiodeae, taxa studied showed considerable heterogeneity in wood anatomical properties. Balakrishnan and Chakrabarty (2007) segregated tribe Hippomaneae from the subfamily and proposed a new subfamily Hippomanoideae. However, we found considerable distinction in wood anatomy between tribe Hippomaneae and Euphorbieae.

Ecological consideration

In the family Euphorbiaceae, evergreen taxa have longer fibre and longer vessel element and smaller intervessel pit diameters as compare to semi-evergreen and deciduous taxa. Wide vessels with low frequency found in evergreen species while deciduous species have narrower vessels with higher frequencies. It was found that taxa of temperate regions have longer vessel elements, longer fibres and narrower intervessel pits in comparing of taxa from tropical regions.
In the subfamily Acalyphoideae, all the genera reflect their adaptation to mesic habitat except Lasiococca. In the subfamily Crotonoideae, Blachia and Dimorpocalyx of tribe Codiaeae reflect their adaptation to xeric conditions while rest of genera reflects adaptation to mesic conditions. In subfamily Euphorbiodeae, all the genera within the subfamily showed their adaptation to mesic environment.

In the subfamily Phyllanthoideae, Leptopus, Breynia and Flueggea showed adaptation to xeric environment while Antidesma, Aporosa, Baccaurea, Drypetes Margaritaria and Phyllanthus showed adaptation to slightly mesic environment. On other hand, genus Bischofia, Glochidion and Drypetes showed adaptation to highly mesic environment.

**Evolutionary consideration**

In the subfamily Acalyphoideae, wood anatomical features are evident of both primitiveness and advancement. Primitive features with combination of advance features were found in Chaetocarpus, Lasiococca, Agrostistachys and Hancea while all other genera contain almost all the advanced features.

In the subfamily Crotonoideae, wood anatomical features are evident of primitiveness with few advance characters like simple perforation plates, thin to thick walled fibres.

In the subfamily Euphorbiodeae, almost all the wood anatomical features are evident of advancement except Excoecaria and Euphorbia.

In the subfamily Phyllanthoideae, out of 14 genera of the subfamily, 8 genera (Antidesma, Bischofia, Bridelia, Glochidion, Phyllanthus, Breynia, Margaritaria and Flueggea) contain advanced features and 4 genera (Aporosa, Baccaurea, Drypetes and Putranjiva) contain primitive features while 2 genera (Leptopus and Cleistanthus) contain combination of both primitive and advanced features.