ABSTRACT

The present work on "Taxonomic and phytochemical study of the medicinally known species of *Glochidion* J.R. Forst. & G.Forst. (Phyllanthaceae) of Assam" is based on the taxa collected in various regions of Assam through extensive fieldwork and examining their morphological and anatomical characteristics as well as phytochemical analysis of documented medicinally known species of *Glochidion*. The present study has reported 10 taxa i.e. 6 species and 4 varieties, from the present political boundary of Assam. Among them, one of the varieties of *Glochidion zeylanicum* (Gaertn.) A.Juss. i.e. *G. zeylanicum* var. *paucicarpum* Chakrab. & N.P. Balakr. has been recorded as a new distributional record to Assam. It has been noted that the members of the genus are found in different types of habitats mainly evergreen, moist deciduous, tropical, hilly, *sal* forest, primary and secondary forests, and some swampy areas.

The extended morphological descriptions have been provided with proper author citations, synonyms, vernacular names, detailed descriptions, habitat, distribution, and specimen examined of all collected taxa. The photographic plates and line drawings were also included for all taxa. Based on the morphological characters artificial keys have been arranged as an aid for identification of the taxa. The study revealed that the reproductive structures are the main features for the identification of this genus. Though the species can be identified by its morphological characteristics, some taxa below the rank of the species level are difficult to identify. Therefore, for easy identification of the taxa micromorphological work also has been carried out for the present study.

Detailed qualitative and quantitative foliar epidermal features using both a light and scanning electron microscope of 10 taxa were studied and their comparative analysis was presented along with the photo plates. The taxa can be distinguished based on their stomatal position, shape, size, area, stomatal index, epidermal cell shape, anticlinal cell wall, papillae, epicuticular wax crystals, trichomes types, and sizes. The construction of an artificial key signifies the easy identification of the species and varieties of the genus *Glochidion*. Both qualitative and quantitative data provide diagnostic features to distinguish among the studied taxa. The anatomical features of the petiole of the taxa were compared and photo plates were included in the present account. The artificial key for the petiole anatomy study was provided. The characteristics viz., number and arrangement of vascular bundles, presence or absence of glands, crystals, and epidermal hairs are particularly useful for identification of the taxa. Leaf architectural features of major venation patterns primary, secondary, tertiary, quaternary, areole

formation, free vein endings, marginal venations, vein islet, and vein termination numbers were compared and presented with photo plates. The artificial key for the leaf architecture study was provided as an aid for taxa delimitation. The micromorphological characteristics resulting from the leaf epidermis, petiole anatomy, and leaf architecture study can be used as diagnostic characteristics for the identification of the infraspecific taxa.

The ethnobotanical information of the collected specimen was gathered in the present study. Based on the primary and secondary ethnobotanical information or data provided by local villagers and traditional healers in Assam, further phytochemical analyses were carried out. Only three species, i.e., *Glochidion ellipticum, G. multiloculare,* and *G. sphaerogynum,* were ethnobotanically important species used by different communities in Assam. Most of the species are used to cure diseases, mainly skin ailments, body swelling, and snake bites in Assam. The qualitative and quantitative phytochemical analyses were performed based on the parts used by these three species. In addition, GC-MS analysis, antioxidant activities, and mineral contents of the selected species were estimated by using standard protocols.

The preliminary phytochemical study of different parts of the extract of *G. ellipticum, G. multiloculare,* and *G. sphaerogynum* showed the presence of many important phytoconstituents. All the parts of the studied species possess significant phytoconstituents such as alkaloids, flavonoids, reducing sugar, steroids, phlobatannins, tannins, terpenoids, triterpenoids, saponin, glycosides, and phenol as well as a good amount of concentration of alkaloid, flavonoid, terpenoid, saponin, tannin, and phenolic contents. All the species exhibit potential antioxidant activity. From the GC-MS analysis, all the identified compounds of methanolic extraction of the selected species possess important biologically active compounds such as antioxidants, antitumor, antimicrobial, anti-inflammatory, antifungal, cytotoxic, and various pharmacological activities which creates a basis for defining the plant's potential benefits in the medicinal field. Analysis of the mineral elements showed that Ca has the highest concentration in almost all the selected species, followed by Na, K, Fe, Mg, Mn, Zn, Cu, and a lower concentration of Cr, Pb, and Cd. The members of the *Glochidion* can also be important mineral-consuming plants since they contain a good quantity of concentration of essential macro- and trace elements. All the quantitative data has been statistically analysed for both taxonomical and phytochemical analysis, and showed significant differences.