**Abstract**

The root anatomy and morphology of 23 species of Zingiberaceae from three tribes and eight genera were examined. Roots were sectioned, with a microtome or freehand, and examined using a variety of staining techniques. The anatomical characters of roots were thoroughly studied and analysed laying emphasis on 21 qualitative and 16 quantitative characters. Statistical tools such as UPGMA Cluster analysis, PCoA and PCA were used to elucidate species boundaries. The prominent anatomical characters in the roots were as follows: all the gingers examined had a piliferous epidermis, followed by an exodermis which contained one or more layers of compact, suberized cells. The cortex had two regions (outer and inner layers) with intercellular air spaces that were radially extended, either linear (Curcuma spp. and Kaempferia galanga), tetrangular (Zingiber officinale), or triangular. The uniseriate endodermis had U-shaped thickening at maturity. Stele included a thin-walled, uniseriate pericycle and polyarch vascular tissues. Phloem strands in Alpinia, Curcuma, Hedychium and Zingiber often extended radially inwards, forming phloem islands. The peripheral ground tissues of stele were mostly fibrous and occasionally parenchymatous. The medulla commonly occupied the centre of the stele. Tuberous roots of Globba, Hedychium and Kaempferia had a wide, starch-filled cortex with stele diameter similar to non-tuberous roots. Oil cells were found in Alpinia spp. and members of the tribe Zingibereae. Starch grains were also found in the parenchymatous cortex and medulla in Hedychium. The perforation plates of the tracheary elements were scalariform to simple. Anatomical characters of the roots in Zingiberaceae could not only help in the identification of the plant species but also in authenticating plant materials used in medicine. A phylogenetic analysis of anatomical characters provided information regarding the closely allied species and could be further confirmed by molecular techniques.