INTRODUCTION

Most of the tropical trees, unlike temperate ones, do not exhibit a sharply rhythmic and cyclic pattern of growth. Instead, because of the prolonged favourable climate conditions prevalent in tropical regions, they generally grow in multiple flushes, intermittently, or in some cases even continuously throughout the year. Close correlations between apical and radial growths exist in both temperate and tropical taxa.

In most dicotyledons and gymnosperms stems continue to grow in thickness even after they have ceased to elongate and, therefore, the older the stem, the greater its circumference. This increase in thickness is due to the regular addition of secondary tissues, viz. phloem and xylem, to the plant (axiss). These tissues originate from the lateral meristem called 'Vascular Cambium' or sometimes simply 'Cambium'. It develops from provascular elements between phloem and xylem of primary vascular system forming a continuous sheath about the xylem core of stem and roots, and extending in the form of strips into leaves, if they have secondary growth.

In most of the plants the cambium is reported to undergo successive active and dormant phases during a growth year with a few exceptions of tropical species in which meristematic activity continues all the year round. This specific behaviour of the
cambium is believed to be regulated by several internal and external factors which include heredity constitution, physiological phenomena, and environmental conditions of the habitat, as Philipson et al. (1971) put it. It is, therefore, interesting to investigate the influence of different physical and climatic factors on cambial construction and activity and then to suggest measures for the maintenance of a desirable growth pattern to ensure a vigorous production of derivative tissues together with their useful contents like gums, oil, resins and tannins.

Structure and behaviour of the cambium, although sufficiently explored in temperate flora, are yet to be duly investigated in tropical species. Of late, a few studies have appeared from Aligarh and Delhi (India) describing the performance of cambium in some Indian trees of economic value. Infact, no information is available with regard to the development and activity of cambium in Bauhinia species, some of which carry immense significance from medicinal point of view. One such example is Bauhinia variegata which finds use in the treatment of scorfulla, skin diseases, ulcers, and in dying industries.

The present study investigates structure and behaviour of the cambium of two arborescent species of Bauhinia, namely B. purpurea and B. variegata, and their impact on derivative tissues under diverse conditions of age and season. The study mainly covers the following aspects of radial growth:
1. formation and structure of cambium,
2. structural variation of cambium in relation to age of the tree and to seasonal changes,
3. periodicity of cambium and its relationship with phenological conditions,
4. production of secondary growth, and
5. relationship between extensive and radial growth.

**Concept of Cambium:** There are in actuality two conceptually different views regarding the nature of cambium. One school of thought postulates a multiseriate zone in which all the cells are equally endowed with multiplication capacity. This view, proposed by Raatz (1892) has been strongly supported by Catesson (1964). She defines the cambial zone as those cell layers which are characterised by the greatest RNA content, are the sight of most abundant mitoses, and are distinguished in section by radially narrow cells with thin walls. The other school pleads for the uniseriate nature of cambium. There are two interpretations of this uniseriate concept based on terminological differences. According to one, there exists a single initial cell which, in each radial file of cambial cells, lies somewhere between the phloem and xylem mother cells, and is responsible for the production of cambial derivatives on both outer and inner sides. This view, mainly advocated by Bannan (1955, 1968) and Newman (1956), has been ably supported by the ultra-structural studies of Mahmood (1968) and Muramanis (1970) pertaining to tangential wall
characteristics. To another group of workers (see Wilson et al. 1966; Zimmermann & Brown 1971) the term 'cambium' is applicable only to the initial cells, not to the immediate derivatives also. Thus, admittance of a single initiating layer is common in both the interpretations, the only difference being that one group of workers applies the term cambium to the entire meristematic zone consisting of the initiating layer as well as the tissue mother cells, while the other restricts it to the initiating layer only (for review, Iqbal & Ghouse 1985a). Following the former terminology, Butterfield (1975) defines the cambium as a multi-seriate zone of periclinaly dividing cells lying between the differentiating secondary xylem and phloem, with a distinct initial capable of both periclinal and anticlinal divisions lying somewhere within each radial file of cells. The same terminological usage has been adopted for describing the cambium in the present study.