ABSTRACT

The present problem on the structure and behaviour of vascular cambium and its derivative tissues – the food conducting (secondary phloem) and the water conducting (secondary xylem) pathways have been undertaken in relation to different weather conditions of the study-site and age of the selected trees (Ficus infectoria and F. religiosa) for two consecutive years (1980 and 1981). The findings are being summarised as follows:

The vascular cambium consists of fusiform and ray initials and forms a continuous cylinder between xylem and phloem. The arrangement of fusiform and ray initials is semi-stratified or semi-storied type. The length of fusiform initials vary from 286-439 µm in F. infectoria and from 272-380 µm in F. religiosa. In both the cases, the fusiform initials are usually multinucleate and possess upto 5 nuclei in one cell.

The cambial make-up exhibits certain variations in their dimensions under different weather conditions as well as in different age groups of both the species investigated. In F. infectoria, the fusiform initials are noted to be longer in the younger shoots than in the older ones, while in F. religiosa they are found to be longer in the stouter axes than in the slender ones.
Changes in the size of ray initials of the species investigated do not evince any particular trend nor they are so pronounced but they do undergo greater multiplication. As a consequence, the ray initials occupy a relatively greater area in the cambial cylinder of the main trunks as compared to younger shoots.

The wood in both the species is diffuse porous with pores solitary and in short radial multiples of 2-4 and often 6. The rays are homocellular and vary in height from 1-53 cells in *F. infectoria* and from 1-60 cells in *F. religiosa*, while their width vary from 1-6 and 1-7 cells respectively.

Following the mean vessel length from top towards base it shows a gradual decrease in length (312-224 µm) in *F. infectoria*, while in *F. religiosa* it shows a steady increase in length (266-311 µm). Their pore size reveals a gradual increase with the increasing girth until a maximum is reached and then a constancy follows in *F. infectoria*, while in *F. religiosa* no specific trend of variation in lumen size has been noticed.

Observations on the xylem fibres indicate a positive increase with the growing size of the trunk and their average ranges from 899-1245 µm in *F. infectoria* and from 1054-1292 µm in *F. religiosa*, but they do not show any significant variation in relation to seasonal changes. The length average of vessel varies from 120-450 µm in *F. infectoria* and from 150-440 µm in *F. religiosa* as a consequence of seasonal influence.
The bark consists of three distinct zones viz., rhytidome, nonconducting phloem and conducting phloem. The sieve-tube members possess simple sieve plates on their transverse end walls in both the species. The average length of sieve-tube members vary from 304-351 μm in F. infectoria and from 279-376 μm in F. religiosa in different seasons. They occupy about 28% transectional area in F. infectoria and 31% in F. religiosa.

The length of sieve-tube members after an initial increase in length, decreases a bit and then increases with the increase in stem circumference in both the species investigated, while a corresponding increase in the lumen size of sieve-tube members is noticed with the increase in girth of the axes.

The phloem fibres are distributed throughout the secondary phloem and impart a characteristic look to the bark. They grow intrusively by both ends about 3.2 and 4.1 times over the length of fusiform initials in F. infectoria and F. religiosa respectively.

The phloem rays have been found to vary in height from 1-52 cells in F. infectoria and from 1-57 cells in F. religiosa, while their width vary from 1-5 cells and 1-7 cells respectively.

The vascular cambium undergo activation once in a year in both the investigated species. The cells in the cambial zone undergo radial expansion in the first week of July in F. infectoria and in the first week of August in F. religiosa. The cells
start dividing in the third week of July in *F. infectoria* and in the mid-August in *F. religiosa*.

The cambium becomes dormant during late December in *F. infectoria*, while in *F. religiosa* dormancy is attained in early December. Thus, the cambium remains active for about 6 and 4 months respectively.

In *F. infectoria* xylem production precedes that of phloem, while in *F. religiosa*, xylem and phloem formation is simultaneous. The total amount of xylem produced is measured about 1500-1700 µm in *F. infectoria* and 1900-2200 µm in *F. religiosa* in a calendar year.

The phloem formation occurs from October to December in *F. infectoria* and in August, October and November in *F. religiosa*. Precursor phloem formation is also noticed in *F. religiosa* during March. The precursor phloem remains functional for about 5 months in *F. religiosa* and the current year's phloem for about 7 months, while in *F. infectoria*, the longevity of phloem extends upto 9 months. The total amount of phloem produced is measured about 450 µm in *F. infectoria* and about 535 µm in *F. religiosa* in a calendar year.

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