

Taxonomic importance of vessels elements in genus *E. Pulcherrima* L.

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Abstract

Xylem element shows important taxonomic character for difficult to identification of some genera and species of the plants, Vessel element shows great variation in their size, wall thickening, shape, tail and characters of perforation plate like number, orientation and shape. The study of vessel elements which may be useful for the identification of a particular plants drugs because in the drugs the entire or various fragments of tissue are present. Many anatomist have contributed on the various aspect of vessel elements several workers studied the structure of vessel element. Present investigation shows study of these characters for Genus *E. pulcherrima* L.

Keywords: *E. pulcherrima* L., xylem elements, structure of vessels, identification

Introduction

In India regular pharmacognostic work had been started by Joshi (1947) monograph on Himalayan Drugs given Morphology and histological feature of plants along with some pharmacological information. During the last few decades a large number of medicinal plants used in traditional systems have been studied pharmacognostically. Dutta and Mukharji^[1] made an attempts to study pharmacognosy of certain Indian roots rhizome and leaf drugs.

The present work includes the study of vessel elements which may be useful for the identification of a particular plants drugs because in the drugs the entire or various fragments of tissue are present. Many anatomists have contributed on the various aspect of vessel elements several workers studied the structure of vessel element. Fahn^[2] in monocotyledones; Cheadle and Kosakai^[3, 5] in Junicales, Hypolytrieae and Alstroemeriales throughout the 20th century certain workers studied the dimension of vessel element and its importance in the phylogeny^[6, 7]. The study of cotyledon was carried out by metcalf and chalk^[8].

Materials and Methods

For study of vessels the preserved material were made into small pieces and boiled and cooled repeatedly until free from the air. A macerated fluid was prepared by taking aqueous chromic acid (as per Jeffrey's). The pieces of wood were kept in the fluid for 24 hours and after 24 hours the material was crushed with the help of glass rod and washed with distilled water to remove excess stain. The material was stained in 1 % saffranin for 6 hours and microscopic observations. The camera Lucida of the vessel were drawn by taking measurements the illustrations were drawn with India ink and microphotographs were taken wherever possible. The range of length and width of vessel elements was determined by the measurement of 20-25 vessel elements and

were classified as per the classification given by Radlford *et al.*^[9] which is reproduced here for perusals'.

A. Extermely short	Less than 175 um
B. Very short	175 to 250 um
C. Moderately short	251 to 350 um
D. Medium size	351 to 800 um
E. Moderately Long	801 to 1100 um
F. Very long	over 1900 um

Observations

The various characters of vessel elements viz., size wall thickening, shape, tail and characters of perforation plate like number, orientation and shape were studies. A survey of about 30-50 vessel elements of stem was carried out.

Result and Discussion

Vessel elements of *E. pulcherrima* L

Vessel element of root (Table no-01 Plant No. 01)

Dimentions: Extremely short (class A) Very short (class B) moderately short (class C) medium size (class D) vessels were observed. The frequency of very short vessels is higher (39.22%) and the medium sized (10.78) vessels were less frequency. The average diameter of vessel element is 21 mu.

Lateral wall thickening: Simple pitted thickenings were common, pits alternate.

Tail: Vessel with long pointed, long blunt, short pointed short blunt were observed.

Perforation Plate: In the vessel only simple perforation plates were present.

Orientation: The vessels with oval, oblique and transverse perforation plates were observed.

Shape of perforation plate: More commonly vessels have oval or lenticular perforation plate.

Root fibers: The length of root fiber is 213-360 mu and the average length is 290 mu. The diameter of fiber is between 18.1-27 mu and the average diameter is 19.8. All the fibres are pointed at both the ends.

Tracheid's: The length of tracheid's element 325-345 mu and the average length is 258.72 mu. The width of tracheid element in between 19-24mu the average diameter 22.32 mu. The shape of tracheid's is spindle shaped.

Vessels element of stem (Table No.02 Plate No.02)

Dimensions: Very short vessels (class B) moderately short vessels (class C) and medium size (class D) vessels were observed. The frequency of moderately short (40.36) (class C) was higher and very short vessel (class B) were less frequent 29.54 mu.

Shape: The shape of vessel element is cylindrical, linear.

Lateral wall thickening: Simple pitted thickenings were common, pits alternate.

Tail: With long blunt, short blunt were commonly observed.

Perforation Plate: In the vessel, only simple perforation plates were observed.

Orientation: The vessels with oblique and transverse perforation plates were observed.

Shape of perforation plate: More commonly vessels have perforation plate oval in shape.

Stem fibers: The length of stem fibers is between 275-380 mu. and the average length is 294 mu. the diameter of fibers

is between 18.5- 32 mu and average diameter is 22.5 mu. All the fibers are pointed at both end rarely blunted.

Tracheid's: The Length of tracheid elements is between 268-395 mu. and average length is 298 mu. and the diameter is between 18.5-20mu.and the average diameter is 19 mu, all the tracheid's are blunt at tip.

Classification (After Radford *et al.*) and relative frequency (%) of different classes of vessel element in the root and stem of *Euphorbia pulcherrima* L.

Table 1: Vessel element of root.

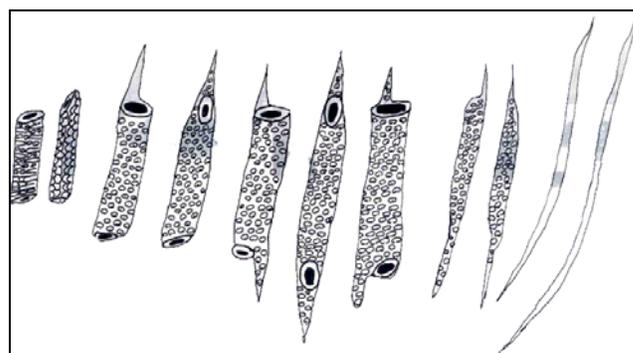
Class A		Class B		Class C		Class D	
Percentage (%)	Range of Length(mu)	Percentage (%)	Range of Length (mu)	Percentage (%)	Range of Length (mu)	Percentage (%)	Range of Length (mu)
39.22	72 to 144	30.00	180to 234	20	252 to 260	10.78	410 to 450

Table 2: Vessel element of stem.

Class B		Class C		Class D	
Percentage (%)	Range of Length (mu)	Percentage (%)	Range of Length(mu)	Percentage (%)	Range of Length (mu)
29.54	180 to 216	40.36	262 to 324	30.10	360 to 522



a - Vessel element of Stem.



Pulcherrima L.

b - Vessel element of Stem.

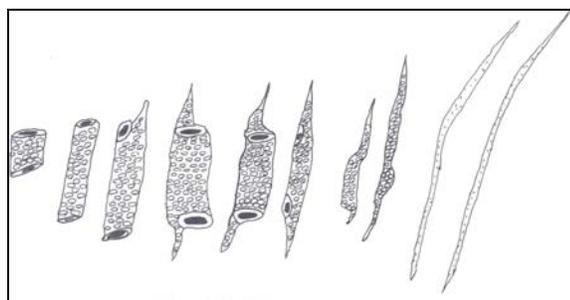
- A) Tail less Vessel.
- B) Vessel with tail at one end.
- C) Vessel tail at both end.
- D) Tracheid
- E) Fibers



b - Vessel element of Root.

c - Vessel element of root.

- A) Tail less Vessel.
- B) Vessel with tail at one end.
- C) Vessel tail at both end.
- D) Tracheid
- E) Fibre



Euphorbia E.

Conclusion

Classification (After Radford *et al.*) and relative frequency (%) of different classes of vessel element and their other characters like size, wall thickening, shape, tail and characters of perforation plate like number, orientation and shape in the root and stem are used for identification of plant drugs or may be used for distinguish them from each other.

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