

(2) T.S. Petiole :-

(7)

T.S of petiole is circular and is differentiated into epidermis, cortex and stele.

i) • Epidermis is the outermost layer of single cell thick. cells are parenchymatous and slightly elongated.

ii) • Cortex is differentiated into three regions -
- outer cortex - is just below the epidermis and is made up of thin walled parenchymatous cells.
- middle cortex consist a ring of air chambers separated by single cell thick septa.
- inner cortex is solid and several cells thick. cells are parenchymatous and contain starch and tannin filled cells.

iii) • Stele :-

Stele is nearly triangular and is bounded by single endodermis ^{pericycle}. It is of protostelic type.

xylem is 'V' shaped with two distinct arms. Each xylem arm comprises one or two metaxylem elements in centre and a few protoxylem elements at both ends. Protoxylem is exarch.

(3) T.S. Leaflet :- T.S. of leaflet shows :-

i) Epidermis - It is the outer boundary or surrounding layer which is one cell thick. It is differentiated into ~~upper~~ ^{lower} upper and ~~inner~~ lower epidermis. In floating leaflet stomata are found on upper epidermis while aerial leaflets have stomata on both sides.

ii) Mesophyll :- Between upper and lower epidermis a wide mesophyll is present.

Online study material (e-content)

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Name of the College: S.S. college, Tbad

Date: 26.08.2020

Name of the Dept: Botany

Time: 11.00-12.00

Subject: Pteridophyta

Name of the Teacher: Dr. S.S.

Topic: Marsilea

Class: B.Sc. Botany - A

Medium of Teaching: WhatsApp & college website.

Bio technology Sub - A1

Marsilea: Internal structure

1. T.S. stem/Rhizome:

T.S. of old stem is somewhat circular in outline. Following structures are seen in T.S. —

1. Epidermis:- It is outer single layered protective cover. Cells are thick walled and compactly arranged. Stomata is absent.

2. Cortex:- Cortex is differentiated into 3 types.

(a) Outer Cortex — It is just below the epidermis and is often called as hypodermis. It is made up of parenchymatous cells and is one to several cells thick. Some of its cells contain tannin.

(b) Middle Cortex:- It is aerenchymatous. It has large air chambers which are arranged in a ring. Air chambers are separated from one another by one cell thick parenchymatous septum. Aerenchyma is more extensive in water forms and less extensive in land forms.

(c) Inner Cortex:- The inner cortex is compact, solid and several cells thick. The cells of

- ⑧ It is differentiated into an upper palisade and lower spongy parenchyma. The palisade layer is made up of elongated chlorophyllous cells while spongy parenchyma has loosely arranged parenchymatous cells.

In submerged species mesophyll is not differentiated into palisade & spongy parenchyma.

(iii) ~~State~~ V. Bundle :-

Several V. bundles are found embedded in the mesophyll. V. bundles are concentric i.e. central core of xylem is surrounded by phloem. The phloem is enclosed by a single layer thick endodermis.

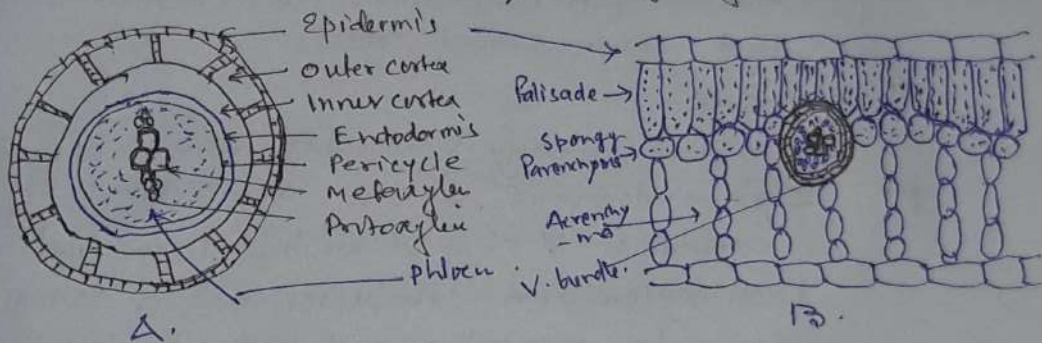


Fig. Marsilea spp. A. T.S. root.

B. V.S. leaflet (M. quadrifolia).

- ④ T.S. of root :- It is somewhat circular and is differentiated into epidermis or piliferous layer, cortex & stele.
- i) Epidermis is single layered and parenchymatous.
 - ii) Cortex is differentiated into outer and inner cortex. Outer cortex has air chambers while inner cortex is differentiated into outer parenchyma & inner sclerenchyma. The inner cortex is represented by single layered endodermis.
 - iii) Stele is of protostelic type. Xylem is diarch and exarch and is surrounded by phloem outside which pericycle is present. Pith is absent.

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- ⑥ outer layers are thick walled while inner layers are made up of thin walled parenchymatous cells. Some of these cells are filled with starch and tannin.

(3) Stele:-

T.S. of young rhizome shows a protostelic condition where xylem is completely surrounded by phloem and pith is absent.

In old stem stele is amphiphloic siphonostele (solenostele) with a clear pith in the centre. xylem is found in a ring surrounded by endodermis, pericycle and phloem externally and internally. In this way the different tissues are arranged in ring (in stele) as follows —

outer endodermis, outer pericycle, outer phloem, xylem, inner phloem, inner pericycle and inner endodermis.

The protoxylem may be exarch (M. vestita) or mesarch (M. aegyptiaca) or ill defined (M. quadrifolia)

T.S. passing through the nodal region shows amphiphloic solenostele provided with one leaf gap.

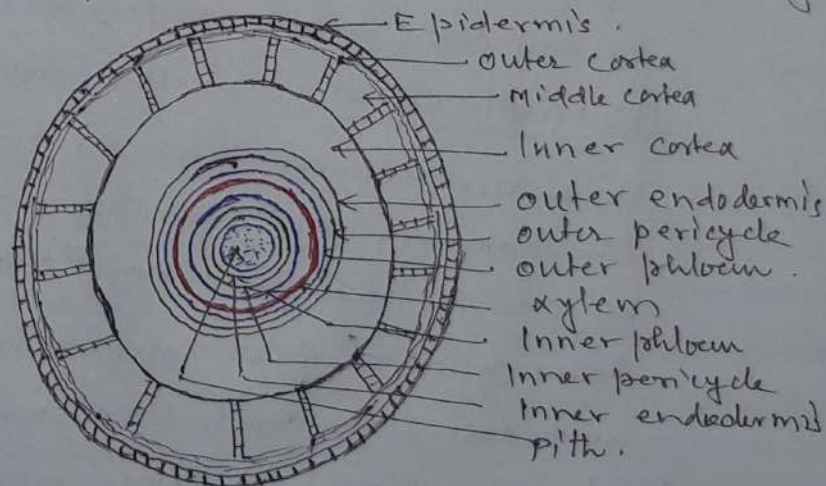


Fig. Marsilea : Internal structure. stem. (Diagrammatic)