

ESTIMATION OF TRANSPARENCY OF WATER BY SECCHI DISC METHOD

LIGHT PENETRATION:

PRINCIPLE: Turbidity in the waters reduces the light penetration. Light penetration in fact depends partly on the light flux but mainly on the optical properties of water.

Light penetration in a body of water can be obtained by immersing Secchi disc and observing its visibility. Secchi disc is a circular disc of metal of 20 cm diameter, painted matt white. Sometimes, a disc painted alternately black and white in a radial fashion is also used. It has got a weight at the lower face so as to avoid a drift during lowering in water. A string is attached to it for lowering, which may be marked in centimeters.

In conditions of bright light and calm water, irradiance at the depth of Secchi disc visibility is about 1% to that of just below the surface. The compensation level (photosynthesis = respiration) on the euphotic limit at which irradiance 1% to that of the surface is nearly 2.5 times the Secchi disc depth. The vertical attenuation coefficient is about $1.0/\text{Secchi disc depth}$.

PROCEDURE :-

- ① Lower the Secchi disc in the water with the help of the string tied to it until it just disappears. Note the depth by marking on the string.
- ② Now uplift the Secchi disc and note the depth at which it reappears again.
- ③ For better results, measurements should be made during the middle of the sunny days.

CALCULATION :-

Secchi disc light penetration $\frac{A+B}{2}$

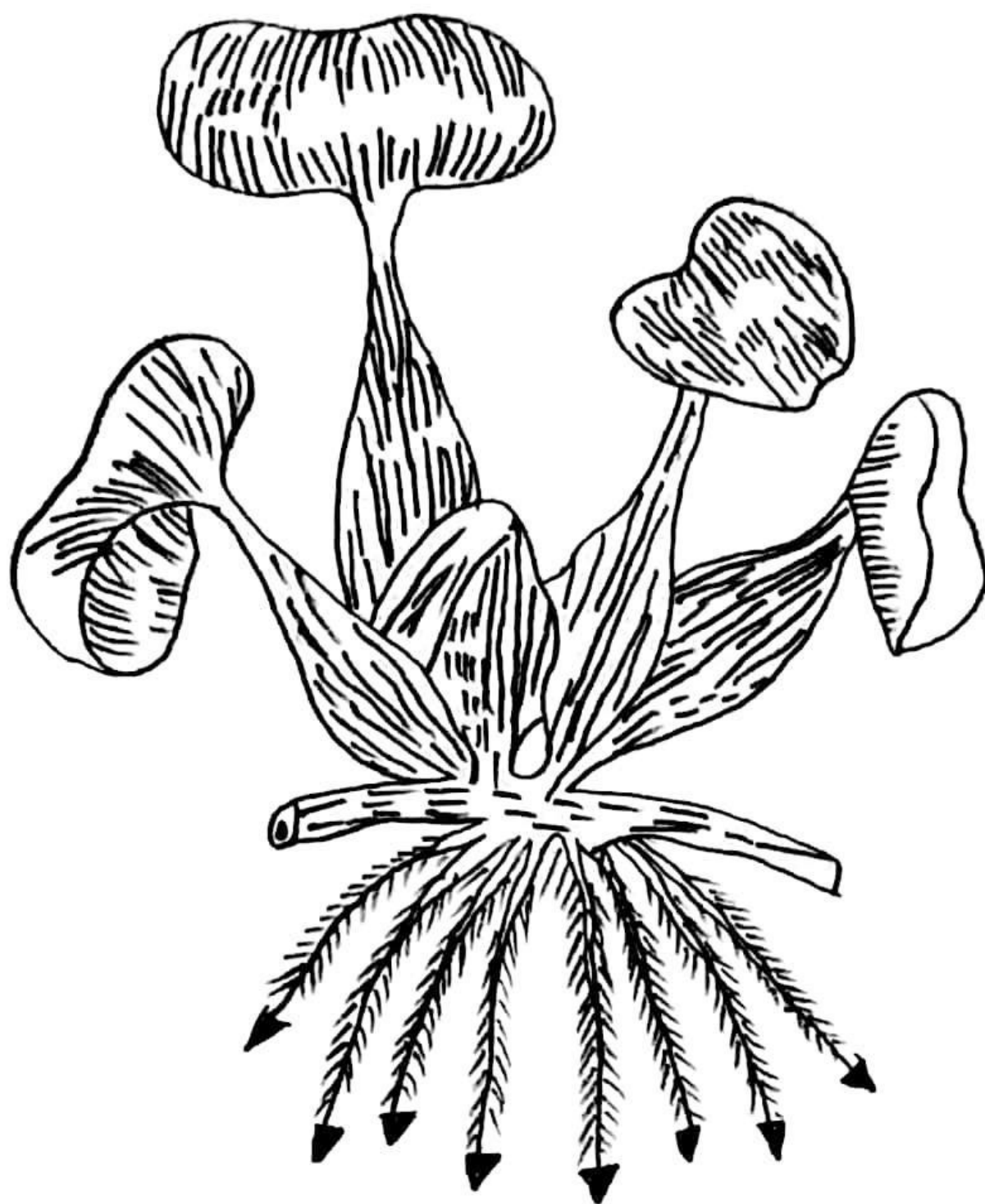
where, A = depth at which Secchi disc disappears.

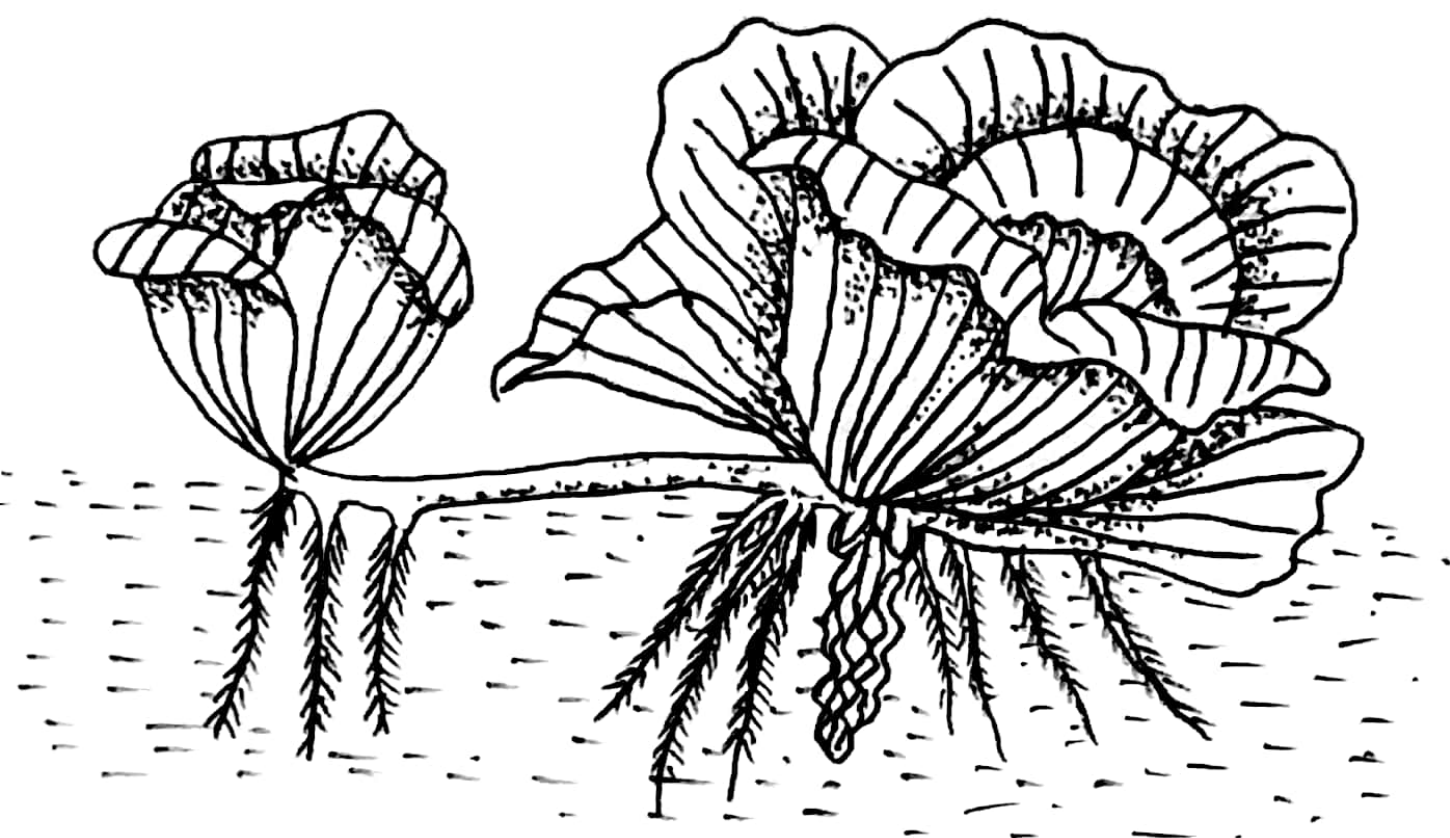
B = depth at which Secchi disc reappears.

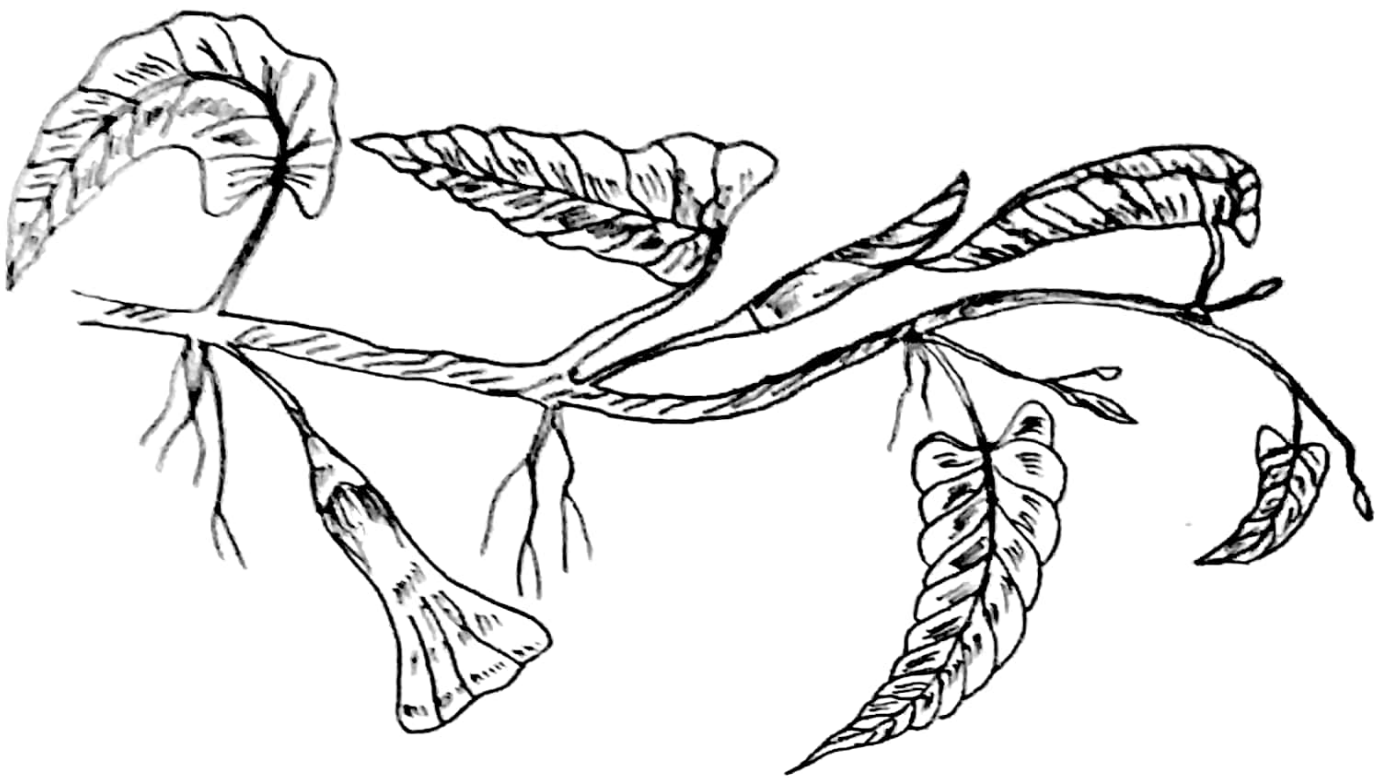
Point of disappearance = 16 cm

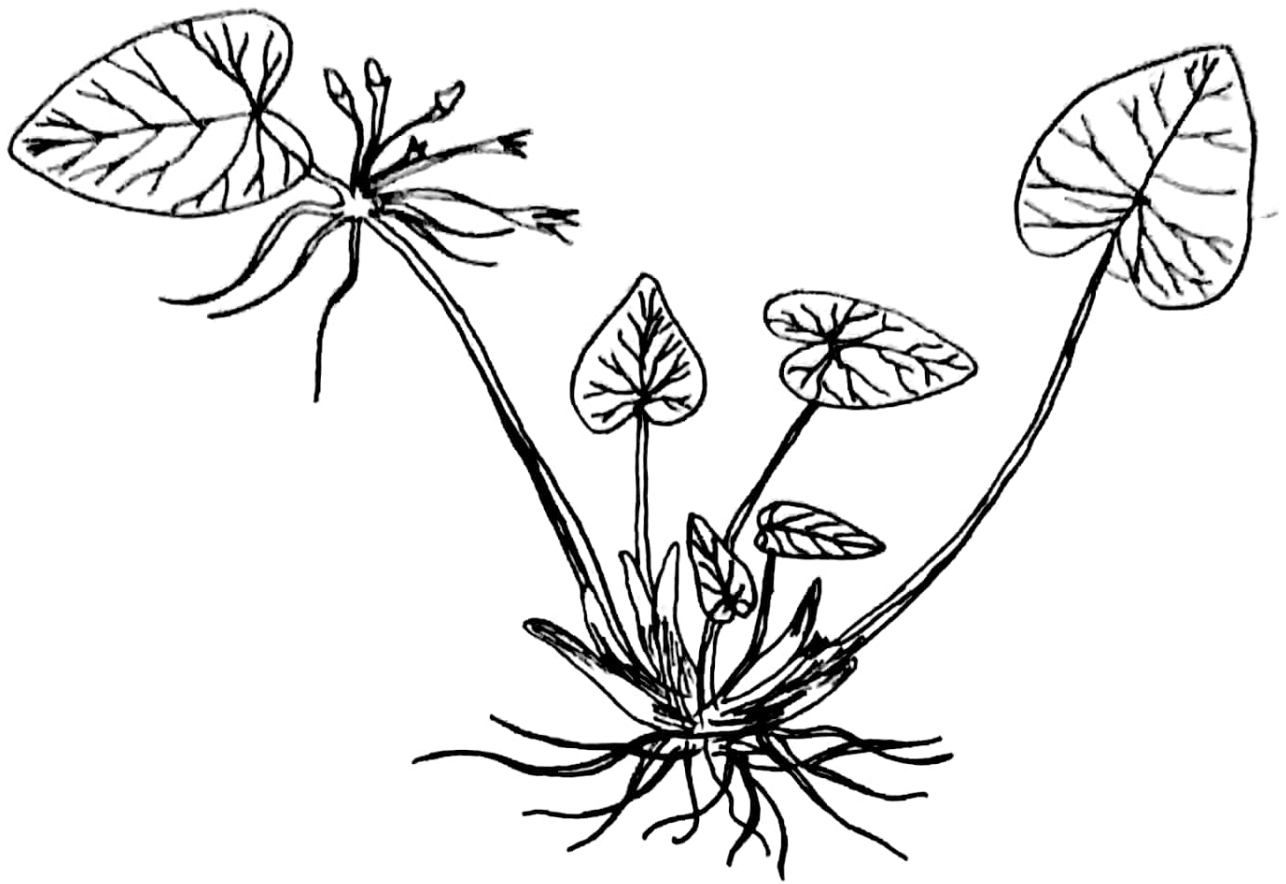
Point of reappearance = 18 cm

$$\therefore \text{Secchi disc light penetration } \frac{16+18}{2} \text{ cm} \\ = 17 \text{ cm}$$









PIC of Nymphaea

Identifying Characters

- (i) Rooted and floating leaves aquatic herbs, rhizome, rooted in the mud.
- (ii) Floating leaves is 4-12 inch long, rounded or oval and long-stalked. Dark green and glossy in above and reddish brown below.
- (iii) Flower is cup / bowl shaped; 5-20 cm (2-8 inch) wide, at least eight petals present in shades of ~~var~~ white, pink, blue or yellow.
- (iv) Fruits are fleshy berry that resembles a capsule.

— Hence, the specimen seems to be Nymphaea sp.

Economic Importance :-

- (i) The seeds of *Nymphaea* are edible due to stored starch. The rhizomes are used as vegetable.
- (ii) The dried and powdered rhizomes are used to cure piles. Flowers are used as cardiac tonic and also in treatment of liver diseases.
- (iii) The flower of *Nymphaea* important for their ~~brilliantly~~ brilliant colours — ~~that~~ for that reason they are cultivate in gardens.

Pic of Ipomoea sp.

Identifying characters :-

- (i) Semi-aquatic, marshy trailing herb.
- (ii) Rooting at the nodes, root system shallow and spreading.
- (iii) Stems are 2-3 m. or more long, hollow spongy allowing them to float.
- (iv) The leaves vary from sagittate to lanceolate.
- (v) Flowers are trumpet-shaped, white in colour with a purple center.

— Hence the specimen seems to be Ipomoea sp.

Economic Importance

- (i) The leaves of Ipomoea sp good source of protein and vitamin A, iron, calcium and phosphorus — therefore used as food.
- (ii) The plant is also used as fodder.
- (iii) Young shoots are used as diabetic patients.
- (iv) The leaves is used to treat coughs and fever.
- (v) The paste of buds used to treat ringworm.

Pic of Pistia sp

Identifying Characters :-

- (i) Small free-floating, stemless, occurring as a single plant or connected to others by stolons.
- (ii) Leaves are sessile, obovate without a leaf stalk, spongy near leaf base and wavy leaf margins.
- (iii) Flowers small, clustered in leaf axils with a single female flower and multiple male flowers.
- (iv) ~~fr~~ Fruits are small ~~berry~~ small green berry.

— Hence the specimen seems to be Pistia sp.

Economic Importance :-

- (1) Pistia sp grown as an ornamental in lakes, ponds, aquaria and gardens.

It is often used in aquarium to provide cover for fry and small fish.

(ii) It can be used as fodder for cattle and pigs.

(iii) leaves can be used as medicine in piles, asthma and cough.

Ecological Impact or

(i) ~~It is a major weed of water lakes, ponds, slow moving waterways, irrigation channels and can completely cover water bodies and hampered the inland fish culture,~~

Ecological Impact

It is a major weed of inland waterbody and can completely cover waterbody and waterbodies, hamper river travel, blocks irrigation canals and ruins inland fish culture.

Eichhornia
pic

Identifying characters :-

- (i) Perennial floating aquatic herb with offset.
- (ii) The leaves are oval to elliptical with spongy petioles. Leaves curve inward at the edges.
- (iii) Shoot consist of branched stoloniferous rhizome with several short internodes.
- (iv) Flowers bisexual very showy pinkish-violet in colour borne on upright spikes.
- (v) Fruit is a thin wall capsule, number of mature seeds ^{can} ~~are~~ 450 per capsule.

— Hence, the specimen seems to be Eichhornia sp.

Economic Importance / Ecological Importance

- (i) It can be used as fodder for cattle and pig.
- (ii) Villagers use dry plant as fuel.
- (iii) It absorbs different heavy metals from aquatic body.
- (iv) Abundant growth ~~it~~ of hyacinth can alter water clarity and decrease phytoplankton production, therefore decrease of ~~lowering~~ dissolved oxygen concentration.
- (v) It has a great impact on food-web structure.

Lymna sp
pic

Identifying characters of

- (i) Free floating weed of surface water.
- (ii) Leaves are two or three in number.
- (iii) Each leaf has one hair like root that has down in water.
- (iv) Rarely produce flower, reproduce asexually by division.

— Hence, the specimen seems to be Lymna sp.

Ecological Importance

- (i) Grown commercially as animal ~~if~~ feed for fish and livestock.
- (ii) It can remove heavy metals from water.
- (iii) Duckweed used to explore the effects of water pollution on plants.