The Sundew plant is well-known for its insect-trapping mechanism. The trapped insects supplement the inadequate mineral nutrition of the soil in which it grows.

Its generic name is ‘Drosera’ and in Bengali it is known as ‘Suryasisir’, in Hindi ‘Mukhajali’ or ‘Kandulessi’, in Kannada ‘Hula Hidaka guda’ or ‘Krimibamdha’, in Marathi ‘Davabindu’ and in Telugu ‘Burada buchi’ or ‘Kavara mogga’.

Members of the genus Drosera occupy a significant part of the Earth’s surface and are mainly distributed in tropical old world countries. Members of this genus prefer to grow in seasonally moist or more rarely constantly wet open habitats with nutrient-poor acidic soils (pH 5.2-6.0) and high levels of sunlight. Some such habitats include ferns, marshes and swamps with a small proportion of sand. Many species grow in association with sphagnum moss in the bogs and most of the tropical species are mainly found in moist riverbanks (Figure 1).

Generally, Sundews inhabit warm climates. However, there are reports that some species have adapted to a wide variety of environments, including extreme living conditions. For instance, species like Drosera burmannii and D. indica even occur in deserts whereas some other species such as D. adelae, D. prolifera and D. schizandra tend to grow in highly humid and shaded environments of the Australian rainforest. Besides, a few European species like D. anglica, D. intermedia, D. rotundifolia, North American species D. linearis and Australian species

The population of Sundew or Drosera has been decreasing day by day. There is a need to conserve this carnivorous plant that has several medicinal properties.
D. arcturi, D. stenopetala, etc., are frost-resistant temperate species, which form hibernacula (a tight cluster of unfurled leaves) in the winter to overcome extreme cold.

Pygmy Sundews (D. pygmaea) show reduced growth and with a dense hairy habit to overcome the extremely dry summer months where they live. For the same reason, some other genera form an underground corm or tuberous stems. Sundews use their underground stems for water and food storage.

In most Sundew plants, the flowers are held far above the leaf traps by a scape or long leafless stalk. The long scape raises the inflorescence to a height that makes physical isolation of the flowers from the trapper leaves. This adaptation is quite helpful for attracting pollinators to the flowers and to divert the direction of non-pollinator insects to the traps as preys.

The flowers are photosensitive, that is, open early in the morning and close by the afternoon. The entire inflorescence is heliotropic, moving in response to the sun’s position in the sky.

Only three species of Sundews are naturally grown in India. Among them Burmann’s Sundew (Drosera burmannii) is the most common species. It occurs throughout India. Burmann’s Sundew is a small plant, normally spanning only 2 cm. The upper surface is covered with sticky glands which trap insects and digest them. It is one of the fastest responding Sundews, and its leaves can curl around an insect in only a few seconds.

Flycatcher (D. indica) mostly grows in the Deccan Peninsula, particularly on the western coasts. The plant is naturally found along ephemeral creeks on sandy soil. The plant can be yellow-green to maroon in colour.

Shield Sundew (D. peltata) is mainly found in Northern Indian plains and even on the hills up to an elevation of 3000 m. It grows up to 9-30 cm. Its upper leaves are shaped like shields.

Many species of Sundews are widely used as herbal medicines. Its medicinal properties have been traced back to the twelfth century when Matthaeus Platearius, an Italian doctor, described the plant as an herbal remedy for coughs. The parts of Sundew plant used in medicine include roots, flowers and fruit capsules.

Expert Trappers
Each leaf of Drosera has hundreds of tentacles that hold a gland at the tip. Sparkling dots of sticky liquid are formed by these glands. This probably earns the plant the common name ‘Sundew’ or ‘Dew of the sun’.

Actually there are two types of glands for trapping and digestion purposes. It has been reported that the stalked glands secrete mucilage to attract the prey and enzymes to digest them whereas the sessile glands absorb the final extract after
digestion. However, the sessile glands are missing in some species.

The mucilage is very thick and sticky. When a prey, walking as well as aerial insect, gets stuck to the mucilage, more tentacles move in to get their mucilage-tipped glands against the insect to keep it from escaping. The insect usually succumbs to death within fifteen minutes as the secreted mucilage envelops them and clogs their spiracles.

The glands atop the tentacles then secrete acids and enzymes which dissolve the insect. The glands produce certain digestive enzymes like esterase, peroxidase, phosphatase and protease. The sessile glands or the leaf lamina then reabsorb the nutrient-rich extracts.

The leaf tentacles of Sundew plants are extremely sensitive and all the species are able to move their tentacles in response to contact with the prey. It is a kind of chemonasty and some species such as D. burmannii, D. glanduligera, D. sessilifolia, etc., take a fraction of seconds to respond – they can bend their snap-tentacles (outer large tentacles of the leaf lamina) towards the digestible prey. Besides, a few species like D. capensis are able to bend their entire lamina just after contact with the prey.

Medicinal Benefits
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Traditional healers of Australia and New Zealand use D. anglica, D. linearis and D. rotundifolia as stimulants and expectorants for treating serious microbial infections like leprosy and tuberculosis. Sundew is usually used as a regimen to various respiratory ailments such as asthma, bronchitis, bronchial spasm, cough, lung infection, and whooping cough. Some species of Drosera have also been used as aphrodisiac and to strengthen the heart, as well as to cure sunburn, stomach ulcer, and toothache.

Recent phytochemical analyses have revealed that Sundews contain a pharmacologically active naphthoquinone compound plumbagin. Plumbagin is largely used for healing
arteriosclerosis, hyperglycemia and hypolipidaemia. Plumbagin also acts as an immunomodulator that enhances phagocytosis activity of human granulocytes. As a result, Sundew is regarded to be very useful for the treatment of leishmaniasis and malaria.

Sundews also contain certain flavonoids such as kaempferol, myricetin, quercetin, and hyperoside. Such bioactive compounds are supposed to be effective against infertility and quercetin is said to be active against cancer.

Other Uses
Sundews contain rossoliside (7-methyl hydrojuglone glucoside) which inhibits the development of insects, parasitic nematodes and the growth of certain pathogenic fungi. It is also applied as an effective anti-feedant to control insect pests. Moreover, Sundews possess various organic acids, viz., ascorbic acid, butyric acid, citric acid, formic acid, gallic acid, malic acid, propionic acid, etc., and also some other constituents such as carotenoids, resin, tannin, etc., which are yet to be used commercially in cosmetics and other products.

Some species of Sundews, such as Drosera aliciae, D. capensis, D. spatulata, etc., have aesthetic value and are usually sold as ornamental plants in nurseries.

The corms of Drosera bulbosa, D. crasipetala, etc., are gathered as a food source by the aboriginal people of South Western Australia. Besides, a local alcoholic beverage is produced from the fresh leaves of D. capensis and D. spatulata. In Scotland, a traditional yellow dye is prepared using D. rotundifolia.

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Threat to Drosera
Some species of Drosera are at the verge of extinction and others are facing acute survival problems. One of the major causes of their depletion is habitat destruction. Sundews generally occur in open wetlands and non-forest regions. But the ever-increasing pressure of human intervention like urban and rural developmental strategies for agriculture and construction purposes has posed a threat to Sundews.

Moreover, nutrient-rich pollutants from agricultural and household sources move into the habitat of these species, due to which the soil and water chemistry gets altered.

All the species of Drosera are protected by law in most European countries where they naturally grow. In addition, all the native species are listed as threatened and/or endangered in Australia, South Africa and North America including the United States.

However, in Asia, surprisingly no species of Drosera is conserved by any governmental law. As a result, exporters are collecting species from the wild indiscriminately. Moreover, due to its ubiquitous medicinal properties, several European countries are importing tropical Asian species of Drosera such as D. burmannii, D. indica, D. peltata, etc., for a herbal preparation called ‘Herba Droserae’ in order to protect their native endangered species like D. anglica, D. intermedia and D. rotundifolia.

Restriction of the habitat to wetland ecosystem, average rainfall, delayed monsoons and temperature fluctuations throughout the year also influence the life cycle of the Sundews. Sundews also face threats from certain competitive invasive species like Hyptis suaveolens, Parthenium hysterophorus, and some newly introduced grasses.

Drosera is in peril of being wiped out completely unless corrective measures are taken to conserve it.

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