Fact Sheet - **Plants of Sudan**

# Azolla filiculoides

Family name: **Salviniaceae**

Common name: **Salviniaceae**

Local name: **Azolla( الأزولا)**




Wild and cultivated

## Role in Biodiversity

*Azolla filiculoides* can form thick mats (5-20 cm thick), on water bodies up to 10 hectares in size which reduce light levels under the water. These mats lead to severe impact on biodiversity of aquatic ecosystems.

Azolla filiculoides can have a negative impact on ecosystems and lead to less biodiversity:

- During decomposition, it creates anaerobic conditions, leading to poor water quality with effects on fish and invertebrates.
- loss of water by evapotranspiration through the weed surfaces
- *Azolla filiculoides* out-compete native species of the same genus.

## Environment and Growing

*Azolla filiculoides* grows well and settles in static and slow-flowing fresh waters. It is able to grow in nitrogen-deficient waters but less phosphorous can limit the growth of the species. It does not tolerate turbulence or waves and is flushed away in strong currents.

Growth requierements:

- The ideal water depth is between 10 and 30 cm .
- Optimum pH range 5-8.
- Optimum temperatures range 15-20°C.

## Reproduction and Communication

*Azolla filiculoides* propagates both asexually (vegetatively through rhizome fragmentation) and sexually by producing spores. Both spores and plant fragments are dispersed long distances along water systems. It is able to undergo rapid vegetative reproduction throughout the year by the elongation and fragmentation of the small fronds. Under ideal conditions, the doubling time of populations can be 4–5 days. Spores division is carried out quite naturally and very freely by the plant. Spores can remain viable in moist soil for up to 3 years.

## Life span

The life span of individuals is over 200 days.

## Size

*Azolla filiculoides* individuals floating length range is 25–35 mm while the collections (mats) reach 15-25 cm thick.

## Parts

Stems are pinnately branched, <5cm long with hanging simple roots beneath floating leaves.

Roots are simple, have fine lateral rootlets with a feathery appearance in the water.

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Leaves are fern like, have a rough granular appearance, and water proof surface. They are bright green in shade and evelops attractive purplish-rose tints when they are exposed to strong sunlight or during cold weather stresse. Leaflets are sessile, alternate, in two rows on the dorsal side of the stem, and bilobed. The upper leaf-lobes are ovate bearing a single papilla on the outer wall. The lower leaf-lobes are often submerged and colourless.

Sporocarps are formed from a ventral lobe initial of a lateral branch. They are of two types, male microsporocarps which are approximately 1.5 mm in diameter and female megasporocarps which are approximately 0.5 mm in diameter.

*Azolla filiculoides* is a non-fruitful plant. It produces megasporocarps which are approximately 0.5 mm in diameter, each producing a single megasporangium.

*Azolla filiculoides* does not produce seeds. It produces spores which are formed in the sporocarps.

## INTRODUCTION

Aquatic herb

*Azolla filiculoides*, mosquito fern, is an aquatic plant native to the tropics, subtropics, and warm temperate regions of Africa, Asia, and the Americas. It is introduced into Europe, North and sub-Saharan Africa and now is widly distributed in the world. It is a fresh water fern grows in association with a heterocystous cyanobacterium (blue-green alga), Anabaena azollae , which is located in cavities in the dorsal leaf-lobes.

In Sudan, *Azolla filiculoides is documented for the first time* as an invasive aquatic fern in the White Nile near Al Hideib village in 2019 and later observed in many other locations on the White Nile and the River Nile. Some farmers have started cultivating Azolla in limited areas as fodder for cows and chickens.

## LIVELIHOODS / CULTURE

### Cultivation

*Azolla filiculoides* cultivation is new and has been done by researchers in a few areas in Sudan such as the Tarajma area near Shendi in River Nile State, where the cultivated Azolla was used as fish feed. The cultivation process involves separating a small piece of the plant and allowing it to develop into a new independent colony. The steps for its cultivation include:

**Habitat preparation**
A container is filled with water, usually a wide basin covered with plastic bags or tarpaulins.

**Introduction of the new plant**
A portion of the Azolla is placed in the water, and gently distributed to ensure that it receives sufficient sunlight.

**Harvesting**
Within a few weeks, the Azolla multiplies dramatically, forming dense green mats that can be harvested using sieves.

*Azolla filiculoides* cultivation in Sudan

An experiment to use *Azolla filiculoides* feed for poultry in Sudan

An experiment to use *Azolla filiculoides* feed for fish in Sudan

### Cultural Value

Although *Azolla filiculoides* has only recently invaded the White Nile, it has already begun to affect the population who depend on the river water for their livelihood. The population in areas where there is a high density of this plant has begun to be negatively affected by changes in the quality of drinking water and an increase in the density of malaria-carrying mosquitoes. A few of them have begun to benefit from it as animal feed and fertilizer for agricultural lands, especially in the seasonal islands of the White Nile.

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### Cultural Expressions

Information not available.

## THREATS

*Azolla filiculoides* is not considered on the Red List 2017 (IUCN categories). This species is considered an invasive aquatic plant that can pose a number of threats to the environment and other species.

Regionally and in its natural habitats, native *Azolla filiculoides* is highly affected by cold weather, strong sunlight and water currents. It is also sensitive to phosphorus deficiency.

Image(s) source :

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