



Desiccation-Tolerant Plant Species

For Prelims: [Western Ghats Species](#), Hydration, Tropical rock outcrops

For Mains: How Desiccation-tolerant vascular (DT) plant species can be used to boost climate resilience agriculture and ensure mass [food security](#).

Source: [DTE](#)

Why in News?

New study discovers 62 desiccation-tolerant vascular plant species in India's Western Ghats, with potential applications in agriculture & conservation. These species of plants can withstand harsh environments.

- A recent study by scientists from **Agharkar Research Institute (ARI)** Pune, an autonomous institute of the [Department of Science and Technology \(DST\)](#), has identified **62 DT species** in the **Western Ghats**, many more than the earlier known nine species.

What is DT Plant?

- Desiccation-tolerant vascular (DT) plants are able to tolerate the desiccation of their vegetative tissues. DT plants are the most common residents of tropical rock outcrops.
- DT plants can survive high dehydration, losing up to 95% of their water content.
 - Dehydration in plants occurs when the plant loses more water than it takes in. A close-up of a plant



- Population:

- As per the study, the global population of these species' ranges between 300 and 1,500.
 - Out of the 62 species found, 16 are native to India and 12 are restricted to Western Ghats outcrops.
- **Habitation:**
 - DT plants can be found in both tropical and temperate regions.
 - They can quickly regenerate when water supplies are restored and are frequently found on rocky outcrops in the tropics.
 - It is crucial for the world's warming that some species can thrive at higher temperatures.
 - Hydration and desiccation resistance are two widely studied mechanisms for plants in harsh environments.
 - Hydration is a situation in which plant tissues can withstand more than 30% water content.
 - Indian desiccation tolerant plants are primarily found in forest rock outcrops and partially shaded tree trunks. Ferricretes (a hard, erosion-resistant layer of sedimentary rock) and basaltic plateaus (plateaus produced by volcanic activity) seemed to be the preferred habitats.
 - **Glyphochloa goensis, Glyphochloa ratnagirica** and **Glyphochloa santapau** were found only on ferricretes (a hard, erosion-resistant layer of sedimentary rock), while the rest of the species were found in both ferricretes and basaltic (plateaus produced by volcanic activity) plateaus.
 - The dominant genus was **Glyphochloa**, with mostly annual species occurring on plateaus.
- **Characteristic:**
 - The DT species showed colour variations and morphological characteristics.
 - **Tripogon species** changed colours from greyish in dry conditions to green in hydrated situations.
 - In **Oropetium thomaeum**, the leaf colour transformed from green to dark purple or orange in the hydrated phase and ranged from brownish to ash in the desiccation phase.
 - Ferns (fronds) displayed a variety of characteristics, including curling inwards towards the costa, exposing spores at the start of the dry season and during brief dry spells.
- This, however, was not true for all species. In the case of **C lanuginosus**, the leaves folded and shriveled inward to shield the **chlorophyllous portion**, avoiding direct sunlight exposure during the desiccation phase.
- **Significance:**
 - Desiccation-resistant vascular plant genes can be used to develop a high temperature tolerant crop variety to boost climate resilience.
 - The discovery of the desiccation-tolerant (DT) vascular plants has **agricultural uses**, particularly in locations where water is scarce.
 - These plants' genes could be exploited to develop a high-temperature tolerant crop variety to boost climate resilience and ensure mass food security.