

I N C O R P O R A T E D

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What Makes a Plant Drought Tolerant?

By Roger Snell

Biologists in California, led by researchers at The Scripps Research Institute and the University of California (UC), San Diego have solved the structure of a critical molecule that helps plants survive during droughts.

National Oceanic and Atmospheric Administration (NOAA) has reported that major droughts in the last three years have caused more than ten billion dollars in losses to crops United States, particularly in California, which is now three years into a severe drought.

The newly solved molecule structure shows the plant hormone called abscisic acid, attached to its "target" protein called PYR1. Abscisic acid is key survival tactics in challenging environmental conditions.

During dry conditions, drought tolerant plants synthesize abscisic acid, causing them conserve water, their to seeds lie dormant in the ground, leaves close pores to

stop water loss, and slow their own growth, in the pursuit of survival

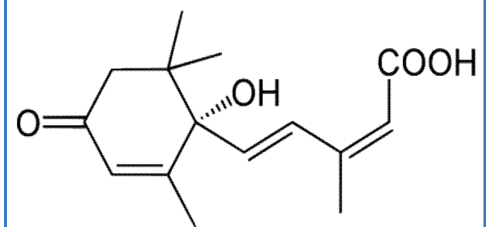
Abscisic acid, discovered in the early 1960s, has been known for decades to play a crucial role in keeping plants alive during drought, but how has not been known.

Earlier this year, two separate groups of scientists discovered a cluster of genes associated with the hormone. Mutations in four of these related genes led to an impaired abscisic acid response and reduced drought resistance.

By solving how the structure worked may reveal new ways of improving drought tolerance in plants. Not just a boon for agriculture, which is the single largest use for water in most of the world, consuming up to 90 percent of available water in some of the hottest and most arid parts of the world, reduced dependence on water has many fold implications for humans.

The possibility of design-

ing chemicals to mimic the action of abscisic acid and spraying these chemicals on crops to protect them drought is quite tantalizing, but the process for producing abscisic acid is very expensive and sunlight can convert the it into an inactive form. Hopefully more research will be done to mimic or cheapen the process in the future and let's hope the technology is kept in the public domain.



abscisic acid

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Plants in the News

Over Half of the World's Magnolia Species Face Extinction in Their Native Habitat

A mapping exercise by experts from Bournemouth University's School of Conservation Sciences has found that over half of the world's magnolia species face extinction in their native forest habitats.

The Red List of the Magnoliaceae is co-authored by Professor Adrian Newton and Daniele Cicuzza from BU's Environmental and Geographical Sciences Group together with Sara Oldfield of Botanic Gardens Conservation International (BGCI).

The Red List identifies threats to the existence of magnolia species including the destruction of habitat to make way for agriculture, and over-exploitation. It claims that 131 wild magnolias from a total of 245 species worldwide are in danger of extinction.

Magnolias are among the most ancient groups of flowering plants and have long been cultivated by mankind. Some specimens growing in the precincts of Chinese temples are estimated to be up to 800 years old.

The significance of their potential loss is considered by experts as a threat to the genetic diversity of the species. Magnolias also serve as highly sensitive indicators of the well-being of the forests in which they are found.

Professor Newton's comprehensive mapping exercise underpins the general report published by BGCI and Fauna and Flora International (FFI).

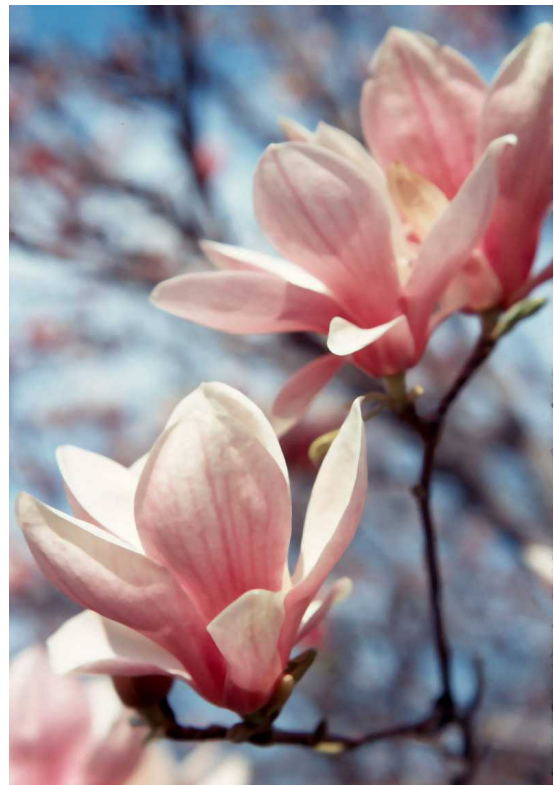
"The maps provide an excellent baseline for future monitoring and conservation planning at a time of rapid environmental change," said Professor Newton. "Comparing species distribution with forest cover for a whole family of flowering plants gives us a unique snapshot of forest biodiversity."

Sara Oldfield added: "There is a strong chance that these species will become extinct unless we take action now. That would be a tragedy because they're so important in local livelihoods and also we would be losing some beautiful trees for ever."

Some two thirds of known magnolia species are found in Asia, with over 40 per cent occurring

in southern China. According to the report half of all wild Chinese magnolias are at risk of extinction. In the Americas, north and south, where magnolias are also found in the wild, a similar picture is emerging. In Colombia, for example, the report concludes that the threat of extinction hangs over 30 of its native species.

BGCI will identify precisely which threatened species are not yet held in ex situ collections (in botanic gardens and arboreta, etc.), and take action to ensure that integrated conservation measures for these species are developed and implemented. —Science Daily



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searchable database!***

Baccharis pilularis by Pattie Roberts

Coyote Bush



Sunset Zones: 5-11; 14-24

Sun: Full

Water: little to moderate;
looks best with monthly watering

Flowers: inconspicuous white

Mature landscape size: 8-24" by 6 feet or more

Extremely drought tolerant, tough, and evergreen! *Baccharis* species are the nectar sources for most of the predatory wasps, native skippers (small butterflies) and native flies. Highly recommended for attracting wildlife! California native, great starter plant for a bad site.

Deer Resistant Plant O' the Month

Pattie Roberts



Deer Resistant Plant o' the Month:

Saponaria x lempergii 'Max Frei'

AKA: Soapwort



Sunset zones: 1-11; 14-24

Water: moderate

Soil: well drained

Size: 6-8" x 20"

Showy masses of bright pink flowers cover the plant in midsummer, carrying over into the fall. Foliage is blue-green, compact. Low maintenance, dependable and well behaved. Suitable for rock gardens, or, in front of taller perennials. Easy to grow. **UC Davis Arboretum All-Star**

UC DAVIS
ARBORETUM



All Stars



ROOT PRODUCTION METHOD

December Chores in the Garden

- ◆ Seed catalogs are arriving. Got my Pinetree yesterday and eagerly awaiting Johnny's. Start planning your veggie garden for next spring. Try the Zephyr squash from Johnny's. I promise you'll never plant another variety.
- ◆ Don't rake up those leaves and throw them away. Compost them, spread them out around your plants, sheet compost them over your veggie garden to keep weeds down through the winter.
- ◆ Keep planting spring bulbs
- ◆ Sow these vegetable seeds directly into the soil: fava beans, radish, shallot and spinach. Wait until after the soil begins to warm in March before planting other seeds.
- ◆ Set out seedlings of broccoli, cabbage, cauliflower and lettuce and crowns of artichokes and asparagus.
- ◆ Start pruning deciduous fruit, nut and shade trees. Don't prune evergreen trees, shrubs, roses or vines now or you may stimulate new growth that could be damaged by frost.
- ◆ Time for the first dormant spray of your fruit trees.

Get your garden on,
Roger

For October,

As a chance seedling, I was discovered in a nursery in Williams, Oregon. I am a hybrid of *Lavandula lanata* and *Lavandula dentate*. My beautiful silver-gray foliage, topped by wonderful blue flowers on long stems. I am named after the stream that travels through the nursery where I was found. I can bloom most of the year in our climate, attracting bees and other important pollinators. I have been tested for drought tolerance and performance, which allowed me to be selected for the prestigious U.C Davis Arboretum All-Star Program

Who am I?

??? Mystery Plant ???

Roger Snell

Guess Me And Win Me!

For December,

My leaf extract is used to lower blood sugar in Asian countries. My leaves are high in corosolic acid. Banaba, Bang lang and many other names I am called by. Drive down any suburban street and you'll see me in shrub form or tree. Showy flowers cover the ends of my branches in summer and if trimmed after the flowers fade you can coax me to bloom again. I am named after a Swedish buddy of Linnaeus, Magnus, but that is just my first name. My specific epithet denotes I am from India and most of my variety names are American Indian. Go figure.

Who am I?



For September:

Soleil Paz, TJ, Jeannie Hanson, Jennie Nitta, Don Yamasaki, Li Vellinga, Dee Whitehill,—all guessed the Mystery Plant correctly!



It was:

We a have winner!

***Lavandula* 'Goodwin Creek'**

If you think you know this month's plant, **Call us!** If you have some suggestions, let us know them too. (916) 652-9261 x 1