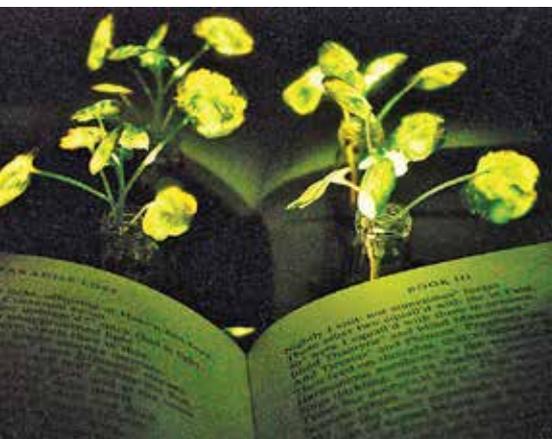


Horticultural News and Research Important to American Gardeners

GLOW-IN-THE-DARK PLANTS

Could your houseplants double as a nightlight? Researchers at the Massachusetts Institute of Technology (MIT) in Cambridge recently have come a little closer to making this a reality.

Developing light-emitting plants could provide alternatives to lamps and even streetlights, as a way of saving money and reducing consumption of fossil fuels. Previous attempts to do so have involved gene splicing, but the MIT engineering team has successfully used an immersion process by which light-emitting nanoparticles are embedded in the plants' cells. This immersion process has the advantage of being adaptable to a wide variety of plants, as opposed to genetic engineering, which is currently limited to specific plants.



Two watercress plants that have been immersed in light-emitting nanoparticles produce a faint glow in a laboratory at MIT.

Using nanoparticles laced with the same chemicals that are responsible for a firefly's glow, the researchers created watercress plants that could glow for about 45 minutes. They managed to increase the duration to three-and-a-half hours by adjusting the concentrations of the firefly chemicals. The intensity of the light emitted also increases with these concentrations, but so far has not been nearly enough to read by. The researchers are working to determine



After an unusually early snow melt in 2015, communities of wildflowers on the slopes of Mount Rainier drastically changed the timing and duration of their blooms.

exactly how much can be added to plants without becoming toxic to them.

Read more about the MIT study and view a video of the immersion process at <http://news.mit.edu/2017/engineers-create-nanobionic-plants-that-glow-1213>.

CLIMATE CHANGE AFFECTING MOUNT RAINIER'S WILDFLOWERS

Mount Rainier's blanket of snow certainly makes this volcanic peak in Washington's Cascade mountains picturesque. It also plays an important role for local plant communities. On Mount Rainier, "snow is the major driver of plant behavior, because the annual cycle of flowering and reproducing cannot begin until the snow melts," explains Janneke Hille Ris Lambers, a University of Washington biology professor who studies these plants and their ecological interactions.

While collecting data on the mountain's plant communities from 2010 to 2015, Hille Ris Lambers and two doctoral students, Ian Breckheimer and Elli Theobald, observed

how an unusually early snow melt in 2015 dramatically impacted these wildflowers. "Conditions were so warm that they affected the flowering time and flowering duration of species, forming communities in 2015 that simply did not exist in the other years of our study," says Theobald.

As the researchers explain in their paper, published in October 2017 in the journal *Ecology*, their findings provide insight into the ecological implications of climate change. In 2015, the researchers noted that flowering windows for different species converged when they are normally weeks apart from one another. In addition, some flowering seasons increased or decreased by several weeks. For many native plant species, their bloom times coincide with pollinator life cycles, so it will be important to understand how big shifts in blooming due to climate change will affect all the complex interactions of these interdependent communities.

To learn more about this study and its results, visit www.washington.edu/news/2017/11/07/.

IN MEMORIAM: CALIFORNIA PLANTSWOMAN RUTH BANCROFT

Ruth Bancroft, a legendary California plantswoman and garden designer, died in late November at the venerable age of 109.

Bancroft was the founder and creator of the Ruth Bancroft Garden in

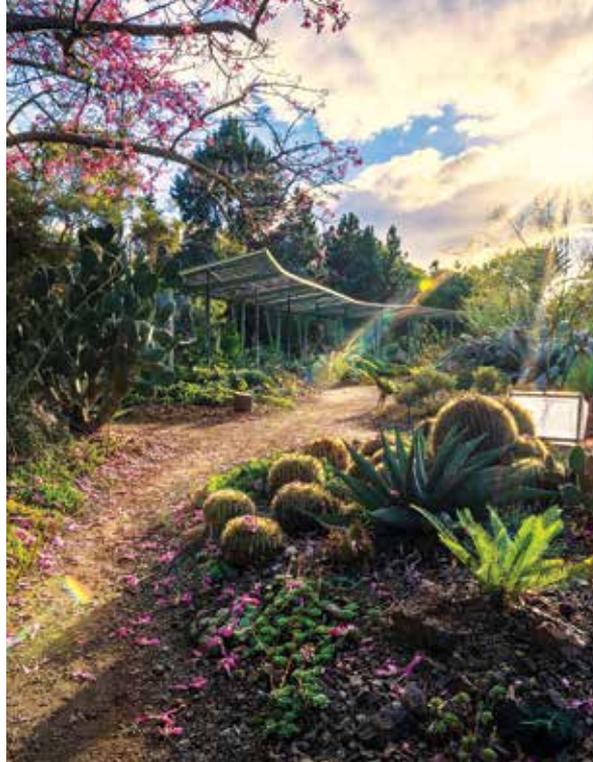


Ruth Bancroft

Walnut Creek, California, a highly regarded “dry” garden that showcases how to use drought-tolerant plants in aesthetically pleasing ways. The Bay Area property was farmland in 1939 when Bancroft moved

there following her marriage to Philip Bancroft Jr.

The modern garden originated in the early 1970s, when Bancroft decided to begin planting her extensive potted succulent collection in the landscape.



A wide variety of cacti and other succulents flourish at the Ruth Bancroft Garden.

Her eye for design—she was originally training to be an architect—and grasp of what plants were adapted to the Bay Area climate drew the attention of plant

lovers from around the world. Among the awed visitors was Frank Cabot, who was inspired to found the nonprofit Garden Conservancy to ensure the garden would be preserved beyond Bancroft’s lifetime. The Ruth Bancroft Garden opened to the public in 1992, and Bancroft remained the primary gardener until she retired in 2005. [See the March/April 2014 issue of this magazine for an article about Bancroft’s garden.]

A public celebration for Bancroft will be held at the garden on February 17. You can learn more about her legacy and the garden itself at www.ruthbancroftgarden.org.

NEW AWARD FOR SUSTAINABLE ROSES

A rose by any other name would smell as sweet...but might not be as well suited to one’s garden. American Rose Trials



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LEFT: DENNIS GALLOWAY, COURTESY OF RUTH BANCROFT GARDEN. LEFT, BRIAN GIN, COURTESY OF RUTH BANCROFT GARDEN

GARDENS AND OTHER GREEN SPACES LINKED TO BETTER HEALTH

As wild spaces disappear and urban sprawl further separates people from the natural world, a growing body of empirical evidence suggests that reversing this trend is essential for our well-being. Here is a brief roundup of studies published in the past year that associate exposure to nature and green spaces with better physical and mental health.

Forests Boost Healthy Brain Activity. Researchers in Germany concluded that people who live near forested areas in Berlin have “healthier” activity in the amygdala, the part of the brain that controls emotions, than those who don’t. The study, which involved land-use records and brain scans, focused on adults 60 and older because they were likely to be more sedentary than younger adults and thus more deeply affected by their immediate environment. www.nature.com/articles/s41598-017-12046-7.

Green Spaces Extend Life Expectancy. While the prior study was localized, researchers at the University of New Brunswick in Canada recently released results of an 11-year study that included 1.3 million adults across the nation’s largest cities. They found that living in proximity to green spaces significantly lowered people’s risk of dying prematurely from natural causes. The study, based on satellite imaging and postal records, indicated the effect was not linked to a specific type of green space—i.e. gardens, golf courses, or parks—but to any type of “green surroundings.” [www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(17\)30118-3/fulltext](http://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(17)30118-3/fulltext).

Plants Help Kids Concentrate. An analysis conducted by a Spanish organization, INMA, found children’s cognitive development benefits from exposure to green space. Previous studies had been limited by the time frame used in the study; this new report evaluated a group of children at varying stages of growth. Children who lived near green space scored higher on attention tests. The authors believe more work is needed to test the effects of climate and differing regional vegetation. <https://ehp.niehs.nih.gov/ehp694>.

Nature’s Psychological Benefits. A study by researchers at the University of British Columbia, Okanagan investigated how students’ visceral reactions to nature affected their emotional state. The undergraduates in the study were asked to photograph objects or scenes that elicited a reaction from them, and record those responses. The qualitative results revealed that much more positive themes were evoked by nature than by manmade structures. After the study, those participants who’d been asked to look at natural scenes expressed happier, more prosocial attitudes. www.tandfonline.com/doi.

—Aaron Dorman, Editorial Intern



for Sustainability (ARTS) has been putting newer rose varieties to the test around the country over the last few years, evaluating them on a number of environmentally-related criteria. Three varieties earned the label of Master Rose from ARTS: Icecap™ and Peachy Knock Out™ from Conard Pyle and Star Roses, and the Double 10™ from Altman Plants.

In addition to their floriferousness, these roses demonstrated exceptional hardiness, disease resistance, tolerance to drought, and adaptability to different soils. They did all this without the synthetic chemicals that many other roses often require to look their best.

Established in Maine in 2014, ARTS partners with trial sites across the United States, including botanic gardens, universities, and municipalities. In each trial, the test roses are compared against two “control” roses using a standardized scoring system.



The American Rose Trials for Sustainability has designated Peachy Knock Out a Master Rose.

Regional awards identify the best roses for specific areas of the country, but only those that receive top scores in four or more regions get the Master Rose designation.

For more information, visit www.americanrosetrialsforsustainability.org.

MAJOR EXPANSION FOR MEIJER GARDENS

As far as public gardens go, Frederik

Meijer Gardens and Sculpture Park in Grand Rapids, Michigan, is quite young. But since opening in 1995, the destination has proved so popular that plans are underway for a \$115 million expansion.

The project, expected to reach completion in 2021, will include a new welcome center and entry plaza, a picnic pavilion, rain gardens to control water runoff, and a relocation for the existing English perennial garden. The construction of additional classroom space will also allow Meijer to expand its educational program offerings.

The 158-acre property, which features one of the country’s largest indoor tropical conservatories, had already undergone several upgrades, including the opening of the Richard and Helen DeVos Japanese Garden in 2015.

Work on the new buildings and gardens began this past fall. For further details, visit www.meijergardens.org.

Written by Editorial Intern Aaron Dorman with Associate Editor Viveka Neveln.