Growing Neonic Free

Gary Mangum

Bell Nursery USA

Why we're here

On June 15, 2013, during National Pollinator Week, a landscaper sprayed blooming linden trees with a neonic pesticide to rid them of aphids. Contrary to label instructions, the trees were sprayed in the middle of the day while bees were obviously feeding. This misuse of neonics ignited a national outcry when an estimated 50,000 bees and other insects fell to their death in this Wilsonville, Ore. Target parking lot.

- The Oregon Department of Agriculture found the landscapers negligent in applying a pesticide contrary to label instructions - while the trees were "clearly in bloom" - and imposed a $550 fine
- Soon after, environmental activist groups published a report pinpointing neonicotinoid pesticides as a key cause of bee population decline

Local activists hold a memorial for bees killed by the misapplication of pesticides in Oregon, kicking off a substantial fundraising campaign.

Local activists rally outside a Home Depot store

The sting…

- Over the next few months environmental groups raised hundreds of thousands of dollars, and launched an effective, but factually questionable campaign against the use of neonics in horticulture
- One year later, in June 2014, again during National Pollinator Week, neonics were applied to blooming linden trees in a Eugene, Oregon apartment complex, killing an estimated 1000 bees
- Soon after, the state of Oregon restricted use of two common neonicotinoid pesticides - dinotefuran and imidacloprid
- Once again, the tree care service provider did not follow EPA label instructions, and was fined accordingly. These two incidents included the same trees, in a similar location, both during National Pollinator Week

Activists hand out flyers to consumers

The PR climate

Sources:

TIME MAGAZINE: The Plight of the Honey Bee - August 19, 2013

SCIENTIFIC AMERICAN: Solving the Mystery of the Vanishing Bees - April 2009 – http://blogs.scientificamerican.com/observations/2012/04/06/common-pesticide-implicated-bee-colony-collapse-disorder/

See more at:
http://www.motherjones.com/tom-philpott/2014/05/smoking-gun-bee-collapse
http://science.time.com/2013/05/07/beepocalypse-redux-honey-bees-are-still-dying-and-we-still-dont-know-why/
http://www.fastcodesign.com/1672866/this-is-what-our-grocery-shelves-would-look-like-without-bees
http://www.foe.org/beeaction

Bee educated

European honey bees (Apis mellifera) are the most important pollinator species in agriculture. They are easily managed and moved to meet crop pollination demands.

Important to note is that other species are responsible for the vast majority of open pollination that occurs in the US and elsewhere.

More than half the managed colonies in the U.S. are transported to California each year to pollinate almonds!

90% of all European honey bees in America live in hives managed by professional and hobby beekeepers.

Managed hives make up more than 90% of the honey bee population in America, and are used to pollinate 30% of the nation's food crops, at a value of more than $15 billion a year.

Bee populations

01

Globally, the number of honey bee colonies has increased by 45% over the past 50 years.

02

After World War II, non native honey bee populations began to decline in the United States, along with reduced demand for honey as a wartime sugar replacement.

03

Populations declined again in the 1980s when Varroa Mites arrived in North America.

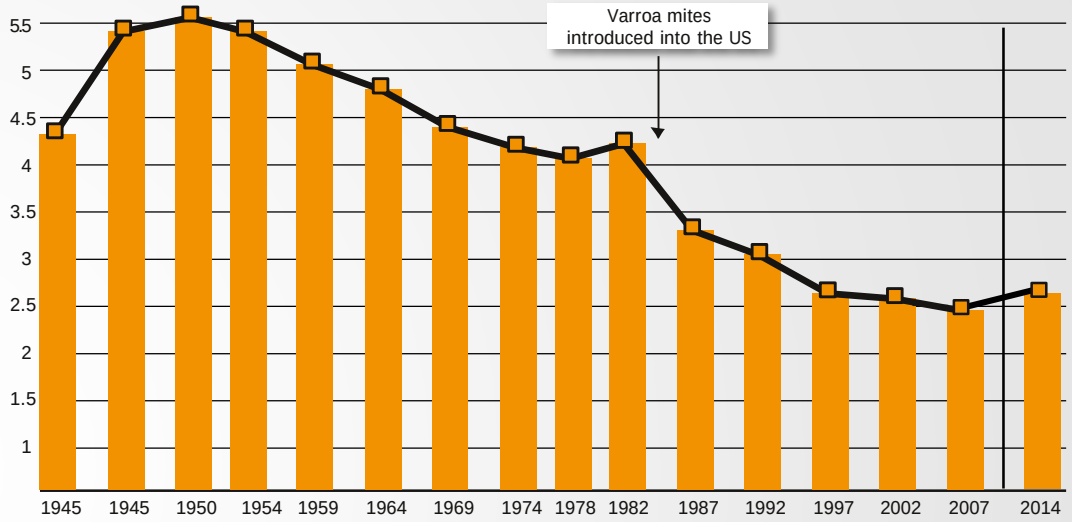
04

In 2006 a phenomenon known as Colony Collapse Disorder (CCD) saw winter losses of 30-90% of managed hive populations rather than the usual 10-15% annual loss. The causes of CCD remain unknown, but rates have flattened.

05

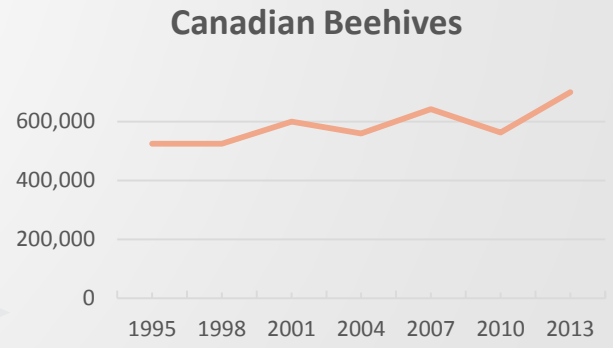
In recent years beehive numbers have started to climb due to demand of pollination services. In 2014 we had returned to 1997 levels.

Number of honey producing colonies in the US (x 1 000 000)



Data source: U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) NB: Data collected for producers with 5 or more colonies. Honey producing colonies are the maximum number of colonies from which honey was taken during the year. It is possible to take honey from colonies which did not survive the entire year.

2014 Data sourced from AmericanHort.



Known factors in bee population decline

- **Habitat loss** - Lack of nutritious summer foraging locations = lack of varied diet = poor nutrition
- **Genetic Weakness** - Because the majority of honey bees are in managed hives, they lack genetic diversity, which makes them weak against disease
- **Pesticides** - Pesticides, including misuse of miticides used by beekeepers to control disease inside the hives
- **Varroa mite** - The leading cause of bee death in the United States
- **Diseases** - N*osema ceranae* and other bacteria and viruses
- **Long distance transportation** - Commercial beekeepers frequently move colonies great distances to meet pollination demands of different crops during the season, adding stress to bee populations
- **Poor bee husbandry** - Beekeeping management practices are not regulated in the United States. Hobbyists are often untrained, and are often criticized in the professional beekeeping industry for a lack of education, resulting in unsubstantiated claims related to pesticides
- **Weather patterns** - Changing climates effect bees which have naturally occurring population declines in winter months

International influence

- The EU imposed a two year partial ban on neonics as of December 1, 2013
- A recent memo dated June 2010 indicates researchers opposed to neonics may have made up their mind before analyzing their data, in an effort to isolate data which supported only preconceived notions.

Sources:

http://www.thetimes.co.uk/tto/environment/article4286838.ece

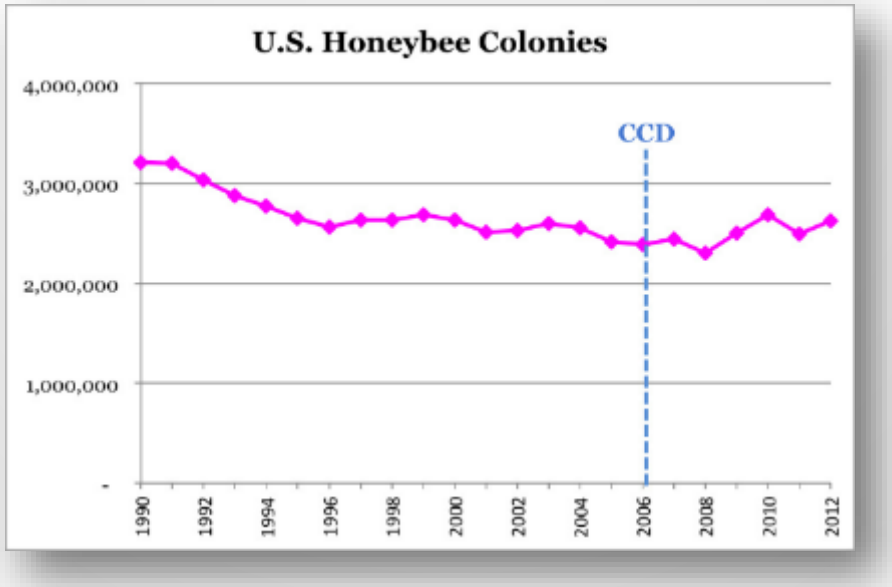
http://www.forbes.com/sites/paulrodgers/2014/12/04/leaked-memo-raises-questions-about-pesticide-ban/

http://www.independent.co.uk/environment/nature/victory-for-bees-as-european-union-bans-neonicotinoid-pesticides-blamed-for-destroying-bee-population-8595408.html

International figures (continued…)

- Australia, the only continent on the planet without Varroa mite, has steady bee populations, producing vast quantities of honey, with steady exposure to neonics
- Canadian honey bee populations are on the rise, particularly in the canola fields of the west where neonics are regularly used

A focus on 1990 to 2012 population trends

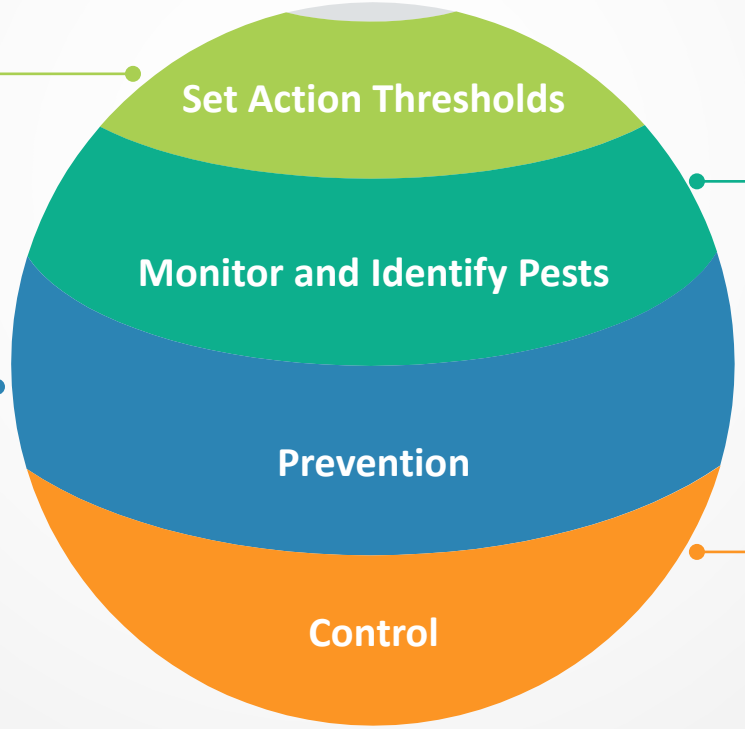


IPM

Integrated Pest Management (IPM) relies on a combination of common-sense practices, and uses comprehensive information on pests and control methods to determine the most economical, least hazardous treatment. The four tiers of IPM are:

Set a point (action threshold) at which pest populations or environmental conditions indicate that action must be taken. A small-scale pest intrusion does not always mean control is needed.

Prevent pests from becoming a threat by rotating crops, selecting pest-resistant varieties, and planting pest-free rootstock. These can be effective and cost-efficient methods with little to no risk to people or the environment



Not all insects, weeds, etc. require control. Many are innocuous, and some are beneficial. Monitors for pests and identify them accurately, so that appropriate control decisions can be made in conjunction with action thresholds.

Once determined that pest control is required, evaluate methods for effectiveness and risk. Choose less risky controls first, then additional methods, such as targeted use of pesticides, may be employed as needed.

Facts of neonics

"Neonics are a key asset to helping avoid resistance build up and maintain effectiveness. Remove neonics and the alternatives just aren't effective, and we run the very serious risk of developing pest resistance to the few remaining systemic tools we have."
Tom Wheeler – Head Grower (Bell Nursery)

1 Neonics are among the safest class of pesticide on the market, for birds, pets, and people.

2 Since the introduction of effective systemic neonics in the '90s, overall pesticide use in our operation has been reduced by more than 70%.

3 Systemic neonics require fewer applications and are not airborne, reducing worker exposure to potentially harmful chemicals.

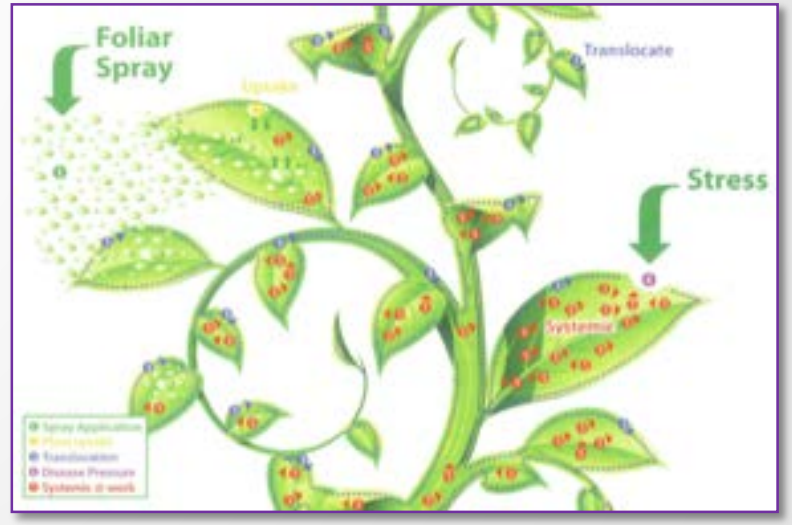
4 Reducing chemical options increases risk of developing pest resistance to treatments from the remaining options. The most effective use of controls, chemical or otherwise, is to rotate through the full range of options.

Benefits of systemic pesticides

Systemic pesticides are applied to the soil, absorbed, and translocated, into the plant via the xylem, or water canals of the roots, stems, and leaves.

- A single application protects plants throughout the growing season (in our business)
- Minimal, if any, issues associated with “drift” to neighboring crops compared to foliar applications
- Less exposure to workers and customers when compared to plants that receive foliar applications
- Not washed off in the rain or broken down by UV light
- No unsightly residue on the leaves
- Less direct impact on beneficial insects and pollinators

“Broader spectrum [foliar] treatments are simply not as safe. Neonics are the best of both worlds: effective on the target insects and safe for humans and the environment, when used according to the label.“ ***Tom Wheeler***



Growing neonic free: challenges

In 2014 Bell Nursery grew all crops, inside and out, without neonics

This was an internal experiment, not intended for public discussion

Fewer tools = increased resistance

This did not mean we grew chemical free

New alternatives are coming on the market

New as of late 2014:
Mainspring
Rycar
Sultan
XXPire

"We experimented with alternatives throughout the year, but many were simply not as effective or efficient. Using chemical controls that damage beneficial insects such as ladybugs would alter IPM as we know it."
Tom Wheeler

Growing alternatives

New as of late 2014

Kontos **Mainspring** **Rycar** **Sultan** **XXPire**

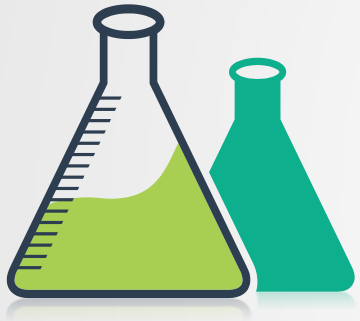
- Kontos from OHP, was our primary neonicotinoid alternative for poinsettias 2013 and 2014, and our alternative systemic drench for spring season on all combinations not containing geraniums
- Can be used as a systemic as drench or foliar spray
- Labeled as not for use on geraniums, and some tropicals
- We saw some flower delay in verbena at particularly higher rates
- Potentially toxic to honey bee larvae through residues in pollen and nectar
- Refer to label to minimize risk

Geranium - there are limited chemical options that can be used on geraniums, which could lead to reduced production of one of our most popular varieties, sold as bedding plants and in our most popular combination containers and baskets.

Verbena – Kontos negatively affected the flowering of verbena.

Implications of a world without neonics

- Major species in certain forests could be wiped out if not for neonicotinoids used in controlling:



Asian Longhorned Beetle (ALB)

Hemlock Woolley Adelgid

Emerald Ash Borer (EAB)

Japanese Beetle

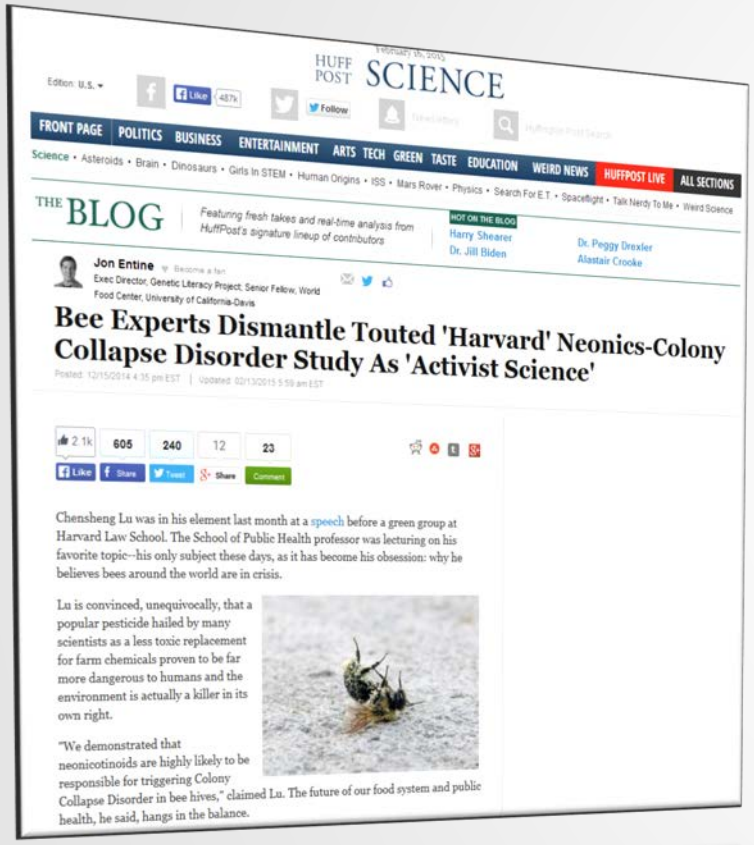
- At home and in the greenhouse, growers and consumers alike would be confronted with whiteflies, scales, aphids, mealybugs
- Moving away from neonics would force growers back to previous generations of insecticides that are less effective, requiring higher application rates and increased frequency of application, further exposing workers and others to chemicals known to cause disease in pets and humans

The PR tide turning?

- Recent coverage is increasingly balanced
- One headline states Neonics may actually help bee health –
  a claim we are not making but one becoming more prevalent recently

Sources:
http://www.science20.com/jon_entine/part_i_bee_deaths_mystery_solved_neonicotinoids_neonics_may_actually_help_bee_health-149615
http://online.wsj.com/articles/henry-i-miller-why-the-buzz-about-a-bee-pocalypse-is-a-honey-trap-1406071612
http://www.forbes.com/sites/jonentine/2014/02/05/bee-deaths-reversal-as-evidence-points-away-from-neonics-as-driver-pressure-builds-to-rethink-ban/
http://www.nytimes.com/2014/01/22/us/bee-deaths-may-stem-from-virus-study-says.html?ref=research&_r=3

More articles



Huffington Post: Science

By John Entine | Posted: 12/15/2014 4:35 pm EST Updated: 02/13/2015 5:59 am EST

http://www.huffingtonpost.com/jon-entine/post_8761_b_6323626.html

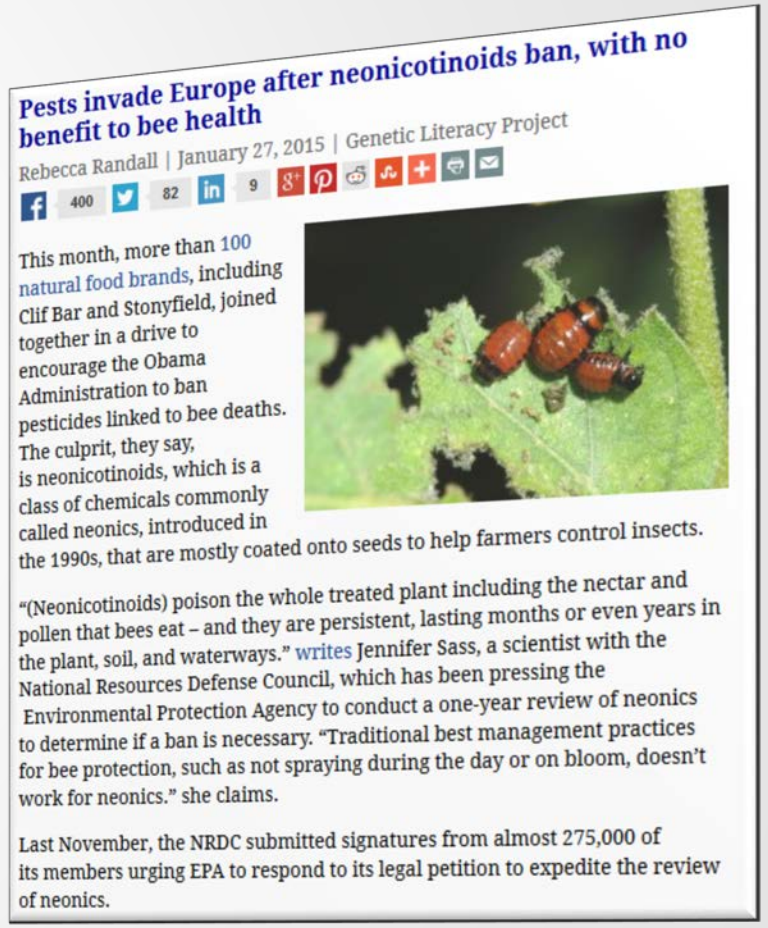
Bee Experts Dismantle Touted 'Harvard' Neonics-Colony Collapse Disorder Study As 'Activist Science'

Genetic Literacy Project

Rebecca Randall | January 27, 2015

http://geneticliteracyproject.org/2015/01/27/pests-invade-europe-after-neonicotinoids-ban-with-no-benefit-to-bee-health/

Pests invade Europe after neonicotinoids ban, with no benefit to bee health



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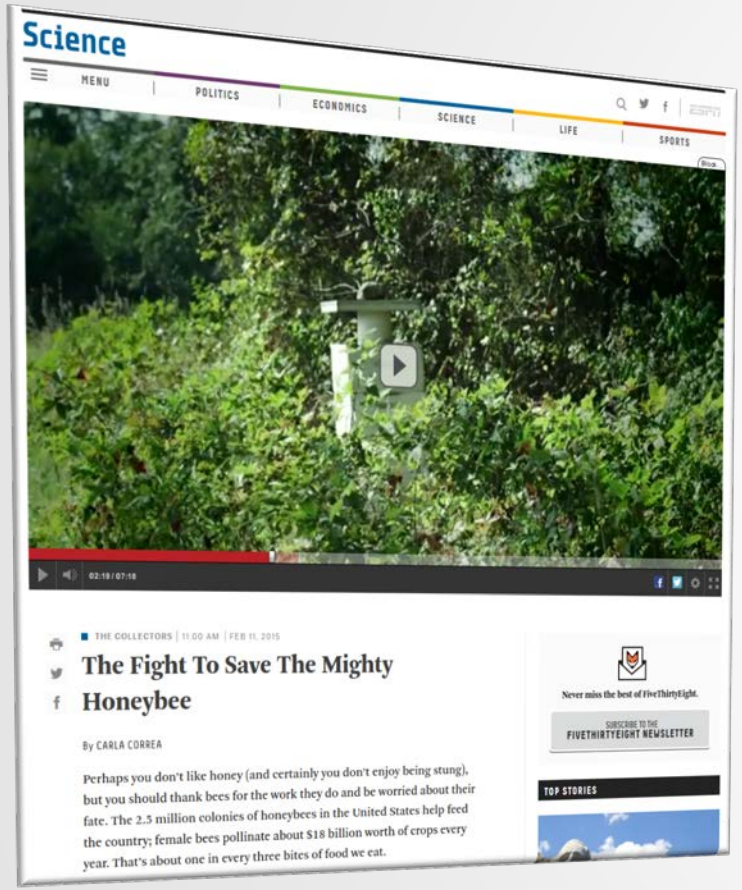


The Fight To Save The Mighty Honeybee

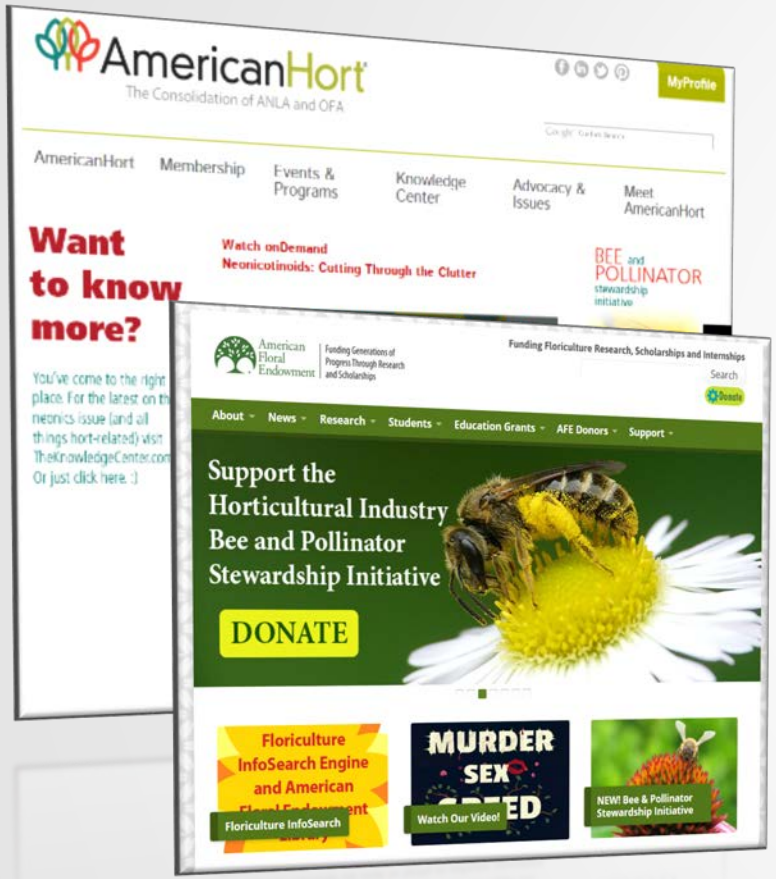
- By Carla Correa | Feb 11 2015
  http://fivethirtyeight.com/science/

Perhaps you don't like honey (and certainly you don't enjoy being stung), but you should thank bees for the work they do and be worried about their fate. The 2.5 million colonies of honeybees in the United States help feed the country; female bees pollinate about $18 billion worth of crops every year. That's about one in every three bites of food we eat.

But there's a threat to that system that director Steven Cantor chronicles in the latest short film in our "Collectors" series, "Beekeeper." The film was accepted into the Sundance Film Festival.

Varroa mites are killing colonies — just 2,000 of the parasites can wipe out 30,000 bees in one year. University of Maryland entomologist Dennis vanEngelsdorp explains to Cantor, and us, how he and others in the field are trying to keep colonies — and ultimately our kitchens — stocked.

PR: educating the public: Our role

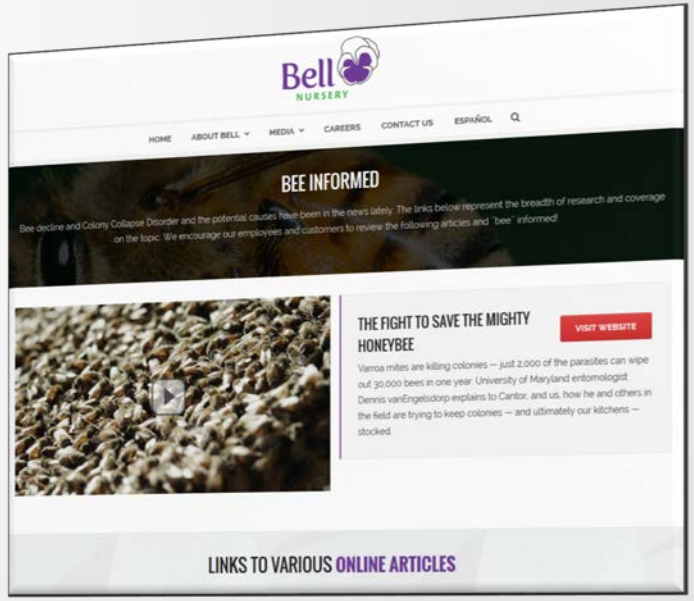


Work with AmericanHort and SAF to develop and fund:

- National PR campaign for horticulture and floral industries to facilitate a more balanced discussion
- Speak with leading voices including beekeepers, growers, and environmentalists on the reality of bee health and the role of horticulture on their populations
- Ask relevant questions and develop research parameters to get them answered

http://americanhort.org/bees

http://endowment.org



http://bellnursery.com/articles/bee-informed

http://bellnursery.com/articles/2014-sustainability-statement

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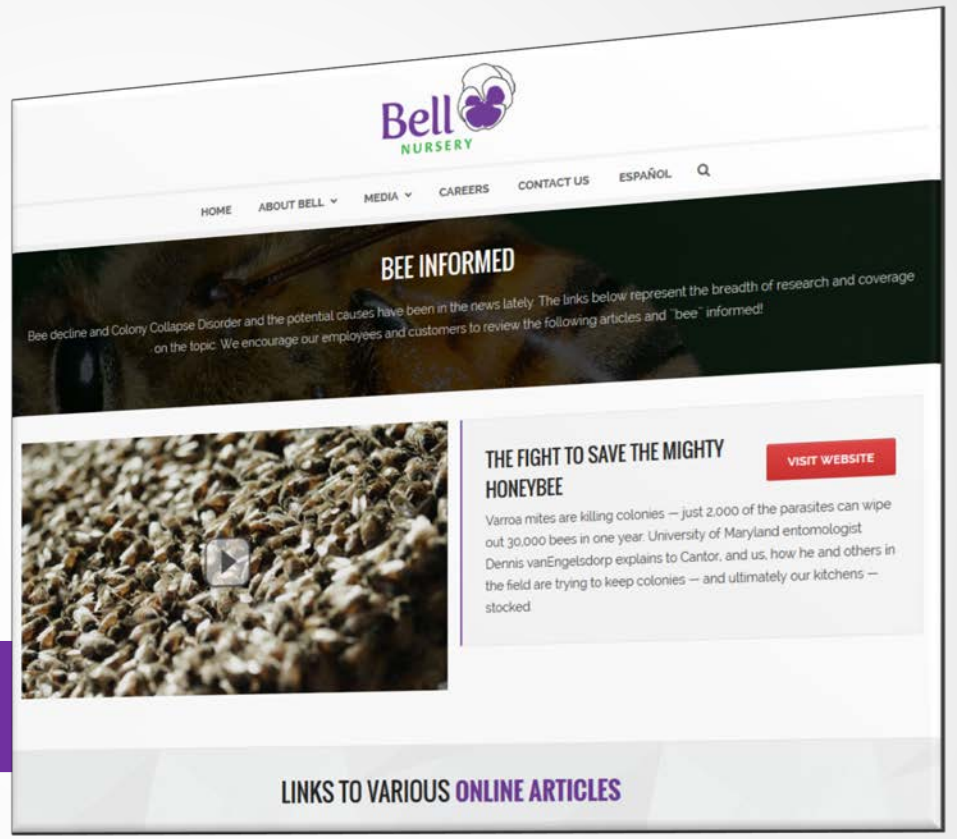
For a concise collection or related articles, please visit our “Bee Informed” subsite…

http://bellnursery.com/bee-informed



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What is the end game?

How do we reach a common ground in order to understand the importance and relevance of neonicotinoids, as they are considered the safest class of pesticides. Is the real goal of some to eliminate pesticides all together?

Over the past ten years in our business we've reduced the use of pesticides by over 70% as part of our comprehensive Integrated Pest Management focus. The applications we make today are necessary and effective. We fully removed neonicotinoid class chemicals from our treatment regime in 2014 to see for ourselves the results and economic impact. By reviewing much more science around the subject, we have made the decision to reintroduce neonicotinoids in 2015 as an option for our growers so that we don't see resistance develop, and because it seems clear that this chemical class is the safest product group that there is. We intend to follow the fact-based science and the associated recommendations from EPA and our state departments of agriculture. Should we determine a need, any plants that we treat with neonics will be tagged for consumers as required by our primary customer, the Home Depot.