North Dakota State University Extension

Yard & Garden Report

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Treasure Hunter Discovers Pesticide

If you could go on a treasure hunt, what would you search for?

Would you search for gold? Precious jewels? Dinosaur bones?

John Mynderse searched for a different type of treasure. He was a chemist who loved to collect soil from odd places, hoping to discover pharmaceutical chemicals to fight human diseases.

In 1982, John was enjoying his vacation with his family in the Caribbean. They laid on the sandy beach and relaxed in the warm sun.

But then swarms of bugs started to attack them. They swatted away the bugs, packed up their stuff, and moved to a new spot on the beach.

This new spot was much better. The bugs were surprisingly gone!

After a few moments relaxing in the new location, John's scientific curiosity took over. He began to wonder why there were fewer bugs on this part of the beach.

John took a walk around the area and saw an abandoned rum distillery similar to one shown in the photo.

Time to dig for treasure!

He took soil samples from the distillery and brought them to his lab. There he discovered unknown chemicals produced by a microbe in crushed sugar cane. The product was named spinosad.

Several years of medical and agricultural testing revealed spinosad would kill insects that touched or ate it. The muscles of an insect would flex uncontrollably, leading to paralysis and death within two days.

Since its release in 1997, spinosad has protected crops against beetles, caterpillars, flies, ants, grasshoppers, mites, thrips, mosquitoes and slugs. It is available to gardeners in numerous products including Entrust, Captain Jack's Dead Bug Brew, and Monterey Garden Insect Spray.

This organic pesticide is low in toxicity and much safer to humans compared to the common synthetic chemical insecticides sold at garden centers. The Environmental Protection Agency has detected no link of spinosad to cancer.

Spinosad is very toxic to honey bees, but evidence suggests it has little or no effect on honey bees and beneficial insects after sprays have dried.

You can prevent harming bees by spraying any blooming plants in the evening when bees are not active. The first 3 hours after spraying are critical.

Spinosad breaks down rapidly in sunlight. Most vegetables can be safely harvested from the garden 1 to 3 days after being sprayed.

Spinosad has become one of the safest, most effective pesticides in organic gardening. John Mynderse, the curious chemist, discovered a great treasure in the Caribbean.

Inside This Issue

Preventing Rotten Tomatoes

One of the greatest joys in summer is to harvest your first ripe tomato — unless the tomato is rotten.

Blossom end rot is the No. #1 threat to tomato plants in our gardens today. Our drought has made matters much worse this year.

Blossom end rot is most often associated with a lack of calcium in the fruits. Without enough calcium in their cell walls, the tomato fruits collapse at their bottoms.

Blossom end rot also is associated with drought, high temperatures and low humidities. All of these factors are occurring throughout North Dakota.

What's the answer? **We need to get more calcium to the fruits.**

Some gardeners try to prevent this rot by adding calcium to the soil. They sprinkle eggshells and Tums near the plants. This approach isn't bad but does little good because most soils in North Dakota have an abundance of calcium already in them.

Other gardeners add Epsom salts to the soil, but the magnesium in Epsom salts may worsen the situation.

The best strategy to reduce blossom end rot is to irrigate properly.

The uptake of calcium in the soil by tomato roots depends on the uptake of water. Irrigate regularly. Avoid extremes of waterlogged and droughty soil. Mulch to maintain consistent levels of moisture in the soil.

Cultivate shallowly. Don't damage the roots of your tomato vines. We need these roots to absorb the calcium in the soil solution.

The bottoms of tomato fruits may rot due to a lack of calcium.

Your fertilization practices can make a difference. Do not overfertilize.

Tomato leaves compete with tomato fruits for calcium in the vine. Overfertilization will lead to vines full of leaves that will take calcium from the vine before fruits can get it.

As a general rule, do not sidedress tomato vines until their first fruits are set.

Avoid fertilizers containing ammonium nitrate, a very common source of nitrogen. Ammonium ions compete with calcium ions for the limited areas on roots where nutrients are absorbed. Calcium nitrate is a better choice.

Calcium sprays are available that may prevent blossom end rot, but their effectiveness is inconsistent. Follow the instructions on the label.

You can prepare your own spray if you want to give it a try. Mix 4 tablespoons of calcium nitrate per gallon of water. Spray fruits, not leaves, two to three times a week. The key time is when tomatoes are dime-sized or smaller.

Now is a good time to inspect your tomatoes to see if they are rotten. The first cluster of fruits is most often damaged. Remove any rotten fruits.

Subsequent clusters of fruits are much less susceptible to blossom end rot. As summer progresses, the vine's network of roots expands, allowing it to absorb more calcium into the plant. The leaves and fruits on the vine are in better balance later in summer, too.

Focus your attention on irrigating your garden when needed and don't overfertilize. Soon you will be enjoying lots of tasty tomatoes this summer.

Plant Health Care

Landscapes

How to Water Your Lawn

Your lawn needs about an inch of water per week from you and/or rainfall.

Set a group of flat-bottomed cups at 5- to 10-foot intervals from the base of your sprinkler to the edge of its reach. Measure the time it takes for an inch of water to fall in the cups. Use this as your base time.

Water deeply. It is better to give your lawn a big gulp of water rather than a series of sips. Roots grow where the water is. If you water deeply, you will develop a deep root system. On the other hand, if you only sprinkle the surface of the soil, you will create a shallow root system.

If you have a clay soil, irrigate only once or twice a week. Sandy soils can't hold a full inch of water, so we will need to split the application to two or three times a week.

Split applications are also a good idea if you see water running off from the lawn (for example, on a sloped landscape). We want the water to be absorbed and not to run off. Water in the early morning.

Pause on Fertilizing

Lawns are not hungry now. Wait until September when temps cool off and lawns get invigorated.

Stop fertilizing trees and shrubs. We do not want to stimulate new growth, which will be succulent and subject to winter injury.

Leaf Scorch

Notice the brown edges. Newly planted trees are especially sensitive. Irrigate deeply when needed. Rock mulches generate heat and should be avoided; shredded bark or wood chips are better.

Dicamba Injury

Increased use of dicamba in soybeans puts nearby trees at greater risk. Leaves may become cupped, curled and elongated. Most trees survive.

Petiole Galls on Poplar

Bumps appear on petioles, and the leaves may drop. Aphids develop inside the galls and later emerge to feed on mustards. Defoliation is minor. Rake leaves. No pesticides are needed.

Remove Tree Guards

Tree guards during summer can strangle trunks, reduce growth, promote trunk rot and provide shelter to insect pests. Place guards back on trees after leaves drop in fall.

Plant Health Care

Vegetables

Herbicide Injury in Gardens

Exposure to pesticide drift or pesticide-contaminated manure/clippings may cause curling of foliage. Potato and tomato vines are very sensitive. Plants will be stunted and yields may be poor.

Early Blight on Tomato

Remove foliage that is infected and/or touching soil. Protect with fungicides chlorothalonil, mancozeb or copper. Avoid overhead irrigation. Avoid splashing soil (the source of the fungus) onto vines. Stake and prune vines.

Leafhoppers on Potato

Small, wedge-shaped pests suck sap and inject toxin in leaves, causing "hopper burn." Leaf edges and tips turn yellow and dry. Plants usually tolerate the damage. Spray with pyrethroids, neem or pyrethrin if needed. Control weeds.

Sow Fall Spinach

This is a great time to sow spinach. It will be ready within 40 days. Keep the seed bed moist because spinach seeds struggle to germinate in hot soil.

Slow to Ripen Tomatoes

Optimal ripening temps are 68–77°F. The more temps stray from this range, the slower reddening occurs. Clipping vines won't accelerate ripening.

Blind Cauliflower

Temperatures over 86°F during the day and 77°F at night may prevent a cauliflower plant from producing a head. This damage may also be caused by mechanical injury, birds or insects. Mulch to keep the soil cool and moist.

Bumpy Broccoli

Heat stress may cause broccoli heads to develop unevenly. Leaves may grow inside the heads. Keep soil moisture uniform. Mulching helps to conserve soil moisture and reduce temperatures. Plant heat-resistant varieties.

Tomato Flower Drop

Blossoms fail to set fruit under extreme temps, drying winds or drought. A series of day temps above 85°F or night temps above 70°F can cause drop. Bean and cuke blossoms are less sensitive; pepper blossoms are more sensitive.

Plant Health Care

Fruits

Scorch on Raspberry

Tissues directly exposed to sun will turn light and may wrinkle. This most often occurs under dry conditions with fruits growing on plants with few leaves. Promote healthy plant growth through fertilization and irrigation.

Plum Spindle Gall

Eriophyid mites fed on the leaves in spring, causing a reaction that led to unusual columns forming. Fruits are edible. Damage is cosmetic and no pesticides are needed.

Rust on Juneberry

Berries develop "spikes" that emit rust spores. This rust comes from junipers. Avoid planting near junipers. Prune to reduce shade and humidity in canopy. Use fungicides such as chlorothalonil or copper when shrubs set fruits.

Pear Slugs (Sawflies)

Slimy larvae skeletonize leaves of pear, chokeberry, cherry and rose. A jet spray of water is usually adequate for control. Sprays of spinosad, insecticidal soap, carbaryl or pyrethroids are more options.

Lace Bugs

Pests pierce leaves, sucking sap, creating yellow spots. Black droppings are evident. Adults are 1/4-inch-long with flat, lacy wings. Plants tolerate feeding and treatments are rarely needed; a jet spray of water will knock off nymphs.

Credits

Sources:

Bunch, T. R.; C. Bond, K. Buhl, and D. Stone 2014. Spinosad general fact sheet; National Pesticide Information Center, Oregon State University Extension Services. http://npic.orst.edu/factsheets/spinosadgen.html.

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Written by Tom Kalb, who expresses gratitude to the Horticulture/Forestry Team for their contributions to this report.

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Weather Almanac for July 2021

	TEMPERATURE[1]				RAINFALL[1,4]				GROWING DEGREE DAYS[1,5]			
	July 2021				July 2021		2021		July 2021		2021	
Site	Avg	Norm	Max	Min	Total	Norm	Total	Norm	Total	Norm	Total	Norm
Bottineau	71	68	92	42	1.09	2.70	4.72	9.85	613	548	1381	1242
Bowman	74	70	104	49	1.49	2.16	5.79	8.94	648	600	1371	1243
Carrington	73	70	96	50	0.13	3.39	3.81	11.09	650	606	1477	1354
Crosby	72	67	97	49	1.34	2.86	7.12	8.79	620	512	1338	1135
Dickinson	75	69	103	51	1.22	2.58	6.69	9.84	674	573	1453	1239
Fargo	75	71	95	56	0.72	2.79	6.19	10.86	724	646	1713	1460
Grafton	72	68	96	50	1.00	2.75	5.09	10.20	622	549	1488	1264
Grand Forks	73	69	93	51	0.33	3.15	4.68	10.32	649	568	1550	1298
Hazen	74	71	103	49	1.78	2.48	5.91	9.90	655	612	1439	1385
Hillsboro	72	70	94	51	1.46	3.29	4.63	11.00	650	609	1552	1369
Jamestown	72	70	95	48	0.21	3.29	10.59	10.57	633	612	1456	1344
Langdon	70	66	92	49	2.71	3.22	6.42	10.81	578	484	1307	1070
Mandan	75	71	102	54	2.22	3.26	5.95	10.38	693	616	1550	1325
Minot	73	68	98	49	2.08	2.55	5.07	9.87	658	555	1436	1213
Mott	74	70	101	50	1.65	2.19	9.96	9.27	655	608	1414	1302
Rugby	72	68	94	47	0.67	3.37	4.08	10.98	635	543	1425	1248
Wahpeton	73	72	95	52	1.96	3.19	7.77	11.39	654	655	1612	1516
Watford City	76	69	102	54	1.57	2.59	6.37	8.64	699	586	1469	1267
Williston	76	72	102	52	0.68	2.47	5.83	8.25	707	641	1511	1428
Wishek	73	69	97	52	1.57	2.73	6.74	9.43	653	560	1492	1205

DAYLENGTH (August 1, McClusky, ND)[2]

Sunrise: 6:19 AM Daylength: 14h 57m

Sunset: 9:17 PM Change since July 1: –57m

LONG-TERM OUTLOOKS[3]

Aug 10–14: Temp.: Above Normal; Precip.: Below Normal

Aug 12–18: Temp.: Above Normal; Precip.: Below Normal

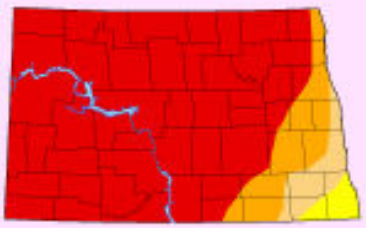
[1,2,3] Sources: North Dakota Agricultural Weather Network, www.sunrisesunset.com, and National Weather Service, respectively.

[4,5] Rain data begin April 1. GDDs for garden vegetables are not available. GDD data in this table are for corn, which responds to temperature as most vegetables grown in gardens. Data begin May 1 with base minimum and maximum temperatures of 50 and 86°F, respectively.

Drought Watch

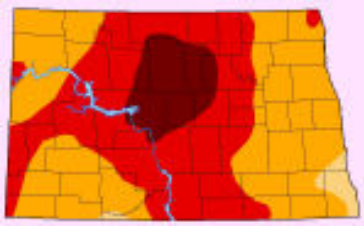
The state has been in a drought this entire growing season (see maps). There were no positive developments last week, and no signs of relief are in sight.

Outlooks for next week, next month and through November indicate conditions are likely to stay warmer and drier than normal for much of the state. Sources: Adnan Akyuz, NDSU; Drought Monitor.



April 27, 2021

- Abnormally dry: *100% of state.*
- Moderate drought: *98% of state.*
- Severe drought: *93% of state.*
- Extreme drought: *83% of state.*
- Exceptional drought: *0% of state.*



July 27, 2021

- Abnormally dry: *100% of state.*
- Moderate drought: *100% of state.*
- Severe drought: *98% of state.*
- Extreme drought: *52% of state.*
- Exceptional drought: *10% of state.*