BMT Infestation Data Visualisation

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What is the goal for our presentation?

TO MAKE AN EFFECTIVE MODEL OF ESTIMATING THE INFESTATION OF BROWNTAIL MOTH (BTM).

Brown tailed moth infestation

Why do we care so much? Because the toxic hairs shed by browntail moth caterpillars can cause a severe rash or respiratory issues for those who encounter them. These hairs are easily encountered once they become airborne. Many people don’t even know they are being exposed because the hairs are so small.

Throughout much of their life cycle, the moth sheds its toxic hairs which become airborne or attach to leaves and brush. When the barbed hairs contact our skin or lungs, they can cause itchy painful rashes or respiratory issues. Issues are reported most in June and July when the toxin concentration in mature larvae is at its highest.

Browntail Moth Life Cycle

EGG

AUGUST - SEPTEMBER

Egg masses contain 200 to 400 eggs. When the larvae hatch they feed for a short time before building their winter nests.

Photo: Fturmo
via Wikimedia Commons

Large amount of hairs on leaves and brush.

LARVAL

SEPTEMBER - JUNE

Nesting: October - April

Nests contain 25-400 larvae which emerge in spring to feed on new spring leaves.

Photo: Walwyn
via flickr

PUPAL

JUNE - JULY

The larvae spin cocoons in which to pupate. The cocoons are full of toxic hairs.

Photo: Steve Ogden
via www.wildlifeinsight.com

ADULT

JULY - AUGUST

Moths emerge from their cocoons, mate, and lay eggs on the underside of leaves. More hair is shed to cover the egg mass.

Photo: Bj.schoenmakers
via Wikimedia Commons

APRIL - JULY

Large Amount of Hair Activity

Source: https://www.coastalpharmacyandwellness.com/

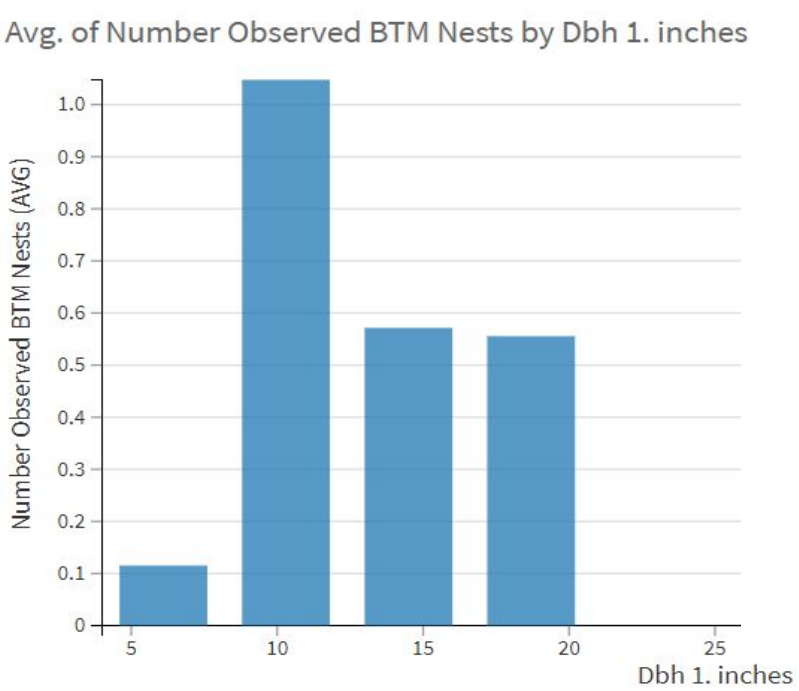
More Facts:

The most common reaction occurs when the caterpillar hairs contact the skin. This can cause both chemical reactions to the toxins and physical irritation when the hairs get embedded in the skin. The chemical reaction, referred to as dermatitis, produces a severe rash similar to poison ivy. Symptoms include itchy, blistered and swelled skin. The rash itself is not contagious. It's caused by a reaction to the toxins that are in the hairs. Unlike the oil of the poison ivy plant, the hairs are not likely transferred to others through physical contact.

Respiratory issues are less common but can be particularly problematic for asthmatics. If you have asthma, you should carry your inhaler with you when spending time outside, especially during windy conditions. If you choose to be outside under these conditions, you may want to wear a mask that covers your nose and mouth.f the hairs get caught in the mucosal areas of the mouth or throat they can cause burning, irritation or itchiness. Symptoms may be relieved by taking liquid Benadryl which helps counter the histamine reaction that the hairs can cause. However, you are encouraged to seek medical attention.Symptoms can appear within hours of contact. If you think you've developed a reaction, make an appointment with your doctor as soon as possible to discuss treatment options.

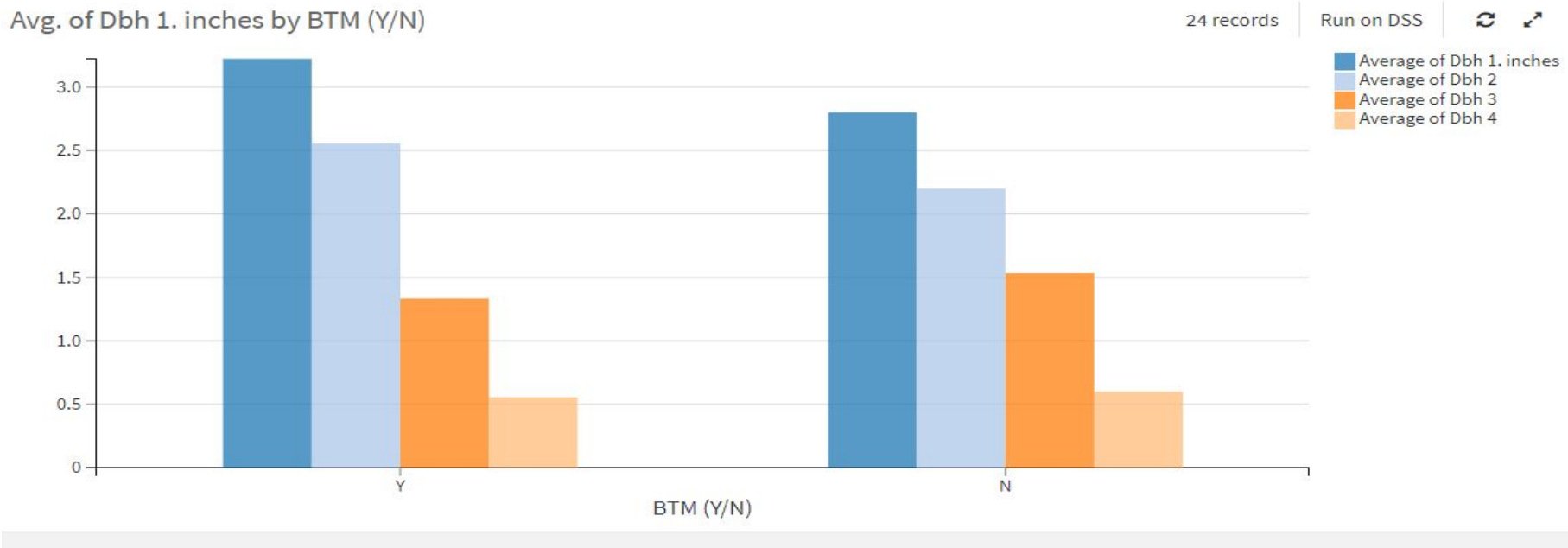
Source: https://www.coastalpharmacyandwellness.com/

Maple Norway: Estimating Diameter inches' relation with the BTM



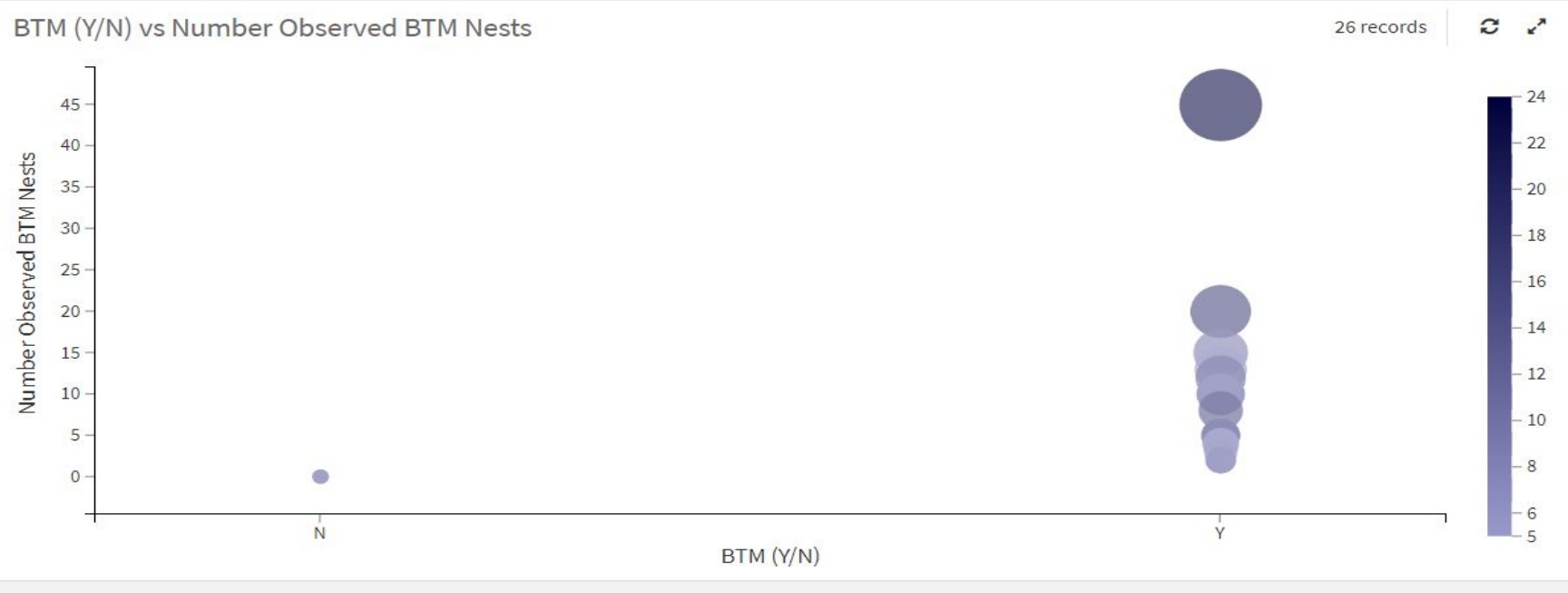
Average Number of BTM observed nests is highest when the Dbh 1. Inches is within 8-12. BTM tries most to get into the trees where the range of Dbh is 8-12 inches. More than that we can conclude that the BMT likes to get into the trees which are more like oak trees which have Broad leaved trees and shrubs like maple norway trees.

BirchRiver: Relation between Dbh or Splits and BTM infestation



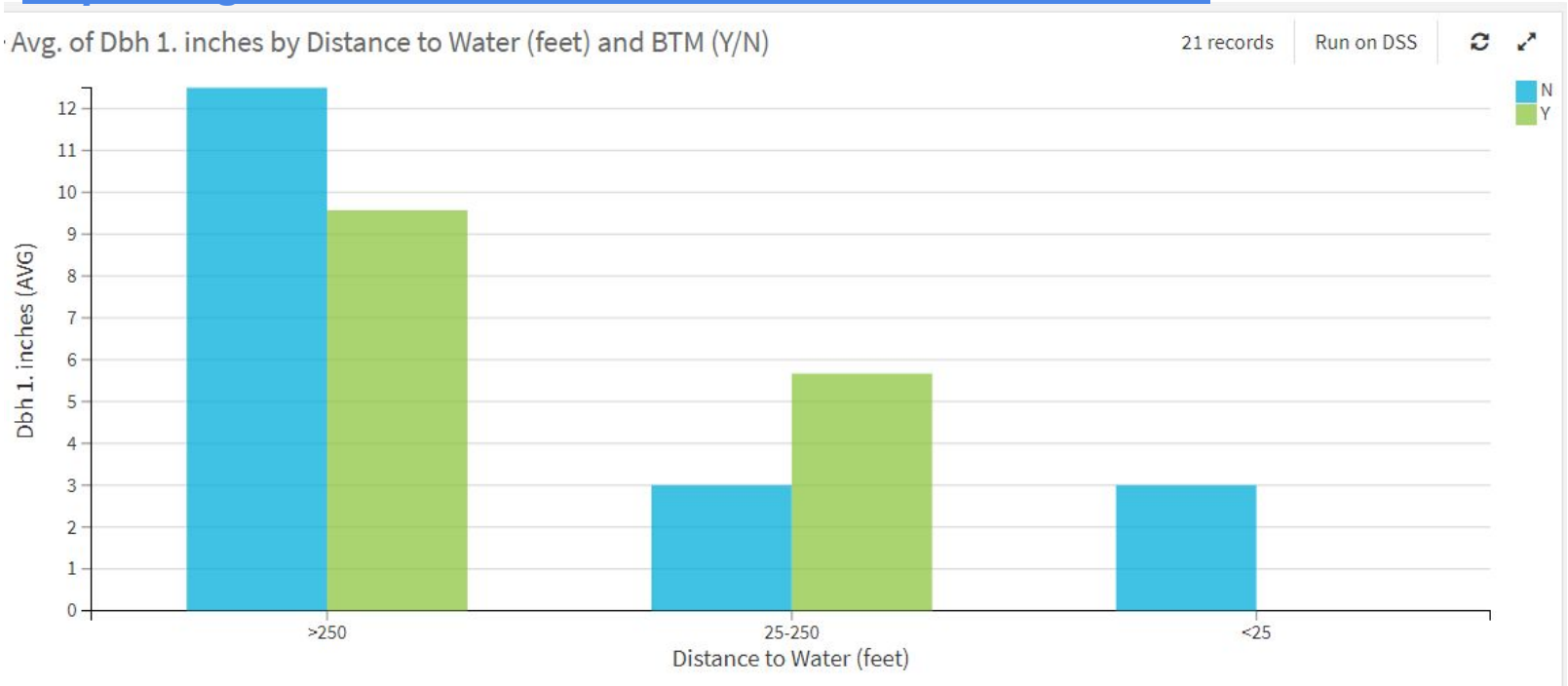
The infestation rate of BTM is higher when Dbh has 1-2 splits and less when it has 3-4 splits.

Cherry-Black: Further explaining relationship between Dbh inches with BTM infestations



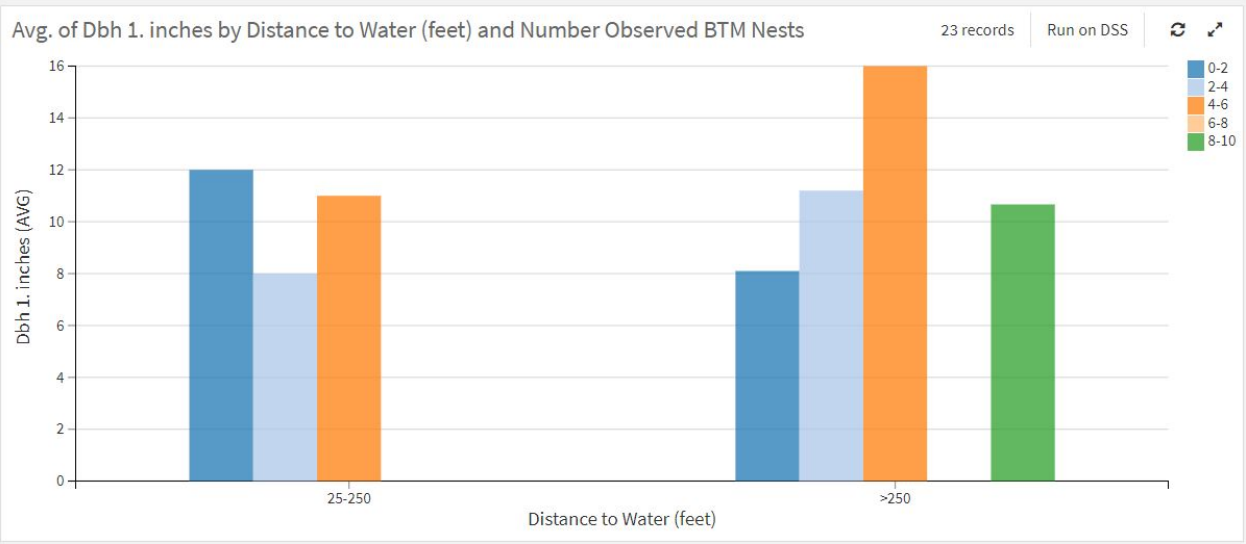
Here, it is clear from the scatterplot that for Cherry-Black, as the Dbh 1 increases, number of observed BTM nests also increases and so, BTM infestation is ‘Yes’. But when the Dbh 1 is less, the amount of infestation is also less.

Maple Sugar: Relation with Dbh inches and water bodies



More closer to water bodies, more infestation

Popular Aspen: (Relation with Dbh 1 and BTM nests)



In Popular Aspen tree, when the distance to water is >250 feet, as the Dbh 1 increases, the number of nests is substantially more. When the Dbh 1 average is around 16 inches, there are about 4-6 nests on average.
When the distance to water is 25-250 feet, and the average Dbh is around 12, there is no infestation or very little infestation. But it also says that when the Dbh 1 is around 11, the BTM nest is following an increasing trend.
But in this case, the standard deviation is not much, so we can't draw a strong conclusion based on the Dbh 1.

Conclusion:

Maple Norway: Estimating Diameter inches' relation with the BTM: 8-12 inches Dbh is most favorable for the BTM for infestation. That's why they choose oak trees like cherry trees, maple norway trees.

BirchRiver: Relation between Dbh or Splits and BTM infestation: The infestation rate of BTM is higher when Dbh has 1-2 splits and less when it has 3-4 splits.

Maple Sugar: Relation with Dbh inches and water bodies: More closer to water bodies, more infestation

Popular Aspen: (Relation with Dbh 1 and BTM nests): When far away from water and average Dbh is more, more infestation.

As we analyze the data, we observe that when the distance to water is more (>250 ft), and the length of the Dbh is lower, the infestation is very little or no infestation. But when the distance is less (25-250), the infestation is substantially more.

Thank you so much.