



Notes from the Lab:

The Latest Bee Science Distilled

by Scott McArt

The Importance of Habitat to Both Native and Managed Bees

Location, location, location. Any real estate agent will tell you it's critical. But does the same rule apply to bees? In other words, if you could construct the optimal real estate for bees, what would it look like? Lots of wooded areas? Flowering crops? And what bees are we talking about, exactly? The western honey bee (*Apis mellifera*) forages at a larger radius, collects more nectar, and is active for a longer portion of the year than the other ~4,000 species of bees in North America. Does that mean its ideal habitat is different from other bees? This is the topic for our fifteenth "Notes from the Lab," where we highlight "**Wild, native bees and managed honey bees benefit from similar agricultural land uses,**" written by Elaine Evans and colleagues and published in the journal *Agriculture, Ecosystems and Environment* [268:162-170 (2018)].

In case you didn't know, North Dakota is essentially Mecca for bees. It's the top honey producing state in the U.S., with nearly a half million colonies producing over 17 million kilograms of honey/year, valued at ~\$70 million annually. In addition, North Dakota is home to >300 species of wild bees. However, for the past 10 years, there's been a dramatic increase in land used for corn and soy production in the state. This has led to concern about loss of bee forage and potential impact on pollinators and honey production.

To address these concerns, Evans and colleagues set out to understand

what was good habitat for bees in North Dakota. The authors sampled, counted and identified 13,426(!) wild bees, representing 149 species from 18 locations over the course of 3 years. They also monitored honey bee colonies from 6 apiaries, measuring honey production and proportion of colonies surviving each year. Finally, they used data gathered by the U.S. Geological Survey — essentially a handmade version of Google Maps — to determine the exact composition of different types of land-use (i.e., different habitat for bees) around each of the sample locations. Then, once they had all of these data in hand, they looked to see if there were rela-

tionships between land-use, wild bee abundance/diversity, and honey bee productivity/survival.

So, what did they find? Was good habitat for honey bees the same as good habitat for wild, native bees? To a large degree, yes. The authors found that wild bee abundance and diversity were positively associated with honey production by honey bees. In other words, if an apiary was good at producing honey, it also had a more abundant and diverse wild bee community nearby. This supports the notion that good habitat for honey bees is also good habitat for wild, native bees.

What made some locations better than others? This is what we all want



Mellisodes tray

to know, of course. If you could pick anywhere on a map to put your bees, what should you be looking for? Or, if you wanted to conserve and promote wild, native bees, which habitats or land-uses should be conserved and promoted? Evans and colleagues found that wooded areas, wetlands,

grasslands, pastures, and crops providing bee forage were associated with greater wild bee abundance and diversity. No particular habitat or land-use type stood out more than another; each was important.

In contrast, only a few land-uses were associated with less wild bee

abundance and diversity. Evans and colleagues found negative associations between bee abundance/diversity and land used for corn, soy, wheat, and other small grain crops.

OK, this seems intuitive. But why is this important? It's very useful to know that habitats and land-use



ND woodlands, grasslands and wetlands



Roadside bee forage



Collecting bowl trap



Collecting trip



Bee collection



Collecting bees in canola



Nomada_aquilarium Photo by Wayne Boo, USGS

wooded areas, wetlands, grasslands and pastures is critical.

Given the importance of North Dakota to bee conservation and honey production in the U.S., let's hope that growers, land managers and regulatory agencies are paying attention. A little effort could go a long way.

Until next time, bee well and do good work,
Scott McArt

REFERENCE:

Evans, E., M. Smart, D. Cariveau and M. Spivak. 2018. Wild, native bees and managed honey bees benefit from similar agricultural land uses. *Agriculture, Ecosystems and Environment* 268:162-170. <https://doi.org/10.1016/j.agee.2018.09.014>

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types containing good bee forage are good for both honey bees and wild, native bees. And it's also useful to know that the conversion of land to corn and soy production results in less abundant and diverse communities of bees. Clearly, the past decade of increased land used for corn and soy production could be having an overall negative impact on pollinators in North Dakota. This is a risky situation in a state with historically high bee diversity, which also happens to

be the nation's top honey producer.

But perhaps the most important inference that Evans and colleagues' study makes concerns the *amount* of good bee habitat that can make a difference. Bee-forage crops (mostly sunflower, canola and alfalfa) comprised as little as 1% of the landscape in their study, but often had a positive impact on bees. This suggests that shifting some corn/soy production into sunflower, canola or alfalfa production could have major benefits for bees. Furthermore, conserving