

## Healthy Bee Populations May Boost Soybean Yields

*Iowa Farm Bureau Spokesman*

As growers in other commodities worry more about bee population losses and pollination, the soybean's ability to self-pollinate has meant a bit less worry for Iowa's 42,000 soybean growers.

There are hints, however, that it may be worthwhile to take a closer look at insect pollination, including the role of native bees, in soybean production.

Of interest especially is the possibility that under the right conditions, bees could help boost soybean yields. Several studies have shown that insects working soybean flowers improve pod set.

"If you look at the older literature, when the USDA (U.S. Department of Agriculture) had the Wisconsin bee laboratory, they could show in some years and certain locations that you could get an increase in yield," says Dr. Reid Palmer, USDA's Agricultural Research Service (ARS) research geneticist and a collaborating professor in the Department of Agronomy at Iowa State University.

More recently, Palmer has heard second-hand reports of farmers who saw soybean yields improve in fields adjacent to crops where their pollinator promotion efforts had increased bee numbers.

In Canada, a short-term study found the presence of bees was associated with much higher yields in food-grade soybeans. In Australia, researchers have demonstrated yield increases of 10 to 40 percent in honeybee-pollinated soybeans, compared to naturally self-pollinated beans.

In 2005, Brazilian research looked at soybean seed production between cages with honeybee colonies compared to cages without bees and found a 50% higher yield in cages with bees.

"Soybeans naturally drop a lot of flowers and not from lack of fertilization," says Palmer. "Even now, plants usually produce many more flowers than develop into pods, so if you can reduce flower drop, you should increase yield. We really need to study the role of bees in soybean pollination."

For Iowa, promoting bees can be especially difficult for several reasons. Last year, Iowa lost 74 percent of its honeybees, more than double the national average, according to Andy Joseph, state apiarist.

Several factors are at work, from diseases like Colony Collapse Disorder to a shortage of flowering plants that can provide nectar throughout the growing season, and the challenges of controlling major insect problems like soybean aphids without damaging bee populations.

Another line of research to address is the differences among soybean varieties' ability to attract bees. Palmer notes, "We would use the differences in insect-pollination attraction rates to develop high-yielding and low-yielding breeding lines. These lines should provide clues to the soybean traits that contribute to pollinator attraction. We have been able to produce highly insect-pollinator attractive soybean lines within as little as three years."

The problem of preserving bees while controlling insect pests is another major issue. Palmer notes, for example, that areas around Plainview, Texas, where chemical use has been very limited, have huge numbers of native ground-dwelling bees that love soybeans.

"We need to understand much better what's going on between bees and soybeans," says Joseph.

In the meantime, concerns over bee losses prompted Congress to make native bee preservation a priority in the 2008 Farm Bill, leading the USDA to establish multiple programs to encourage bee

habitat. One example is the matching grants and technical assistance available through the Environmental Quality Incentives Program (EQIP).

Encouraging native pollinators is also now a ranking criterion that can mean higher payments per acre for new Conservation Reserve Program contracts. As a result, farmers established 41,000 acres of new pollinator habitat this year, according to the Xerces Society.

Growers looking for information about encouraging native bee habitats can contact the Natural Resources Conservation Service or find on-line information at the Native Pollinators in Agriculture Work Group ([www.agpollinators.org](http://www.agpollinators.org)), the Xerces Society ([www.xerces.org/Pollinator](http://www.xerces.org/Pollinator)), or in USDA publications at ([www.nrcs.usda.gov/technical/ECS/database/technotes.html](http://www.nrcs.usda.gov/technical/ECS/database/technotes.html)).

###