Bumble Bees in the Wild-- Essay by Sydney Cameron, Jeff Lozier and Isaac Stewart

With the serious concern nationwide over the declining health of honey bees, evinced by widespread reports of colony collapse and death, the importance of other pollinators, particularly wild native species, looms large. The irony is that as the health of the honey bee deteriorates and the importance of wild pollinators rises, the wild species are also taking a hit. No other wild pollinators have had more press recently than the bumble bees (Bombus). Both in Europe and North America multiple species are declining in abundance and geographic range. While the problem has been apparent in Europe for decades, the U.S. is only just beginning to collect the hard data required to determine the extent and potential causes of population decline in some of its species. Recently, we have begun a large-scale effort to monitor the status and population structure of targeted bumble bee species ranging across the Western and Midwestern U.S. and an investigation of the microsporidium Nosema bombi as a potential factor in Bombus decline. We are two teams, my lab and Dr. Leellen Solter’s lab at the University of Illinois, and a team working out of Utah at the USDA Bee Biology and Systematics Laboratory in Logan.

Our Illinois team also includes Dr. Jeffrey Lozier, a postdoc who joined my lab this winter with a newly minted PhD degree in insect population genetics from Berkeley; Nils Cordes, a PhD level graduate student who arrived from Germany with a diploma in social insect behavior and an interest in insect pathogens; Isaac Stewart, entomologist with an interest in teaching high school biology (currently in the UIUC graduate education program in Biology); Whitney Stewart, a middle school biology teacher in Champaign; and last but not least, Elizabeth Peregrine, a graduate from Uni High who began her first undergraduate term at Purdue this fall.

This was a spectacular team, which completed 84 bumble bee site surveys across 15 states this summer. And what a time they all had! When I asked Isaac, one of our team coordinators, to supply me with a summary of the summer surveys, he sent a beautiful essay, the highlights of which I include below. Jeff made up the summer highlights map, indicating some of the best of the survey hotspots. In Isaac’s words:

While reflecting on our research this past summer on bumble bee diversity and decline I couldn’t think of anything more appropriate than the diversity of locations that we visited. Our research team had the pleasure of seeing the prairies of the Midwest, the forests of Indiana, the Rocky Mountains of Colorado and Wyoming, the Badlands and Black Hills of South Dakota, and the Gulf beaches of Southeastern Texas, to name just a few highlights. Through approximately 10,000 miles of driving among the team we had our share of experiences. I will do my best to describe some of the more entertaining and productive occasions.
Our first major trip of the summer, following a stop at one of Illinois’ few topographically unchallenged areas near Carbondale, found us enjoying some of Missouri’s amazing prairie restoration and preservation projects. Mike Arduser of the Missouri Department of Conservation and James Trager of the Shaw Nature Preserve were gracious enough to help guide our team to some of the best that Missouri has to offer, including the Busch Conservation Area, Shaw Nature Preserve, and Spring Creek Gap, after which I collapsed into a pile of spikey pine cones from exhaustion after hiking a most formidable trail. From there it was on to Kansas where forgotten permits threatened to end the day early, but fortunately the staff of the Tallgrass Prairie National Preserve gave us permission to collect anyway. We did find some bees, but not nearly the numbers we were hoping for. Remember, our goal was to survey bumble bee populations at multiple sites per state to build baseline data that would enable us to assess the current status of multiple species. The absence of workers may have been due to the unusually cool spring we had, which caused everything to emerge late, including the floral resources upon which the bees depend.

Our next trip found much greater success along roadsides and in some of the state parks of Indiana. Some of these roadsides made us glad that we had a vehicle with four-wheel drive, and we were able to get good numbers of bees to provide data for the study.

Next up was a trip that Whitney and I took south through Missouri and into Arkansas. Thankfully, we had a place to stay with faculty from the University of Arkansas as that night we brought with us a powerful storm that downed two trees in the yard of the home where we stayed. Next we drove into Oklahoma. Needless to say the people of Oklahoma were more than curious about what we were doing along the road with large nets. We heard many theories as to why bees are disappearing, including one from a colorful gentleman in southern Oklahoma who postulated that chickens are responsible for the loss of populations. We also met a talkative park ranger who enjoyed chatting about giant grasshoppers and Bigfoot, to name some topics of conversation. From there it was on to Texas which offered luxurious swimming, eating, and general good times from gracious hosts that were willing to put us up for the night. The 95+ °F temperatures did not prevent us from finding bumble bees.

A short time after we returned home from the Texas trip, we set out for the eastern side of the Colorado and Wyoming Rocky Mountains. The Rocky Mountains offered such a diversity of bumble bees not found in our area, some of which mimic one another in color pattern, that they were troublesome to identify in the field. After a stop at the insect collection at the University of Wyoming in Laramie to get our bearings, we surveyed all over Wyoming. Unfortunately our mini-van met a rock that was near the size of a boulder. This put a large enough hole in our muffler to cause an asphyxiating effect in the cabin of the car. We had to head to Rapid City South Dakota to get a replacement. Unfortunately, due to Sturgis bike week (big motorcycles!) that weekend (we drove right through it unknowingly) the local National Car Rental had only an SUV that offered about 50% of the carrying capacity of our van. After the sacrifice of a few pairs of shoes and some other miscellaneous bits and pieces we were able to squeeze ourselves, the
bees, and the collecting equipment into the new car with only a few items that required
lap storage.

After this near fiasco we found our way back toward Illinois, stopping at the famous
“Wall Drug” (original Wall Drug Store in Wall, SD) and the Badlands of South Dakota.
From there we moved into North Dakota, on into Minnesota, and finally into Wisconsin.
In the interest of time we did bypass the Spam Museum of Minnesota, but this is
definitely on the list for next summer. In the end Nils and Jeff have more than enough
bees to keep them busy over the course of the winter screening for pathogens and
collecting microsatellites, respectively. I would say this qualifies the summer as a
successful one.