

# ESA2019

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## LOUISVILLE

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### 14: The kleptoparasitic bee *Nomada* as a potential indicator of ecosystem health

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Tuesday, August 13, 2019

04:30 PM - 06:30 PM

📍 Kentucky International Convention Center - Exhibit Hall

#### Background/Question/Methods

Due to the decline of native bees, implementation of land-use practices to promote stable bee communities has become popular. To quantify the impact of these land-use practices, studies often focus on the diversity and abundance of the entire bee community. However, research has shown that parasitic bees are strongly affected by environmental changes, suggesting their potential as an ecosystem health indicator. Additionally, these parasites are thought to control and stabilize their host populations, and these parasite-host relationships may provide additional insight into bee community health. The present study evaluates the abundance of the parasitic bee *Nomada* and its relationship to the host bee, *Andrena*, as surrogate markers of overall bee community health at six study sites across Southeastern Massachusetts. The six sites were categorized into rural or urban based on percent impervious land cover quantified using ArcGIS. Two of the sites implement sustainable land-use practices which include a reduction in chemical use, no-mow areas, and planting of native flora. Data were collected from 2016 to 2018 during the foraging season, using a bi-weekly sampling method that included 24h-pan traps and 1h sweep netting.

#### Results/Conclusions

Over three seasons, 156 *Nomada* and 145 *Andrena* were collected. Site impacted *Nomada* abundance ( $F_{1,89}=3.1$ ,  $p=0.03$ ) and pairwise comparisons revealed that the highest *Nomada* abundance was present at a rural site with reduced pesticide use, and at a suburban site characterized by limited imperviousness, a community garden, abundant forest edge and infrequent mowing. *Nomada* abundance mimicked the overall bee abundance suggesting that the parasite has potential as an ecosystem health marker. Although, no significant covariance of *Andrena* and *Nomada* abundances was detected ( $F_{1,89}=3.1$ ,  $p=0.08$ ), there was a considerable impact of site on the weak *Andrena* – *Nomada* abundance relationship ( $F_{5,78}=4.2$ ,  $p=0.002$ ). The strongest positive covariation was found at the aforementioned suburban site which suggests this site has an additional beneficial effect on the bee community allowing a healthy host-parasite relationship. Other sites, including urban and rural areas, had fewer *Nomada* and displayed weaker host-parasite correlations. However, some *Nomada* spp. are known to parasitize other genera which could weaken the host-parasite signal. Altogether, human activity appears to influence the abundance of *Nomada*, and variation observed in the strength of the host-parasite relationship suggests that monitoring this marker could yield new insight on the health of the bee community.

#### Authors

##### Kinga Auguste

Massasoit Community  
College

##### Adam Germaine

Massasoit Community  
College

Prisca Sanon

*Massasoit Community  
College*

Andrew Oguma

*Massasoit Community  
College*

Folusho Ajayi

*Massasoit Community  
College*

Michael Bankson

*Massasoit Community  
College*

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