INTRODUCTION

- Urbanization can alter biological communities by eliminating them through habitat loss or replacing native species with exotics.
- Effective management of protected areas depends on detailed knowledge of biota, particularly bioindicators.
- Ground-dwelling arthropods are a diverse group of organisms that are critical to ecological processes such as nutrient cycling (Fig 1).
- Arthropods are sensitive to rapid environmental change, such as urbanization, and are considered bioindicators.
- Arthropods in arid regions face high environmental stresses through lack of water and high temperatures, and urbanization can compound these problems.

![Fig 1. Blister beetles (Lyta magister) [left] and green lynx spider (Peucetia viridans) [right]](Image)

OBJECTIVES AND PREDICTIONS

- Our goal was to investigate arthropod community dynamics in an urban-wildland interface in an arid region.
- We hypothesized that sites near the urban edge would have lower arthropod richness and different arthropod compositions compared to the interior sites.
- We hypothesized that temperature and precipitation would be strong drivers of arthropod community dynamics and arthropod communities near the urban edge would differ seasonally.
- Specifically, we predicted that the most stressful seasons would present the largest effect to arthropod communities on the urban edge.

RESULTS

- In total, we captured and identified 25,477 arthropod individuals belonging to 287 LPT over eight years.
- Dominant taxa included ants and mites (Fig 3).

![Fig 3. Percent abundance of major arthropod groups recorded in the Preserve.](Image)

METHODS

- We examined the arthropod communities at five locations across the McDowell Sonoran Preserve in Scottsdale, Arizona, USA (Fig 2).
- Sites were established for long-term monitoring as part of the Central Arizona–Phoenix Long-Term Ecological Research (CAP LTER) program, using the CAP LTER arthropod monitoring protocol.
- Edge sites were within 100m of urban development, while interior sites were >0.5km away from the Preserve boundary.
- We sampled four interior-edge site pairs and one interior-interior site pair, for a total of 10 sites.
- At each of the sites, we placed 10 pitfall traps at 5-m intervals along a transect.
- Sampling occurred across seasons from 2012-2020.
- After collections, arthropods were sent to ASU to be identified to the lowest practical taxa (LPT).

![Fig 2. Map of study area, Scottsdale’s McDowell Sonoran Preserve.](Image)

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This research is important for understanding the dynamics of arthropod communities in arid regions and for developing conservation strategies that may mitigate the negative impacts of urbanization on ecosystems.

DISCUSSION

- Overall, we found no consistent effect of the urban edge on arthropod communities. Instead the effects were site, season, and taxon specific.
- We found ant increases during summer on the urban edge were largely driven by a single non-native and invasive species, fire ants (Fig 5).
- We also found support of our hypothesis that climate would be a strong driver of arthropods.
- This research is important for understanding the dynamics of arthropod communities in arid regions and for developing conservation strategies that may mitigate the negative impacts of urbanization on ecosystems.

![Fig 5. Red imported fire ants (Solenopsis invicta)](Image)