# *Brachyponera chinensis* threatens Great Smoky Mountains National Park Ant Assemblages

Andrew S. Kanes, Daniel A. Malagon, Simon Dunn, Sharon Bewick

## The Asian Needle Ant (*Brachyponera chinensis*)

- *B. chinensis* is an invasive ant species first reported in the southeastern U.S. in 1932 and has spread rampantly since[1]
- *B. chinensis* outcompetes native ant species in the southeast and disrupts seed dispersal mutualisms with native plants[2]
- Populations of *B. chinensis* have only been found inhabiting low elevations within their invsive range thus far; however, native range presence data suggests potential habitat suitability at higher elevations[1]

## Objectives

- Collect ants from sites across GSMNP with various levels of disturbance
- Devise a MaxEnt Species Distribution Model to assess potential habitat suitability for *B. chinensis* across GSMNP and the southeastern U.S. at large
- Determine potential paths of entry of *B. chinensis* into native ant communities
- Relay findings to appropriate agencies in pursuit of creating management strategies to quell the spread of *B. chinensis*

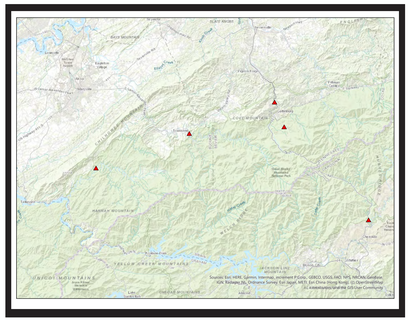
## Methods

- Sites were chosen across GSMNP, including ATBI sites and sites with various levels of human and fire disturbance
- Five leaf litter samples were collected from each site using a litter sifter. Individual ants were also collected by sight using an aspirator
- Litter samples were brought to an indoor facility and placed in hanging winklers for a period of two weeks
- Ethanol- filled vials were taken from winklers after a two week period for sorting
- All ants were sorted out of remaining litter left in vials and placed into separate vials
- Ants were then identified to genus with the help of a dichotomous key
- Sites found to contain *B. chinensis* were marked as presence data points and integrated into the training program for the species distribution model

## Results

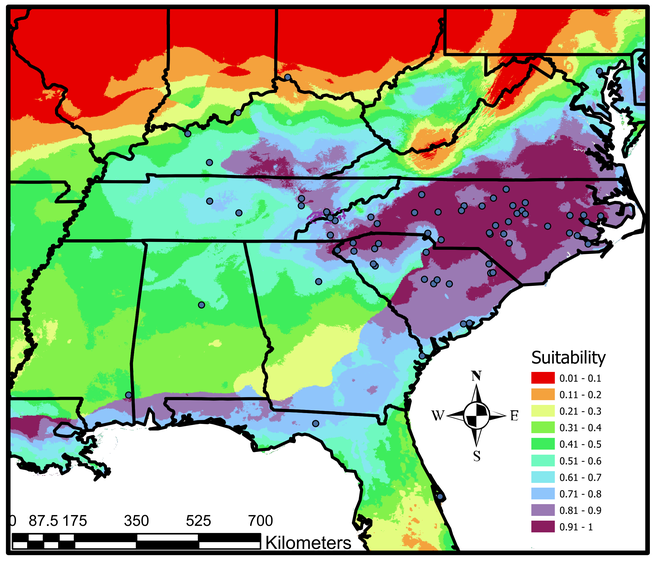
- Colonies of *B. chinensis* were found at three disturbed sites within GSMNP; however, no colonies were found at undisturbed sites within the park
- This presence data in conjunction with online data aided in the creation of an SDM that predicts habitat suitability for *B. chinensis* across GSMNP and the southeastern U.S.

Posing with a vial containing *B. chinensis* workers collected at Twin Creeks Science Center



Presence points of *B. chinensis* found across GSMNP

## The Model




A maxent model output incorporating presence data from the native and invasive range of *B. chinensis*

An Asian Needle Ant (*B. chinensis)* worker[3]

## Discussion and Implications

- Our model predicts suitable habitat for *B. chinensis* across GSMNP and much of the southeastern U.S.
- Disturbed sites appear to serve as a passageway for *B. chinensis* into GSMNP and may allow for penetration into undisturbed habitat
- Future disturbance events such as fires and human development may accelerate penetration of *B. chinensis* into undisturbed habitat
- Future research efforts targeting *B. chinensis* should further explore methods of managing the species and its spread in order to protect local ecosystems

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## Literature Cited

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