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# Ant occurrence dataset regarding *Linepithema humile* (Mayr, 1868) (Hymenoptera, Formicidae), first recorded in Busan, South Korea

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## Abstract

## Background

This study contains information regarding the occurrence of ants in the area near Busan station, where the invasion of *Linepithema humile* was reported for the first time in South Korea. The Argentine ant is '100 of World's Worst invasive Alien Species', commonly discovered in disturbed places, and its spread to other areas causes local ecosystem disturbances. Therefore, we investigated the associated fauna in the invaded areas to determine the *L. humile* invasion effects on the native ants in Busan, Korea.

## New information

This study is based on a field study conducted over four days, from July 12 to July 15, 2022. The location information of the 3,383 individuals, consisting of 14 species of Formicidae in the *L. humile*-invaded area is also provided. All data in the study site, excluding those regarding *L. humile*, were reported for the first time.

## Keywords

*Linepithema humile*, Argentine ant, 100 of the World's Worst Invasive Alien Species, South Korea

## Introduction

The Argentine ant (*Linepithema humile* (Mayr, 1868)) is a native species to South America. Multiple invasions of the species were reported in various countries worldwide due to human activities, leading to the species designation as one of the 100 of World's Worst Invasive Alien Species by International Union for Conservation of Nature (IUCN) in 2000 (Lowe et al. 2000, Suarez et al. 2001, Global invasive species database 2022). The *L. humile* invasion in South Korea was first reported near Busan Station in 2019, and *L. humile* has been designated as an invasive alien species since 2020 that is to be consistently monitored and managed to prevent rapid spread (Kim 2020, Lee et al. 2020, Kim 2021, Lee 2021).

*Linepithema humile* inhabits areas with high soil humidity, as well as dry open regions. They are typically found in disturbed areas, such as stone crevices, tree stumps, under construction materials, rotting plants, houses, garages, and cellars, but there are cases where invasion occurred in stable ecosystems, such as national parks (Deyrup et al. 2000, Hartley and Lester 2003, Carpintero et al. 2005). During an invasion of a new area, *L. humile* acquires dominance by driving the native ants out with high adaptability and density and causes disturbance to the ecosystem by altering the distribution of the indigenous organisms in the affected area (Human and Gordon 1996, Kennedy 1998, Touyama et al. 2003, Carpintero et al. 2005). Therefore, we will observe the occurrence of ants near Busan station every year to determine the effect of *L. humile* invasion on the ecosystem of Korean native ants. The following is the first record of such observations.

## Sampling methods

**Description:** The field study was conducted for four days from July 12 to July 15, 2022, and the container yard and nearby pedestrian roads within 5 km of Busan station (35°7'27.77"N~35°6'43.24"N, 129°2'55.5"E~129°2'36.64"E) were selected as the study site.

**Sampling description:** Handmade traps were used to capture ants, and 300 of these traps were installed at intervals of 2 meters in flowerbeds, buildings, and crevices on road surfaces in the study site where ants were expected. The location of each trap was recorded as WGS84 coordinates as soon as they were installed, and the accuracy of determining coordinates was up to the fourth digit. The trap structure entails six holes with 2 mm diameter in the conical tube with cat food, MINERAL (Pettheman Inc.), attached to the lid. The trap was filled with antifreeze to prevent the captured ants from rotting.

**Quality control:** All the ants extracted from the trap were sampled, and the population and the individual that identified the ant were recorded for each species. The ants were classified based on morphological characteristics, related literature, and research papers (Radchenko 2005, Dong 2017, AntWeb 2022). Features, such as the mesonotum,

propodeum, petiole structure, number of the funiculus, and hair patterns, were observed using a stereomicroscope (LEICA, M205C), for species that are difficult to distinguish with the naked eye, such as *Monomorium chinense* and *Solenopsis japonica*.

## Geographic coverage

**Description:** We downloaded a cadastral map from the National Spatial Data Infrastructure Portal and created the diagram using QGIS (version 3.26.3). We additionally investigated areas that ants could inhabit, such as roads and flowerbeds near Busan station (Fig. 1).

**Coordinates:** 35°7'27.77"N and 35°6'43.24"N Latitude; 129°2'36.64"E and 129°2'55.5"E Longitude.

## Taxonomic coverage

**Description:** 3,383 ants from 14 species, 14 genera, and 1 family were investigated in this study (Table 1). The most common species studied in the habitat of *L. humile* species was *L. humile* (1,256), followed by *Nylanderia flavipes* (593), *Tetramorium tsushimae* (583), and *Lasius Hayashi* (409). *Linepithema humile* is one of the '100 of World's Worst Invasive Alien Species' and is a foreign species that causes ecological disturbance in Korea (Kim 2021, Lee 2021). The 13 species, excluding *L. humile*, were found to be native to Korea. *Solenopsis japonica* (51) and *Pheidole ferdida* (1) were in the same genus as the five ants listed in the 100 world's worst invasive alien species. Furthermore, the study site was added as a new distribution area for *Temnothorax xanthos*, the first unrecorded species in Korea that was recorded by Shin et al. (2019). Finally, *Crematogaster matsumurai* (191), which is symbiotically associated with *Cigaritis takanonis* (Hwang 2017), a species listed in Class II endangered wildlife in Korea, was investigated.

## Usage licence

**Usage licence:** Creative Commons Public Domain Waiver (CC-Zero)

## Data resources

**Data package title:** Ant occurrence dataset regarding the Argentine ant (*Linepithema humile*) first recorded in Busan, South Korea

**Resource link:** <http://doi.or.kr/10.22756/GEO.20220000000806>

**Number of data sets:** 1

**Data set name:** Ant occurrence dataset regarding the Argentine ant (*Linepithema humile*) first recorded in Busan, South Korea

**Download URL:** <http://doi.or.kr/10.22756/GEO.20220000000806>

**Data format:** Darwin Core Archive format

Column label	Column description
occurrenceID	An identifier for the ant occurrence.
kingdom	The full scientific name of the kingdom in which the taxon is classified.
phylum	The full scientific name of the phylum in which the taxon is classified.
class	The full scientific name of the class in which the taxon is classified.
order	The full scientific name of the order in which the taxon is classified.
family	The full scientific name of the family in which the taxon is classified.
genus	The full scientific name of the genus in which the taxon is classified.
SpecificEpithet	The full scientific name of the species in which the taxon is classified.
taxonRank	The taxonomic rank of the most specific name in the scientificName as it appears in the original record.
scientificName	The full scientific name, with authorship and date information.
countryCode	The standard code for the country in which the Location occurs.
locality	The specific description of the place.
stateProvince	The name of the next smaller administrative region than country (state, province, canton, department, region etc.) in which the Location occurs.
occurrenceStatus	A statement about the presence or absence of a Taxon at a Location.
individualCount	The number of individuals present at the time of the Occurrence.
decimalLatitude	The geographic latitude of the geographic centre of a Location.
decimalLongitude	The geographic longitude of the geographic centre of a Location.
eventDate	The date when the event was recorded.
day	The integer day of the month on which the Event occurred.
month	The integer month in which the Event occurred.
year	The four-digit year in which the Event occurred, according to the Common Era Calendar.
basisOfRecord	The specific nature of the data record.
identifiedBy	A list of names of people, who assigned the Taxon to the subject.
coordinateUncertaintyInMeters	he horizontal distance (in meters) from the given decimalLatitude and decimalLongitude describing the smallest circle containing the whole of the Location.

geodeticDatum	The ellipsoid, geodetic datum, or spatial reference system (SRS) upon which the geographic coordinates given in decimalLatitude and decimalLongitude as based.
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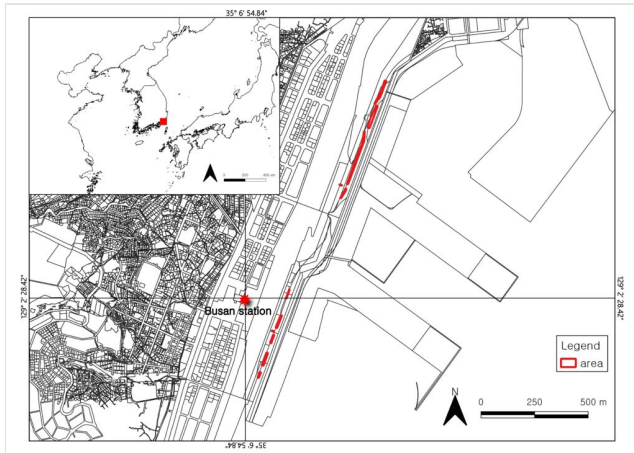


Figure 1.  
Survey location distribution in Busan.



Table 1.

Ant species emergence near Busan station.

No	Order	Family	Scientific name	Total
1	Hymenoptera	Formicidae	<i>Linepithema humile</i>	1256
2	Hymenoptera	Formicidae	<i>Nylanderia flavipes</i>	593
3	Hymenoptera	Formicidae	<i>Tetramorium tsushimae</i>	583
4	Hymenoptera	Formicidae	<i>Lasius hayashi</i>	409
5	Hymenoptera	Formicidae	<i>Monomorium chinense</i>	178
6	Hymenoptera	Formicidae	<i>Solenopsis japonica</i>	51
7	Hymenoptera	Formicidae	<i>Brachyponera chinensis</i>	84
8	Hymenoptera	Formicidae	<i>Formica japonica</i>	12
9	Hymenoptera	Formicidae	<i>Parapatrechina sakurae</i>	12
10	Hymenoptera	Formicidae	<i>Pheidole fervida</i>	1
11	Hymenoptera	Formicidae	<i>Plagiolepis manczshurica</i>	7
12	Hymenoptera	Formicidae	<i>Camponotus vitiosus</i>	5
13	Hymenoptera	Formicidae	<i>Crematogaster matsumurai</i>	191
14	Hymenoptera	Formicidae	<i>Temnothorax xanthos</i>	1