BASIC NEST BIOLOGY AND STRUCTURE OF ARGENTINE ANTS

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Abstract

Linepithema humile (Mayr), the Argentine ant is a very important invasive species that have great impact on agriculture, urban and natural environments through out the world. Argentine ants displace the local arthropod fauna. They also protect insects that devastate plants, destroys fruits and buds and even invades human houses. So, it is that we know and understand the basic nest biology and structure of these ants because these aspects may aid in controlling and preventing the spread of these ants.

Introduction

Argentine ant is native to Southern Brazil, Northern Argentina, Paraguay and Uruguay (Suarez et al. 2001; Tsutsui et al. 2001). It was first recorded in North America by E. Foster in 1891 (Foster 1908). Argentine ant is well established through out the southern united states, and quickly spread to many areas in Northern united states with reports occurring as far north as the state of Washington (Anon 1980).Infestations are also reported internationally from Argentina, Australia, Belgium, Brazil, Britain, Bosnia, Chile, France, Germany, Italy, Portugal, South Africa, Spain, and from many islands (Mallis 1942, Durr 1952). The Success of Argentine ant is attributes to large colonies, aggressive foraging behavior, multiple queens, multiple colonies with little intercolonial aggression and also because humans provide them with nest sites and long distance transportation (Passera 1994). Argentine ants adapt quickly to the new environments (Vega and Rust 2001). Humans are mostly responsible for wide distribution of this species by transporting the ants which are nesting in potted plants, bags of soil etc (Vega and Rust 2001).

Biology of life stages

Argentine ant colony comprises of two castes:

1)Reproductive females (queens) and sterile females (workers).

2)Alate reproductive males (drones) (Vega and Rust 2001).

The different life stages of Argentine ant are

1) Egg
2) Larvae
3) Pupae
4) Adult

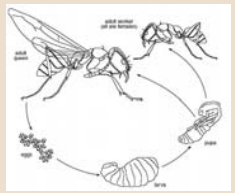

Figure 1: Life cycle of Argentine ant

Egg: Eggs are whitish in color and measures 0.3 mm in length and 0.2 mm in width (Vega and Rust 2001). Eggs are laid by queens through out the year, but mostly during the summer months (Vega and Rust). The average incubation period is 22 and 27 days at 21.3^{0}C and 23.3^{0}C respectively (Newell and Barber 1913). Oviposition does not occur in outdoor colonies below daily mean temperature of 18.3^{0}C (Vega and Rust 2001).

Larvae: Larval period lasts up to 15 and 27 days at 24.7^{0}C and 19.4^{0}C respectively (Newell and Barber 1913). There are 4 larval instars (Vega and Rust 2001). Larvae are completely dependent on workers for food, transportation and grooming (Vega and Rust 2001). A mass of fecal material called meconium will be visible in the abdomen of fully grown larvae (Vega and Rust 2001). At this stage mid and hind gut unite and the meconium is voided and larvae enter prepupal stage (Vega and Rust 2001).

Pupa: Pupa measures about 2mm in length and head is bigger than the rest of the body (Vega and Rust 2001). Young pupa is white in color except for the two black spots that develop in to compound eyes later (Newell and Barber 1913). Mature pupa turns a creamy color, later light brown color and finally dark brown in color (Newell and Barber 1913). Alate male pupa is about 2.8 to 3.2mm in length with a large thorax (Vega and Rust 2001). Male pupa exhibits much darker coloration towards the end of the maturation and almost becomes black in color as an adult (Vega and Rust 2001). Queen pupa is larger than male and worker pupa and requires more time for transformation (Newell and Barber 1913).

Figure 2: Argentine ants carrying away their pupae when their nest is disturbed.

Males: Winged male alates are dark brown and 2.8 to 3.0 mm in length. Males will not leave the nest if virgin queens are abundant in nest (Vega and Rust 2001).If not males will fly out and locate neighboring Argentine ant colony and search for unmated queens in that nest (Vega and Rust 2001). Foreign males will be accepted in to the nest only if unmated queens or if queen pupae are present in the nest (Passera and Keller 1994).

Figure 5: Argentine ant male

Workers: Workers are usually light brown to blackish brown in color and measure about 2.2 to 2.8 in length (Newell and Barber 1913). They posses yellowish dentate mandibles (Vega and Rust 2001). When abdomen is full of liquids it appears as honey colored (Mallis 1942). Legs are lighter in color. Workers live for about 9 months in a colony with queen and 6.5 months in a colony without queen (Newell and Barber 1913).

Figure 3: Argentine ant worker

Queens : Argentine ants lack nuptial flights they mate inside the nest and join the colony as laying queens (Passera and Keller 1994). Mating takes place only once (Passera 1992). Mated queens are dealated (Vega and Rust 2001). Dealated queens are 4 to 6 mm in length and brownish in color and are larger than workers. Argentine ant queens are unusual because they take part in colony work like feeding and grooming of young and also themselves (Mallis 1942).

Figure 4: Argentine ant queen

Nest Structure: Argentine ants prefer warm, dry climates with very good access to water (Vega and Rust 2001). Hot weather favors colony growth (Vega and Rust 2001). In wet environment with very heavy rains workers cannot forage adequately (Anon 1980). However they survive in areas where other species cannot survive.

Mostly the nests are located in typically well-drained soils are concentrated within the top 20cm and have a diameter of a square meter or more (Vega and Rust 2001). Ants will retreat deeper in to the soil when soil begins to dry (Markin 1967). In Urban areas Argentine ants nest under wooden objects, large boards, stones and concrete and also in decaying plant matter (Vega and Rust 2001). Occasionally when food and water are adequate these ants will establish themselves throughout a structure (Mallis 1942). Nests are often found on the south side of the trees infested with honeydew producing homopterans (Vega and Rust 2001). During summer nests will be moved closer to the trees to avoid sunrays and during winter nests will be moved away from the trees (Markin 1967). Ants will abandon their nests when disturbed or when conditions are unfavorable (Markin 1967).

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