The Wonderful World of…

Why are ants important?

- Nutrient cyclers, decomposers, predators, seed dispersers
- Receive very little attention
  - Little credit given to their roles in ecological functioning
  - Not considered a major forest threat
  - Mostly viewed as a residential and agricultural pest

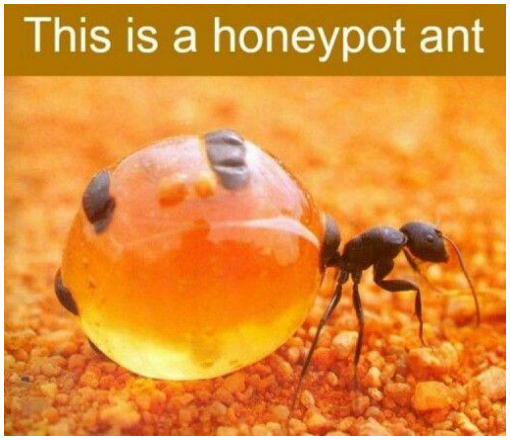
"The neglect of ants in science and natural history is a shortcoming that should be remedied, for they represent the culmination of insect evolution, in the same sense that human beings represent the summit of vertebrate evolution" – B. Holldobler and E.O. Wilson

Evolutional Success

- Ants evolved over 140 million years (humans: 2 million years)
- 14,097 species classified
- Success comes from eusociality, nesting behaviors (ground and arboreal, protected), and workers ability to function as an individual as well as in a group

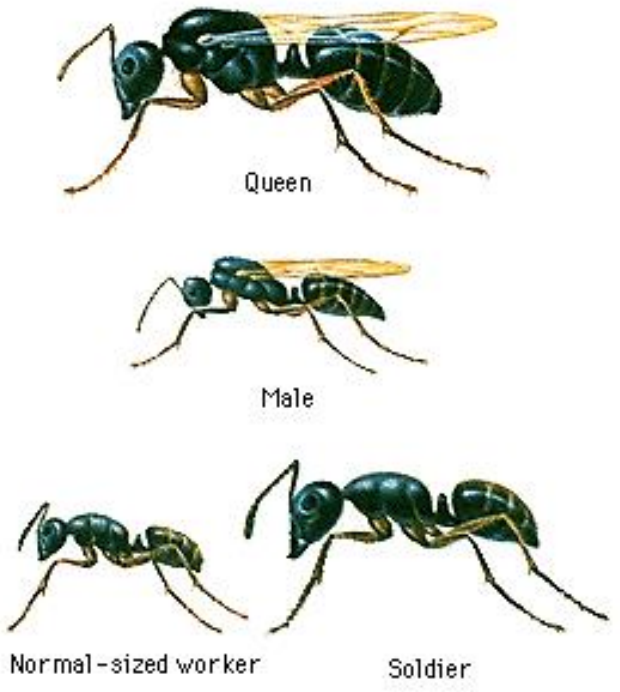
Specialization

- Some species have developed specializations to ensure colony success
  - Food storage
  - Trophic eggs
- Some plants have evolved specialized mutualistic relationships with ants
  - Extra floral nectaries
  - Special growths, hollow structures, etc…. for nesting sites



Colony structure

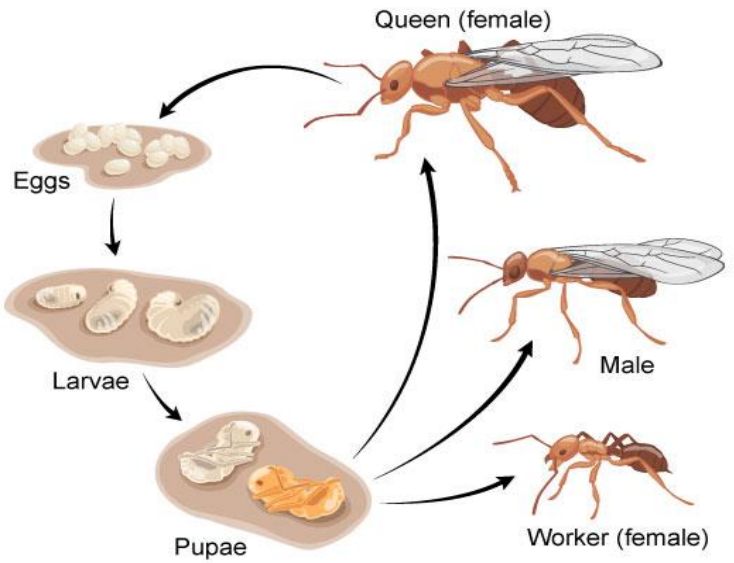
- Caste separation
  - Reproductive
    - Queens
    - Males
  - Non-reproductive
    - Workers
  - Larvae



- The colony is a “super-organism”

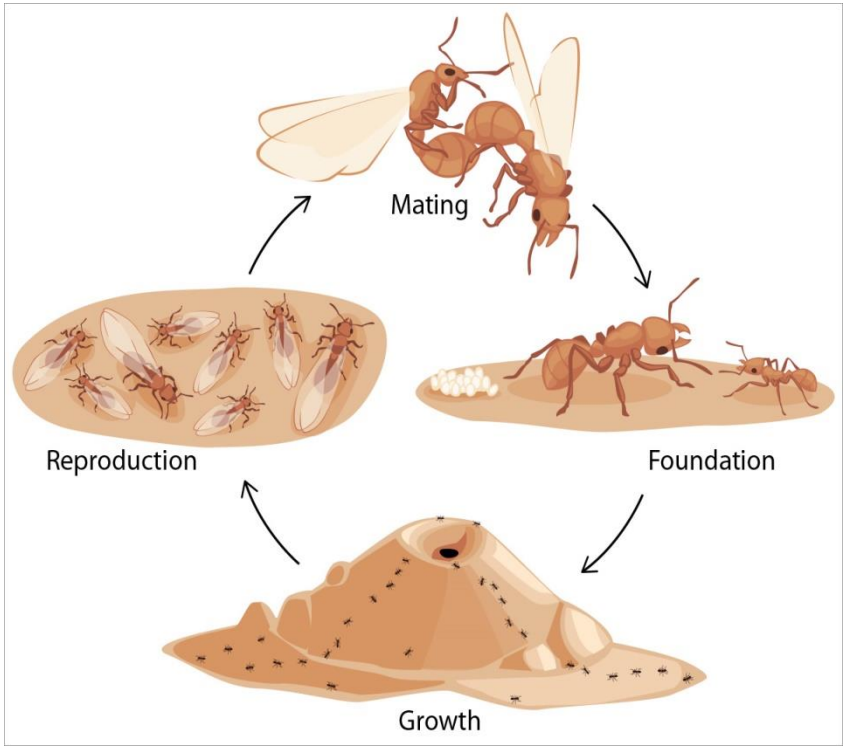
Life Cycle

- Complete metamorphosis
  - Egg
  - Larvae
  - Pupa
  - Adult



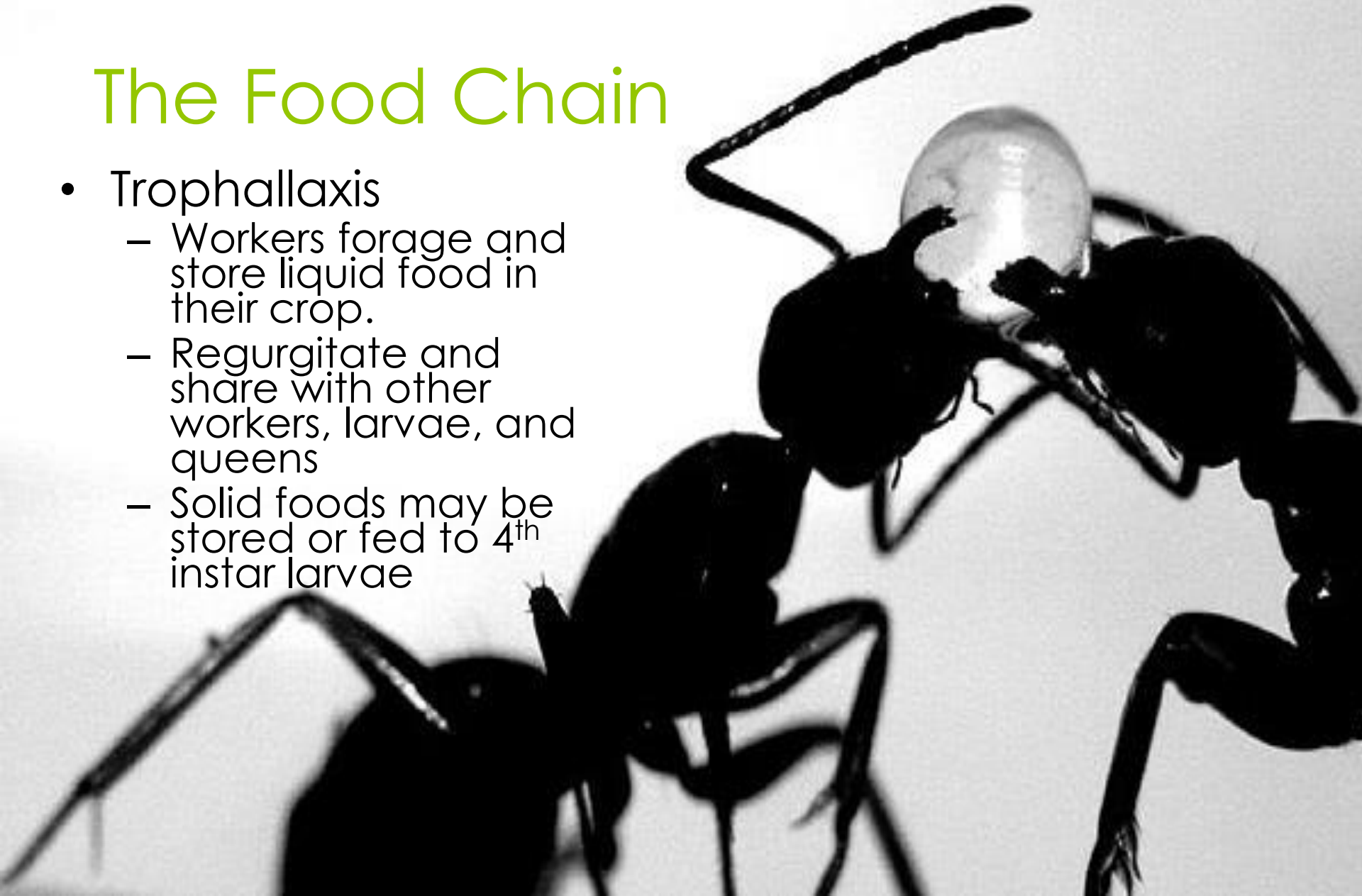
Colony Life Cycle

- Most colonies go through 4 phases annually
  - Production of reproductives
  - Mating (swarms)
  - Dispersal/foundation
  - Growth



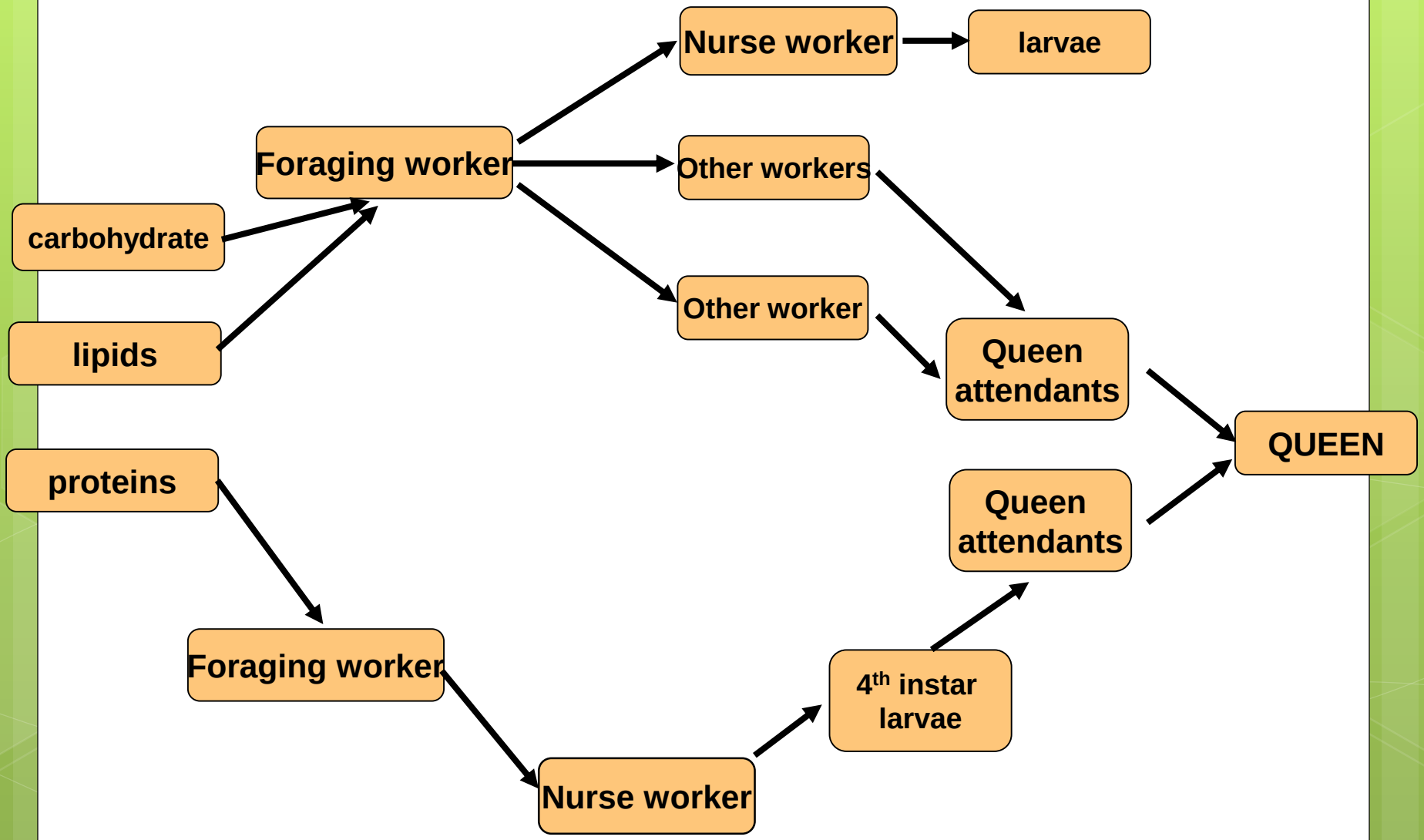
The Food Chain

- Trophallaxis
  - Workers forage and store liquid food in their crop.
  - Regurgitate and share with other workers, larvae, and queens
  - Solid foods may be stored or fed to 4th instar larvae



The Food Chain

- Different Castes (queens, workers, brood) have different nutritional requirements
- 3 essential nutrients
  - Carbohydrates
  - Proteins
  - Lipids
- Workers forage on and bring back different amounts of carbohydrates, proteins, and lipids depending on colony needs
  - Amount of brood
  - Nutritional voids caused by limited resource availability


Nurse worker
larvae
Foraging worker
Other workers
carbohydrate
Other worker
lipids
Queen attendants
QUEEN
proteins
Queen attendants
Foraging worker
4th instar larvae
Nurse worker

Competition for Resources

- Interspecific aggression
  - Aggression towards other species
- Intraspecific aggression
  - Aggression towards neighboring colonies of the same species
  - Linked to pheromone ques in monogynous colonies

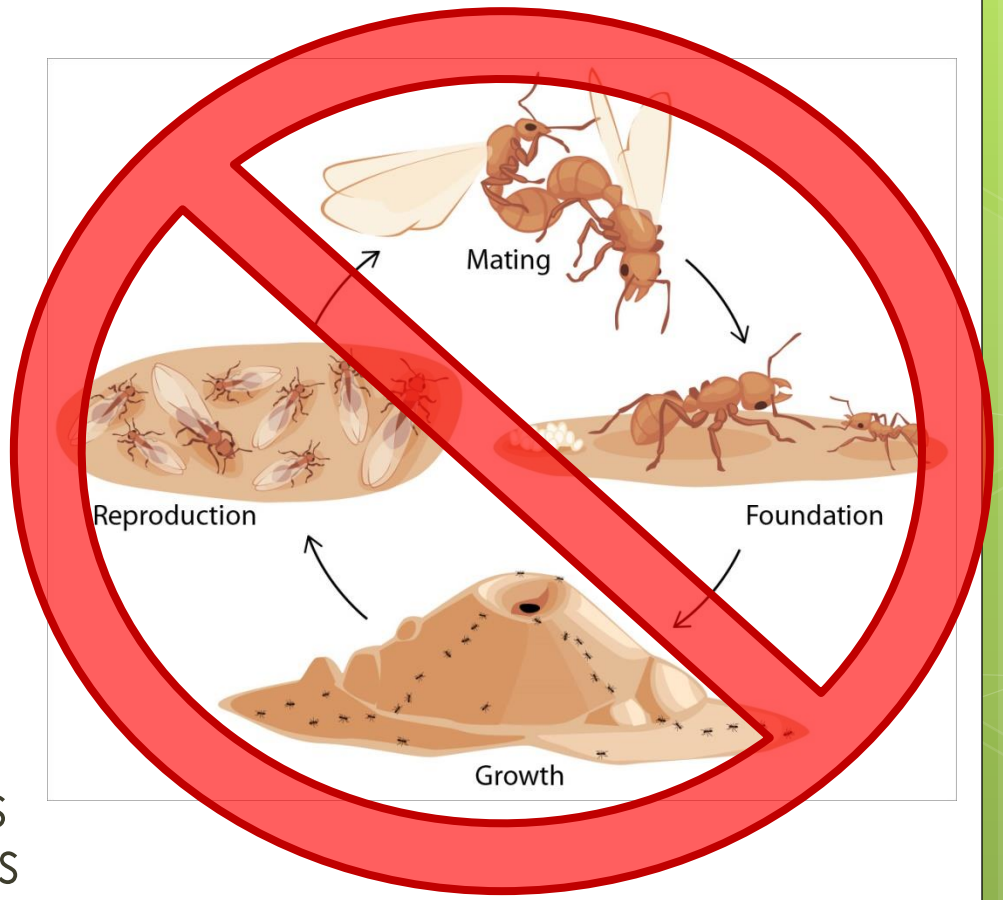
In addition to predators and parasitoids, these general biological traits help to keep populations in balance with everything else in the ecosystems they inhabit.

Why have Certain Species Become Pests?

THEY ARE NAUGHTY RULE BREAKERS!!

Breaking the Cycle

- Production of reproductives throughout the year
- No Swarming
  - All mating occurs within nests
- Dispersal via budding, not aerially
  - Reduces spread spatially, but allows for greater densities within an area.



Sharing is Caring

- Polygyny
- Low intraspecific aggression
- Unicolonial
  - Super colonies
- High interspecific aggression
  - Extirpate other species

Tramp Ants

- "Tramp ants are a diverse group of invasive ant species which have become established widely across the globe. They can arrive through many transport pathways, and once here can affect ecosystems, social and cultural values, and human health." – AU Government Dept. of Environment and Energy
- Closely tied to human activity
- Invasive and non-invasive morphs

Widely distributed

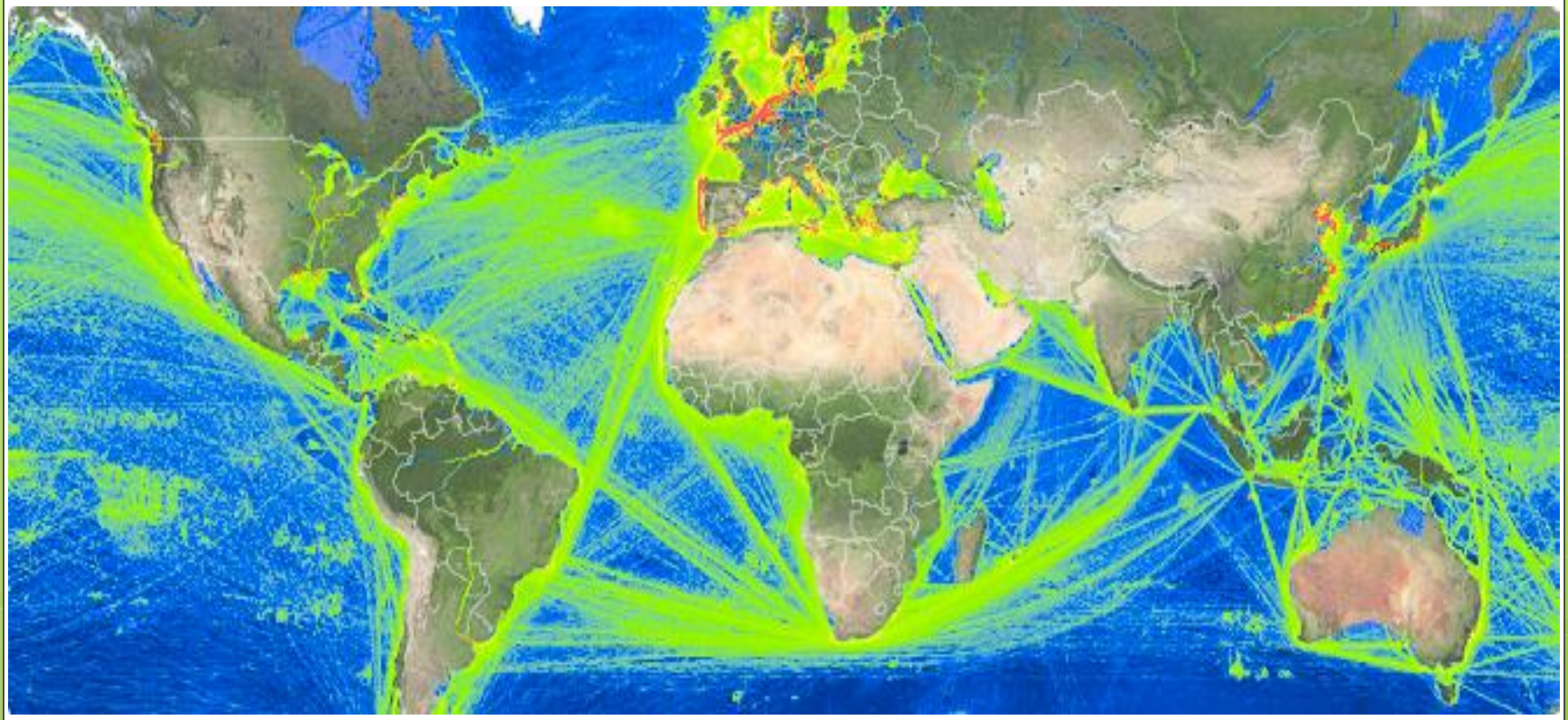
- Anoplolepis gracilipes
  (Yellow Crazy Ant)
- Solenopsis geminata
  (Tropical Fire Ant)
- Technomyrmex albipes
  (White Footed Ant)
- Pheidole megacephala
  (Big Headed Ant)
- Trichomyrmex destructor
  (Singapore Ant)

Limited Distribution

- Wasmannia auropunctata
  (Little Fire Ants)

Not YET Present

- Solenopsis invicta
  (Red Imported Fire Ant)
- Nylanderia fulva
  (Tawny Crazy Ant)



Increased commerce and shipping will lead to species being move around that never were before. Some of these will become "new invasives"

- we are not prepared-