Stop Invasive forest ants – www.littlefireants.com

Pacific Ant Project

Survey Training module

Session 1: invasive ant awareness

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Project background

- USFS Grant 2011-2012
- Administered by Division of Forestry and Wildlife (DOFAW) Hawaii and
- Pacific Cooperative Studies Unit (University of Hawaii)
- In collaboration with
  - Commonwealth of Northern Mariana Islands
  - Republic of Palau
  - Federated States of Micronesia
  - State of Hawaii

In CNMI

- **DOFAW** –
  - Sheri Mann
- **PCSU** –
  - Cas Vanderwoude
- **CNMI Dept Agriculture (Forestry**) –
  - Victor Guerrero
- **College of Micronesia** –
  - Marisol Quintanilla, Arnold Route

Background

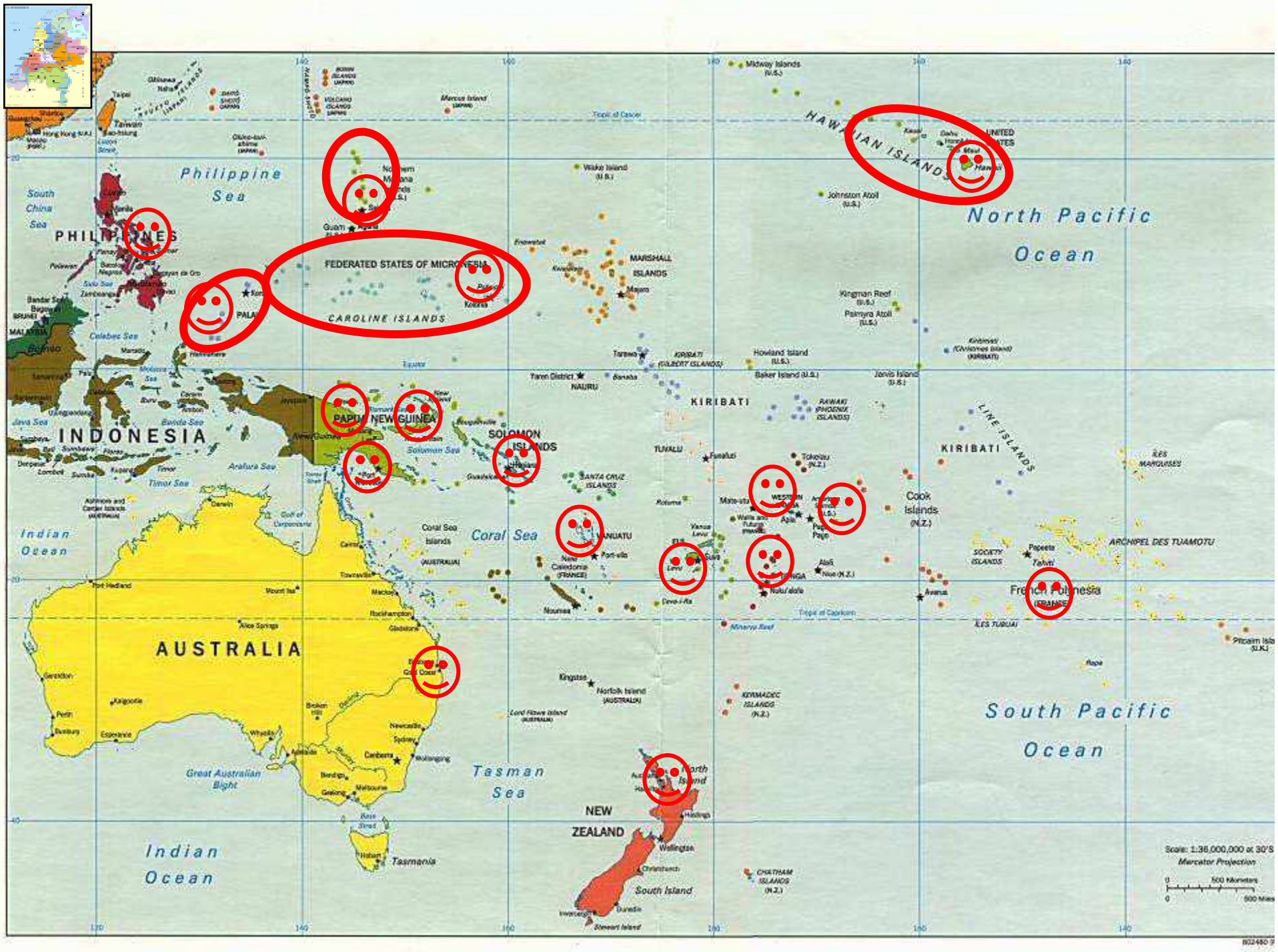
- Invasive forest ants have travelled across the Pacific region over the last 200+ years
  - Many are only a minor nuisance, but some are not
- These ants cause economic damage in the countries they invade as well as far-reaching ecological impacts
- Infest crops and exports
  - makes it more expensive to produce
  - More expensive to export

Pacific Ant Project

- Developed by DOFAW, PCSU, CNMI Forestry
- Funded by United States Forest Service
- Has the following main components:
  - Early detection through surveys
  - Training in ant identification
  - Development of island-specific emergency response plans
  - Continuing development of web-based resources
  - Ensuring policy and regulatory frameworks are in place
  - Incorporation with island invasive species action plans, and facilitating interagency cooperation and coordination
  - Training in management of invasive ants and implementation of management plans in high value forest ecosystems currently impacted by invasive ant species.

Project links - PAPP

- Developed by IUCN Invasive Species Specialist Group (ISSG)
- Part of the Secretariat of the Pacific Community (SPC) Biosecurity and Trade Facilitation programme in 2006-2007
- Survey training conducted in CNMI by Peter Wilkins in 2007


Philippine Sea
South China Sea
PHILIPPINES
FEDERATED STATES OF MICRONESIA
CAROLINE ISLANDS
MARSHALL ISLANDS
HAWAIIAN ISLANDS
North Pacific Ocean
INDONESIA
PAPUA NEW GUINEA
SOLOMON ISLANDS
KIRIBATI
TUVALU
NAURU
Coral Sea
Indian Ocean
AUSTRALIA
Great Australian Bight
Tasman Sea
NEW ZEALAND
South Pacific Ocean
Cook Islands (N.Z.)
French Polynesia

Program for today and tomorrow

- Today
  - Introductions, handout of course materials
  - Session 1: invasive ant awareness
  - Session 2: survey training
  - Lunch
  - Session 3: using a GPS for survey
  - Session 4: prepare baits
- Tomorrow
  - Survey field exercise
  - Written test
  - Course de-brief and assessment
  - Awarding certificates

Session 1:
Invasive ant awareness

- What is an invasive ant?
- Target species
  - Little Fire Ant
  - Red Imported Fire Ant
  - Other invasives

What are the **REAL** causes of declines in global biodiversity?

- **HIPPO** (E.O. Wilson)
  - **H**abitat destruction,
  - **Invasive species,**
  - **P**ollution,
  - Over **P**opulation,
  - **O**verharvesting

Our greed for cheap food, fiber and minerals

A predictable consequence of global trade

Gotta have that Humvee brah!

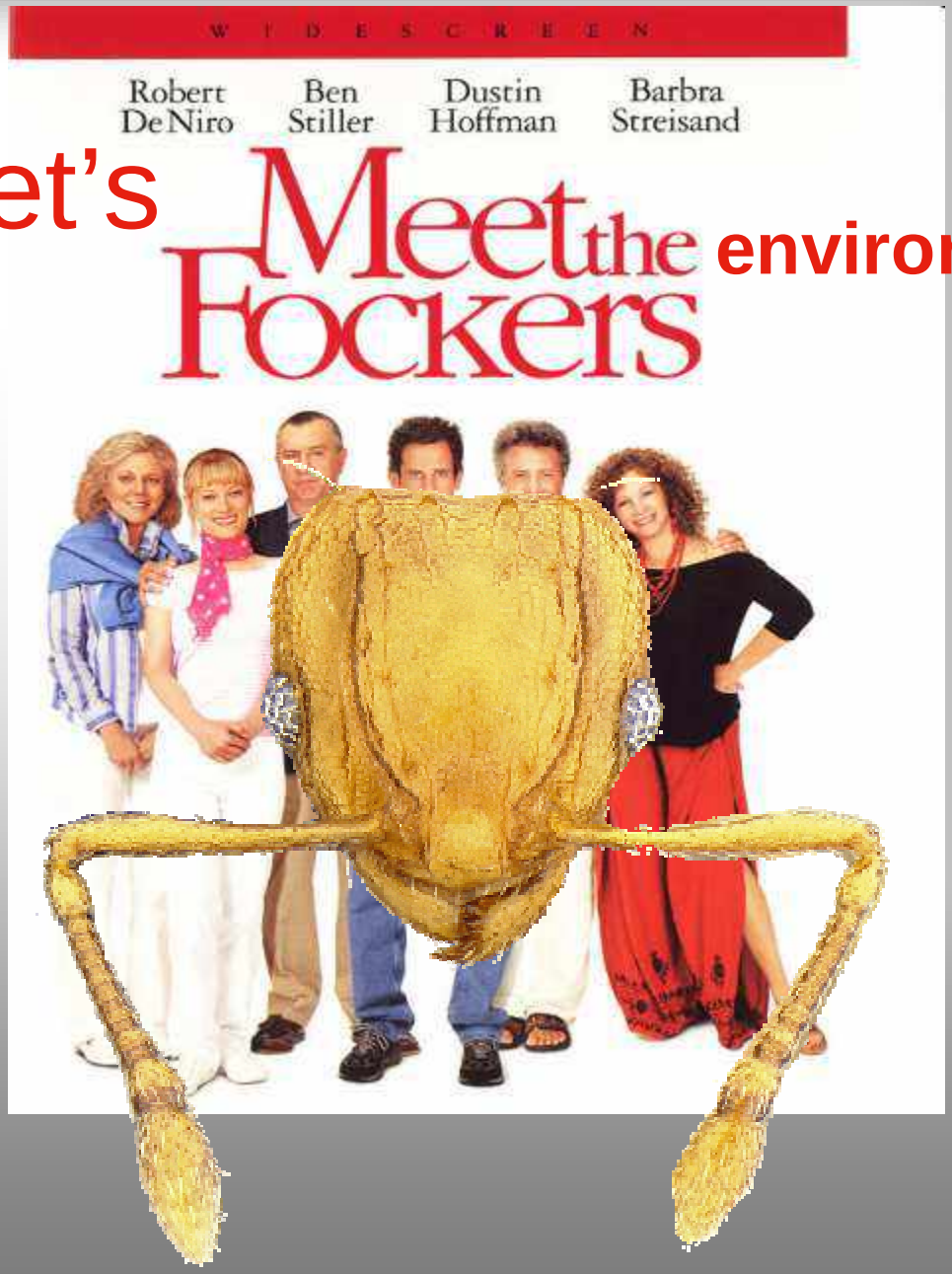
We breed like rabbits

Exploiting natural resources rather than using them sensibly

Invasive species

- Plants and animals, which, introduced to new locations thrive to the detriment of endemic species.
- Ants and other social insects feature prominently in lists of the most damaging invasive species.

So let's **environmental**



Hawaii has around 50 ant species – all thought to be introduced (probably similar in CNMI)

Bad Ants

Ones we have

- *Solenopsis geminata* (Red Ant)
- *Anoplolepis gracilipes* (Yellow Crazy Ant)

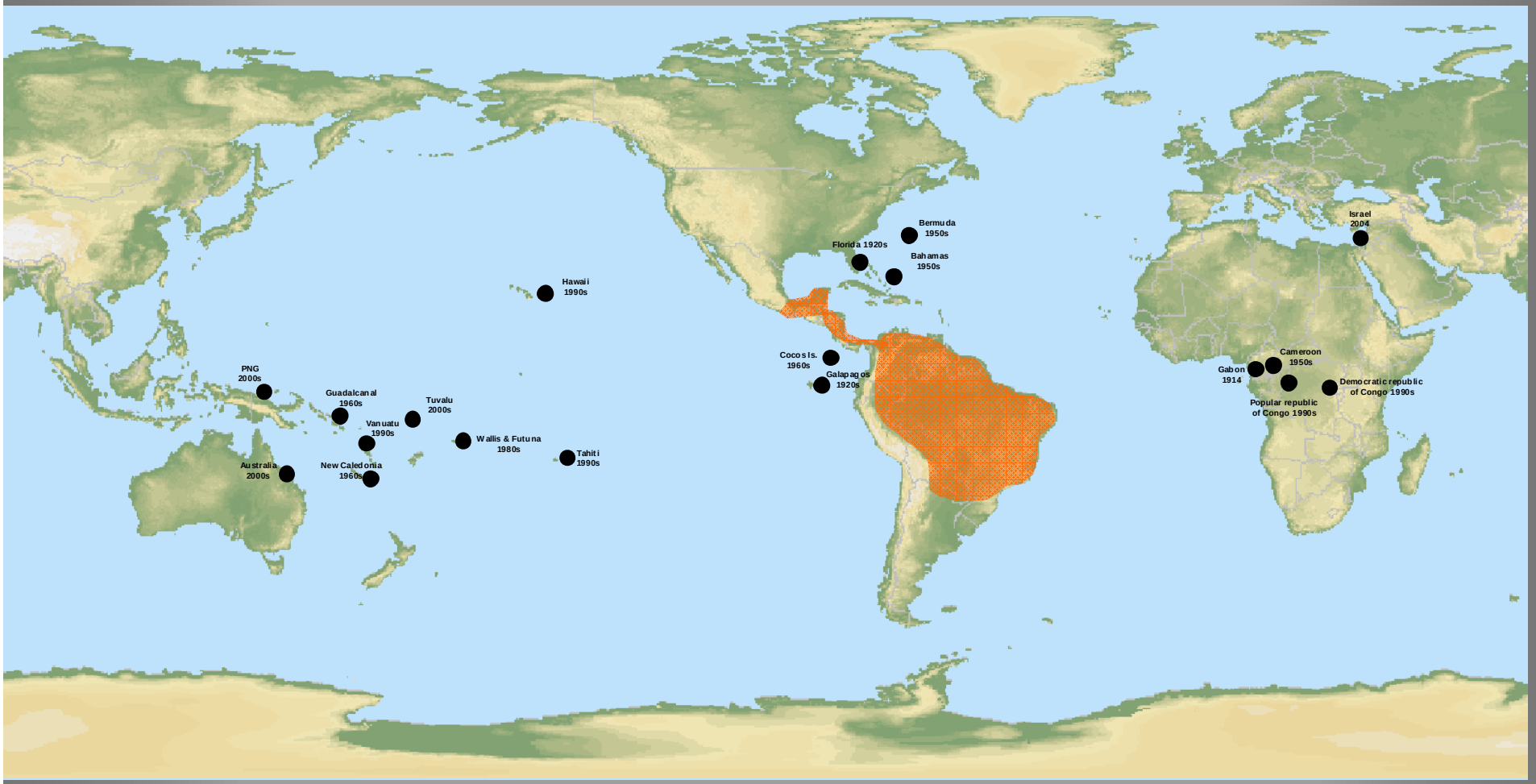
- Ones we don't have (yet)
- *Wasmannia auropuntata* (Little Fire Ant)
- *Solenopsis invicta* (Red Imported Fire Ant)
- *Paratrechina pubens* (Hairy Crazy Ant)

Wasmannia auropunctata

- Scientific name *Wasmannia auropunctata*
- Also called:
  - Little Fire Ant
  - Electric Ant (New Caledonia)
  - Cocoa Tree Ant (Solomon Islands)
  - Liklik Paia Anis (Papua New Guinea)
- Little Fire Ants are **not** closely related to the other Fire Ants present in USA and Hawaii

Origin and spread

- Originally from tropical and sub-tropical regions in south America.
- Over the last 100 years or so has slowly spread through tropical regions worldwide
- Detected in Hawaii in 1999, LFA would have arrived here some years prior


Bermuda
1950s
Florida 1920s
Bahamas
1950s
Hawaii
1990s
Cocos Is.
1960s
Galapagos
1920s
Israel
2004
Cameroon
1950s
Gabon
1914
Democratic republic
of Congo 1990s
Popular republic
of Congo 1990s
PNG
2000s
Guadalcanal
1960s
Tuvalu
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Vanuatu
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Wallis & Futuna
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Tahiti
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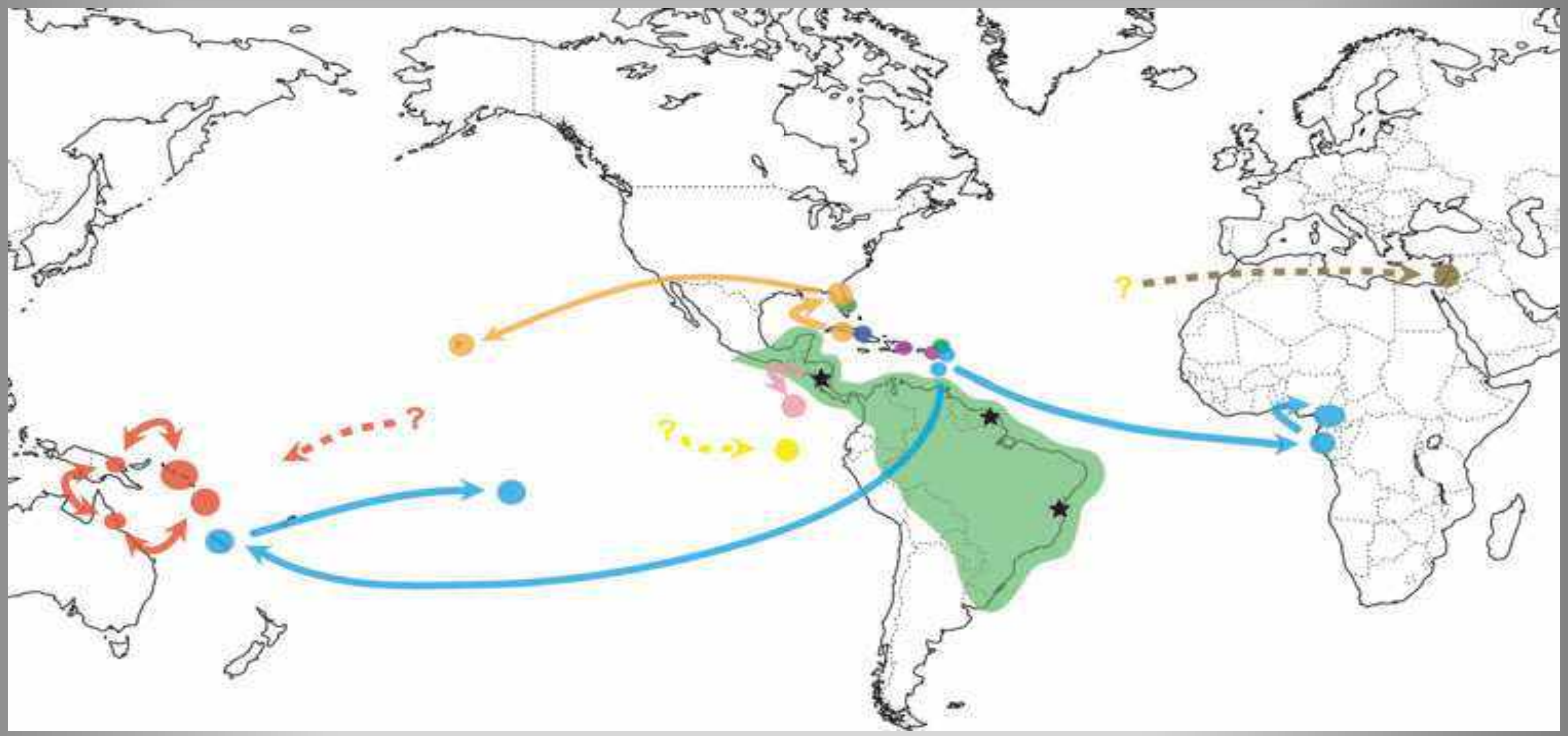
Australia
2000s
New Caledonia
1960s



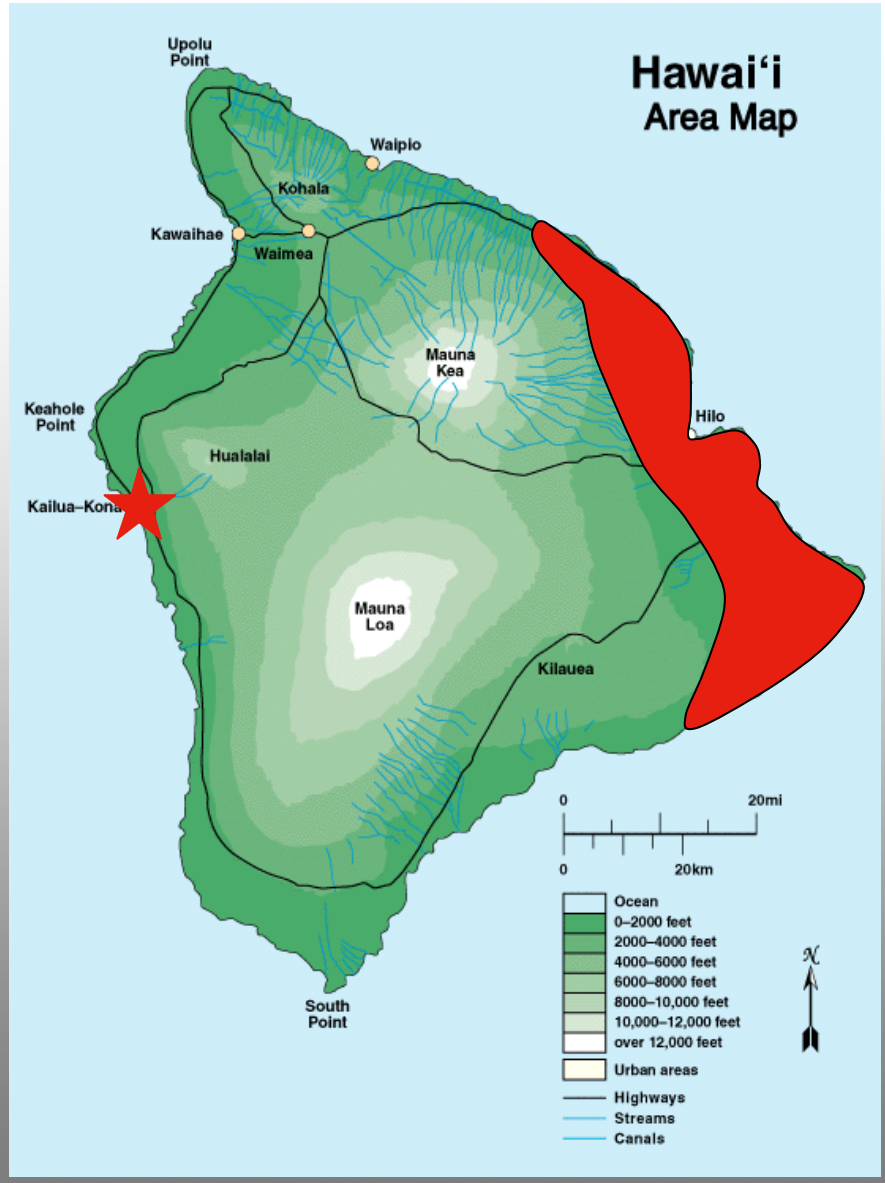
From:

Foucaud, J. Orivel, J. Loiseau, A. Delabie, J.H.C. Jourdan, H. Konghouleux, D. Vonshak, M. Tindo, M. Mercier, J. Fresneau, D. Mikissa, J. McGlynn, T. Mikheyev, A.S. Oettler, J. and Estoup, A. (2010). Worldwide invasion by the little fire ant: routes of introduction and eco-evolutionary pathways. *Evolutionary Applications*. 1-13

Hawaii situation report

- The Big Island
  - First detected 1999
  - Now distributed from lower Puna to Laupahoehoe
  - Recently also found in Kailua-Kona
  - No prospect of eradication on east side
- Kauai
  - First detected in 2000
  - Covers around 12 acres
  - Only present on one property (Kiluhea) despite extensive surveys across the island
  - Eradication planned this year
- Maui
  - One infested property at waihe'e
  - Covers around 1.0 acres
  - First detected October 2009
  - Property treated every month with granular baits and experimental paste bait
  - No live LFA seen since February 2010 - we have now reached the point of "virtual eradication"

Current distribution



Biology and ecology

- An arboreal ant species that loves shade and moisture
- Also found in lawns and open places if sufficient moisture present
- A “tramp” species, LFA have many queens in each colony, and colonies interconnect to form huge 3-dimensional “supercolonies”
- Extremely efficient at farming scale insects and other homoptera

A pest of people

- Painful stings
- Unable to enjoy outdoor activities
  - Walking through forest
  - Letting children play outside
- Gardening becomes almost impossible

A pest of agriculture and horticulture

- LFA “ranch” mealybugs, scales and other insects.
  - Protect them from natural enemies
  - Move them from leaf to leaf, plant to plant
- This causes stunting of growth, premature fruit excision, fruit spoilage.


07.05.2007

A pest of animals

- Domestic animals frequently stung
  - LFA hang around the food bowl and forage around where dogs, etc live
- The result is frequent stings which leads to hair loss and rashes
- Stings on the eyes can cause keratopathy – a clouding of the corneas

Economic costs

- Crop losses
  - Scales and mealybugs reduce production
  - Workers unwilling/unable to harvest
  - Rejection of export commodities
- Blinded domestic animals
- Medical costs
- Pest control costs
- Impacts on tourism

Environmental costs?

- Impacts on invertebrates
- Impacts on plants
- Impacts on vertebrates

New species waiting to arrive

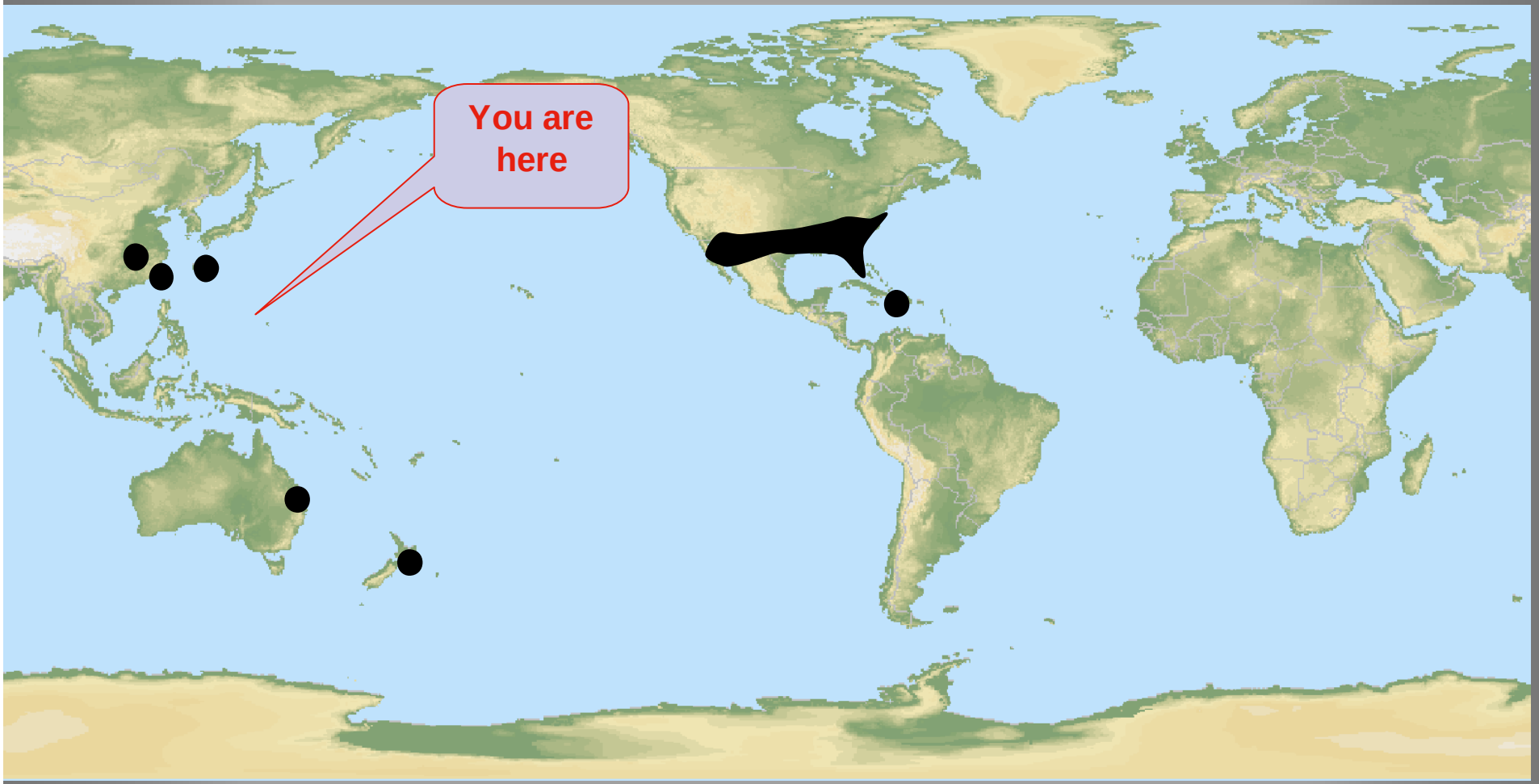
- The imported fire ant (*Solenopsis invicta*)

Red Imported Fire Ants

- Scientific name *Solenopsis invicta*
- Called fire ants because of their burning sting
- “invicta” means unconquered
- Originally from South America
- Now found in USA, Australia, Taiwan, China, Hong Kong, Singapore, Penang
- Costs US$ Billions of dollars each year to control in USA
- Large eradication program in Brisbane (AUS$ 200 Million)
- Previously found in NZ (Auckland and Napier) but eradicated there
- A black form also found (*Solenopsis richteri*) with almost identical ecology and biology

Impacts

- Environmental
  - Preys on other animals including sea turtles, crocodiles, birds
- Social
  - Stings people and pets
- Economic
  - Expensive to control
  - Countries with RIFA could have trade restrictions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Biology and ecology

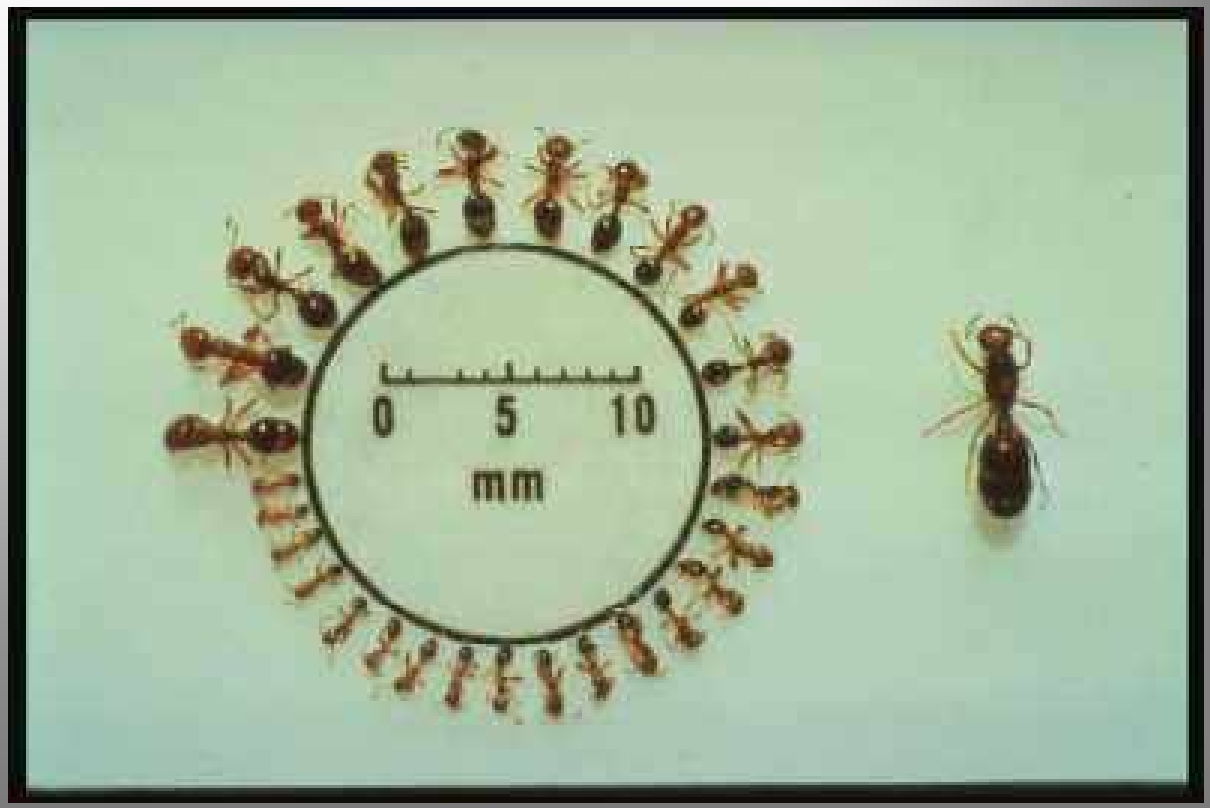
- Ground dwelling species that build elaborate earth nests with distinctive galleries
- 2 forms, single queen (monogyne) and multiple queen (polygyne)
- Extremely aggressive when disturbed

Habitats

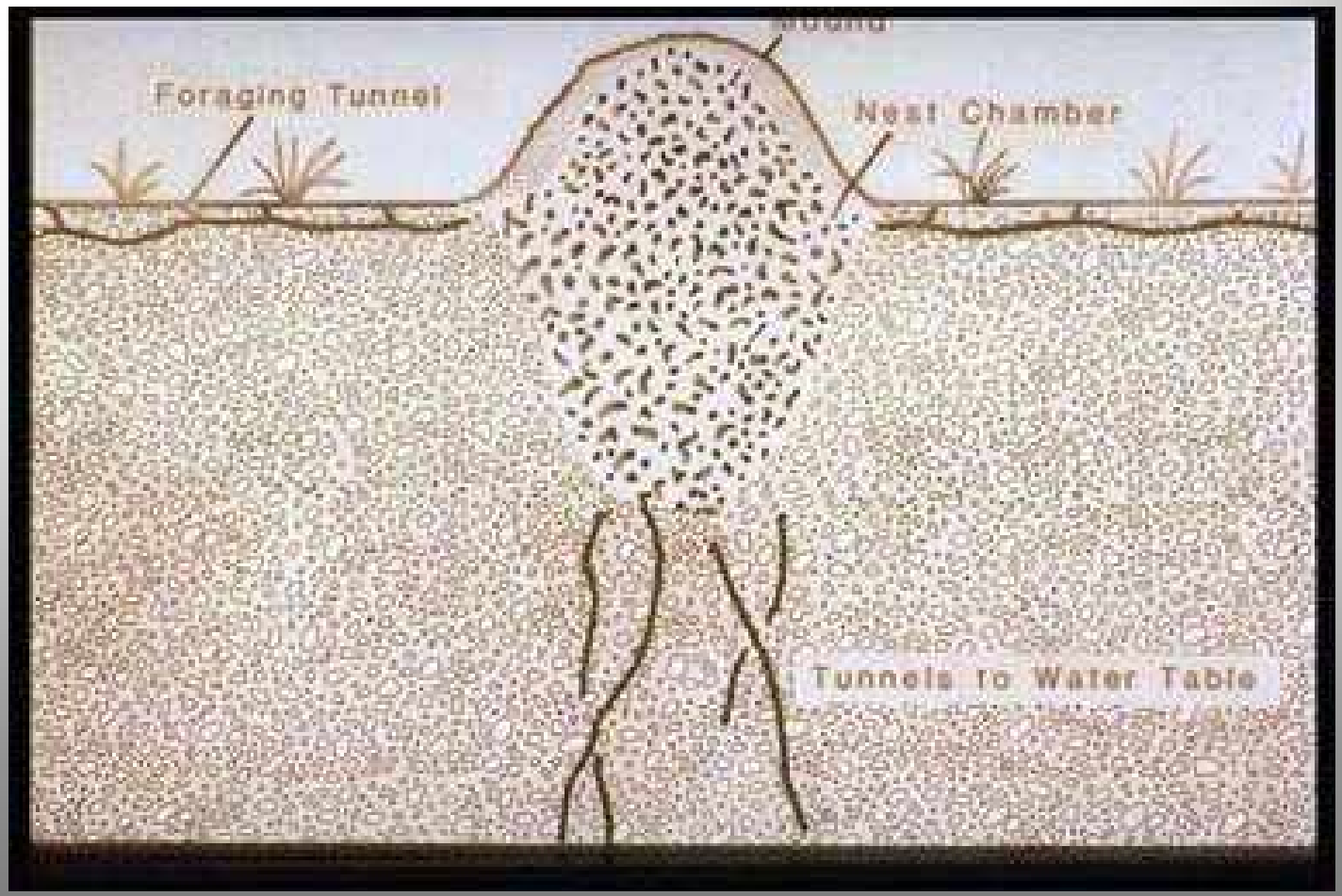
- Grassed areas
- Gardens
- Near food supplies (grain etc)
- Around homes
- Industrial areas
- Swamps and river banks

What do they look like?

- Polymorphic (many different sizes)
- 2-6 mm in size
- Dark red colour



Cross sectional view of typical nest



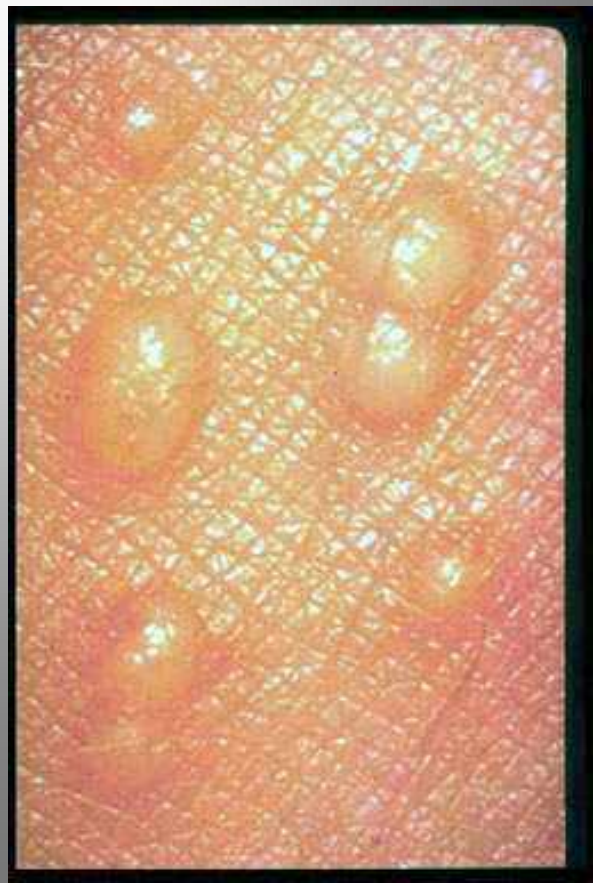
What do they look like?

What do they look like?

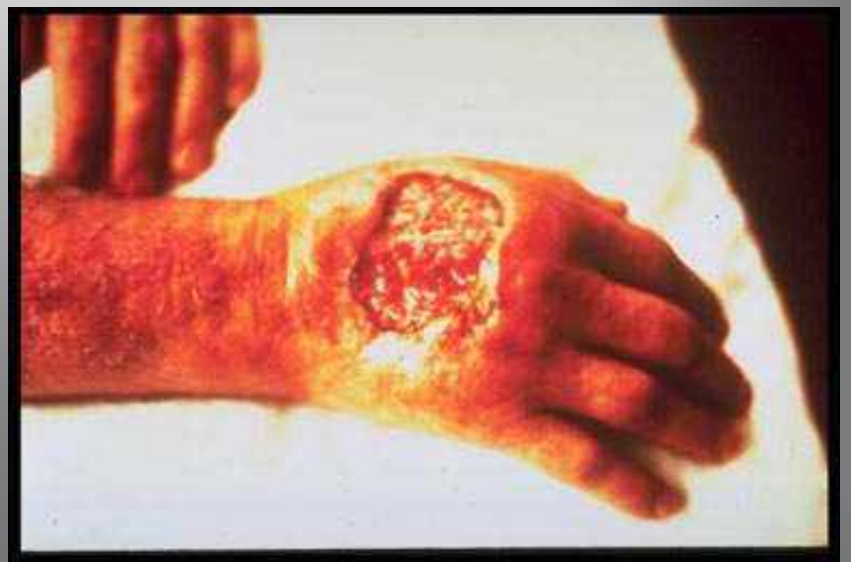
What do they look like?

Stings

- Typical fire ant sting leaves white pustules



Stings

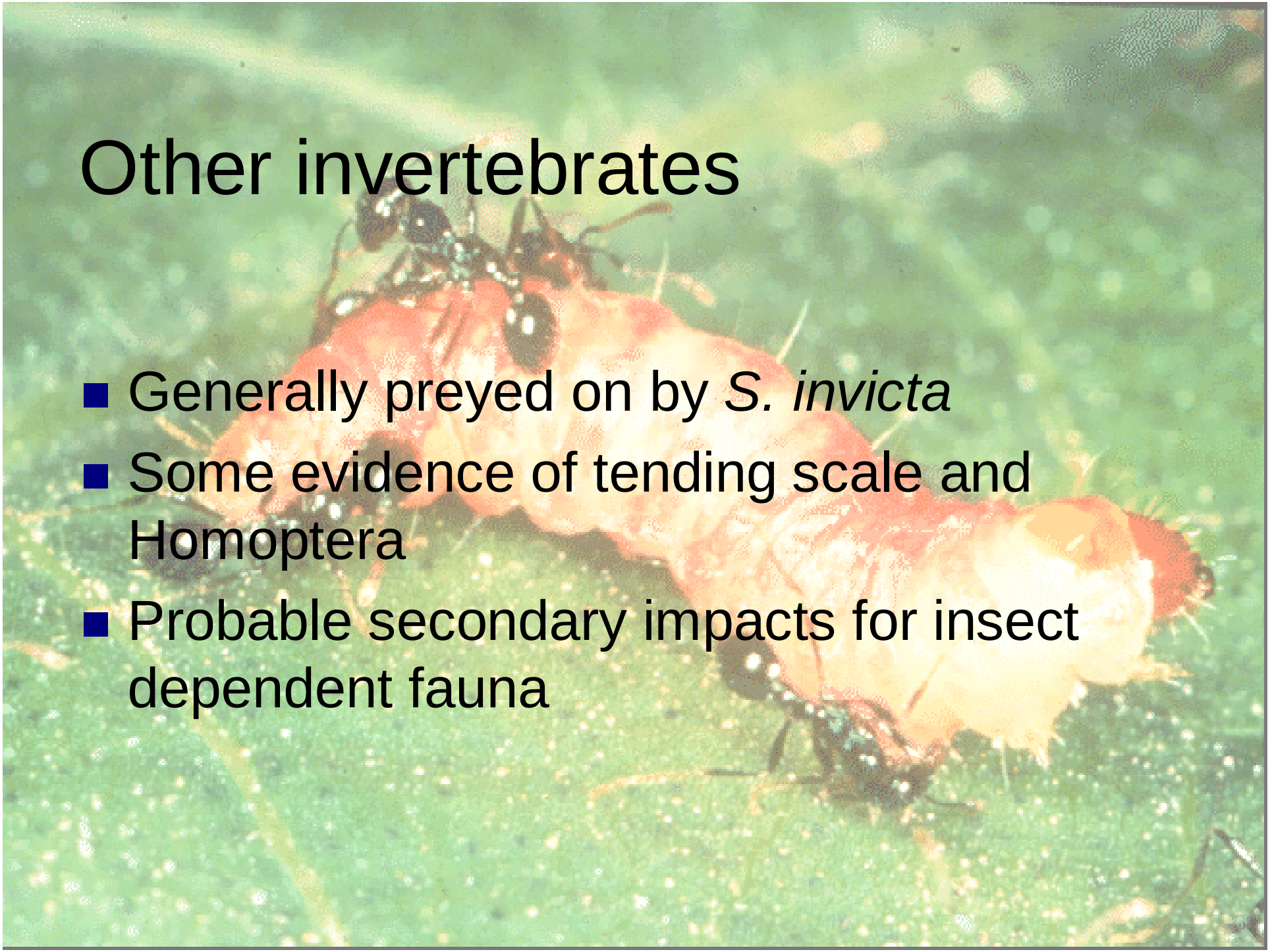


Potential impacts on the environment (an Australian perspective)

- Native ants
- Other invertebrates
- Amphibians
- Aquatic reptiles
- Terrestrial reptiles
- Birds
- Mammals

Native ants

- Ants are the dominant ground-active invertebrate
- Rich ant fauna 1000s of species
- *S. invicta* do not play by the rules governing Australian ant community dynamics
- Native ants provide substantial biotic resistance
- However, they eventually succumb to fire ant supercolonies
- Only “weedy” opportunist species remain

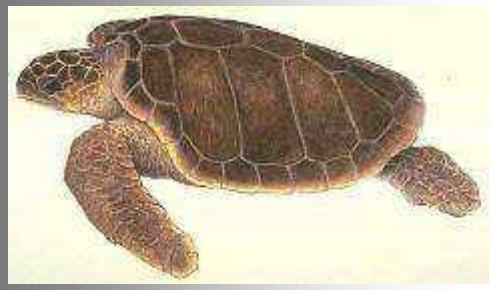


Other invertebrates

- Generally preyed on by *S. invicta*
- Some evidence of tending scale and Homoptera
- Probable secondary impacts for insect dependent fauna

Amphibians

- Rich and unusual frog fauna
- Some lay eggs on land
- Burrowing frogs
- Gastric brooding frogs
- Some feed on ants
- Genera *Philoria and Pseudophryne* considered most at risk



Aquatic reptiles (turtles)

- Australia's east coast is a rookery for 6 of the world's 7 sea turtles
  - Green, Loggerhead, Ridley's, Hawksbill, Leatherback, Flatback
- All species already threatened
- Hatching success on Florida beaches infested with fire ants is greatly reduced
- Australian situation will be the same

Crocodiles

- Both fresh-water and salt-water species present (abundant in tropical areas)
- Under threat due to habitat loss
- Eggs of USA alligators predated by fire ants
- Australian situation expected to be very similar

Terrestrial reptiles

- Diverse and unique reptile fauna
- Common terrestrial reptiles not easily found in areas invaded by fire ants
- All species at risk from further range expansion by RIFA

- Ground nesting birds heavily impacted by fire ants in USA
  - Predation on eggs
  - Injury to chicks
  - Competition for prey items

- Many Australian ground-nesting bird species already threatened by habitat loss, feral cats, foxes
- All will be further threatened by fire ants
- Species extinctions inevitable

- In USA, small mammal densities negatively correlated with fire ant densities.
- Effects probably from attack (esp young) and competition for resources
- Australian mammal species all equally at risk, but this risk unknown
- Small mammals and marsupials may have a greater risk

Economic impacts

- Most estimates for USA in Billions per year
- In Texas alone, impact estimated at 1.2 Billion
- Repairs to electrical equipment
- Golf course and amenity maintenance
- Stock and domestic animals
- Medical costs
- Domestic yard treatments

Costs

- In Texas USA the costs of damage and control costs $32 per person each year
- In Queensland Australia – eradication program to cost $200 million

Red Ants

- Scientific name *Solenopsis geminata*
- Originally from USA
- Probably spread during WW2 in the Pacific
- Now found in Australia and throughout the Pacific
- Has a painful sting

What do they look like?

- Polymorphic (different sizes)
- Larger workers with very big heads
- An orange or ginger colour
- 2-4 mm in length

What do they look like?

Singapore Ants

- Scientific name *Monomorium destructor*
- Originally from ?Africa
- Now found in Australia and throughout the Pacific

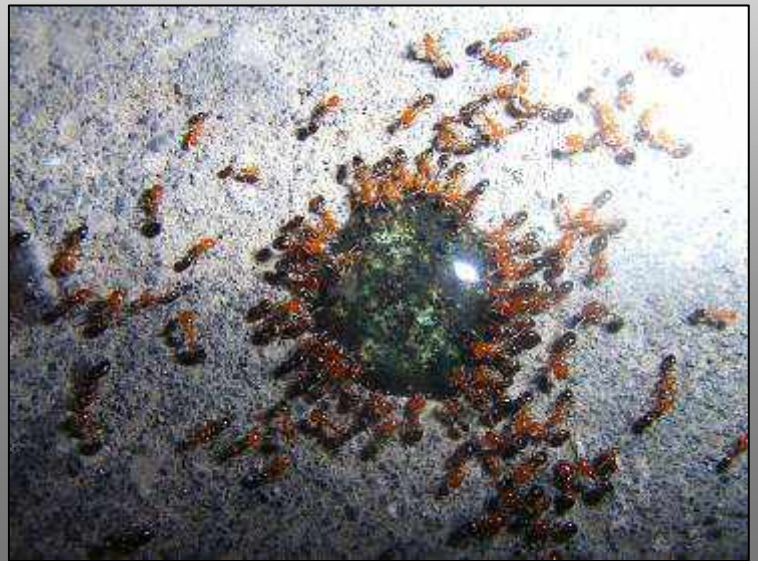
Singapore Ants

- Often found in kitchens, near food or in buildings
- Infests electrical wiring, phone lines causing damage
- Has a painful sting

What do they look like?

- Small (1-2 mm)
- Normally yellow in colour with darker abdomens
- Polymorphic (many sizes)

What do they look like?



Yellow Crazy Ants

- Scientific name *Anoploleps gracilipes*
- Called crazy ants because of their fast erratic movement
- Originally from Africa or India
- Now found in Australia and throughout the tropics

Yellow Crazy Ants

- Originally introduced as a biological control in cocoa, coffee and coconut plantations
- Huge colonies covering many hectares
- Likes darker and wet places
- Drains, swamps, rainforests, under houses, under trees

What do they look like?

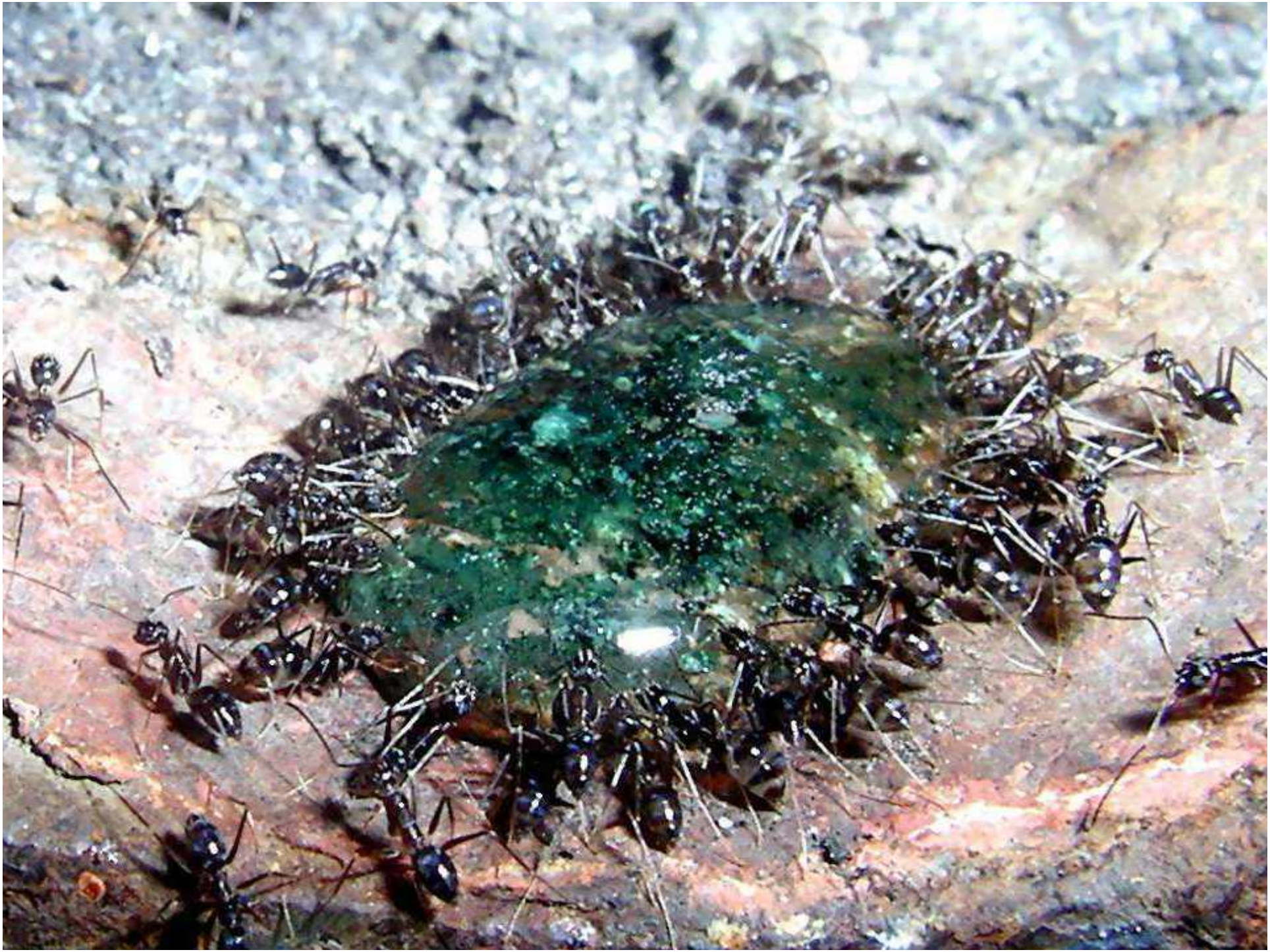
What do they look like?

Black Crazy Ants

- Scientific name *Paratrechina longicornis*
- Called crazy ants because of their fast erratic movement
- Originally from ?Africa
- Now found in Australia and throughout the tropics
- Very common in Port Moresby and Lae

What do they look like?

- Small, black and slender
- Fast moving
- Seen indoors and outside



Ghost Ants

- Scientific name *Tapinoma melanocephalum*
- Called ghost ant because it is partly transparent
- Widespread throughout the world
- Now found in throughout the Pacific
- Very small and shy

What does it look like?

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