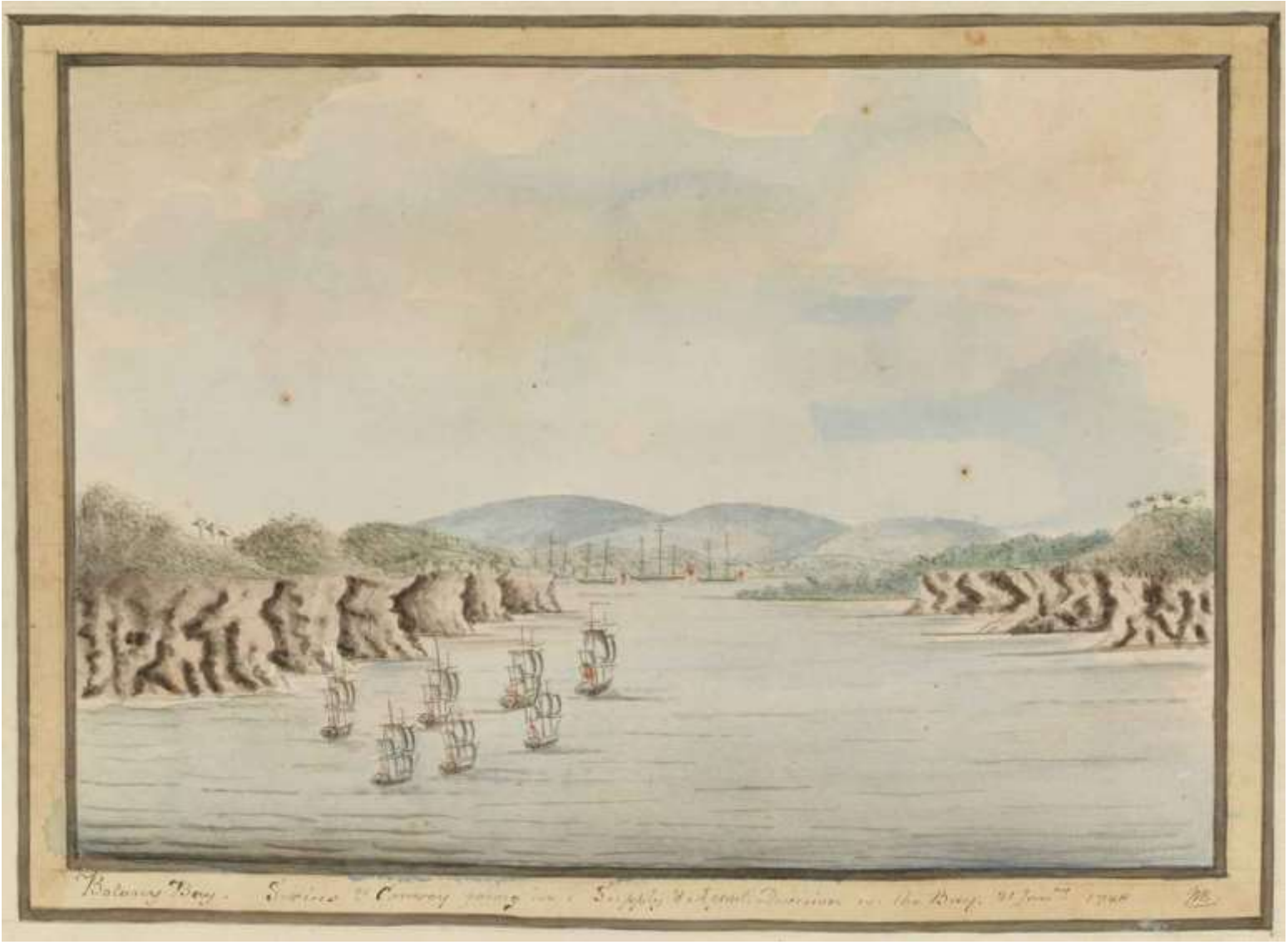
THE NORTHERN HOSPITAL

ANT STINGS



"Botany Bay. Sirius & Convoy going in Supply & Agents Division in the Bay 21 Janry 1788", William Bradley - Drawing from his journal "A Voyage to New South Wales", 1802; Mitchell Library, State Library of New South Wales, Sydney.

....Of insects here were but few sorts and among them only the Ants were troublesome to us. Musquetos indeed were in some places tolerably plentyfull but it was our good fortune never to stay any time in such places, and where we did to meet with very few.

The ants however made ample amends for the want of them, 2 sorts in particular: one green as a leaf and living upon trees where he built his nest, in size between that of a

mans head and his fist, by bending the leaves together and glueing them with a whiteish papery substance which held them firmly together. In doing this their man[a]gement was most curious: they bend down leaves broader than a mans hand and place them in such a direction as they chose, in doing of which a much larger force is necessary than these animals seem caple of. Many thousands indeed are employd in the joint work; I have seen them holding down such a leaf, as many as could stand by one another each drawing down with all his might while others within were employd to fasten the glue.

How they had bent it down I had not an opportunity of seeing, but that it was held down by main strengh I easily provd by disturbing a part of them, on which the leaf bursting from the rest returnd to its natural situation and I had an opportunity to try with my finger the strengh that these little animals must have usd to get it down. But industrious as they are their courage if possible excells their industry; if we accidentaly shook the branches on which such nest[s] were hung thousands would immediately throw themselves down, many of which falling upon us made us sensible of their stings and revengefull dispositions, especialy if as was often the case they got posession of our necks and hair. Their stings were by some esteemd not much less painfull than those of a bee, the pain however lasted only a few seconds.

Another sort there were quite black whose manner of living was most extrordinary. They inhabited the inside of the Branches of one sort of tree, [ ] the pith of which they hollowd out almost quite to the ends of the Branches; nevertheless the tree flourishd as well to all appearance as if no such accident had happned to it.

When first we found the tree we of course gatherd the branches and were surprizd to find our hands instantly coverd with legions of these small animals who stung most intolerably; experience however taught us to be more carefull for the future....

Joseph Banks, "Some account of that part of New Holland now called New South Wales", August 1770.

Australia seemed an unbounded land of limitless opportunity to Joseph Banks, when he stepped ashore on Botany Bay 29 April 1770. He quickly became aware however that many of its smaller fauna were quire deadly. Not only did the "new" continent contain the world's deadliest spiders, snakes and jellyfish, even some of its ants were deadly!

ANT STINGS

The Jack Jumper Ant, (Myrmecia pilosula), (Alexander Wild).

Introduction

The most important complication of ant bites is **anaphylaxis**.

Allergic reactions to stinging ants are an important cause of anaphylaxis in **Australia** and the southern **United States**.

Allergic reactions to the **Jack Jumper ant** (also known as the Jumper Ant, Hopper Ant) are a uniquely Australian problem, although other species such as the **Green Ant** of Queensland, and introduced **South American Fire Ant** also cause occasional allergic reactions.

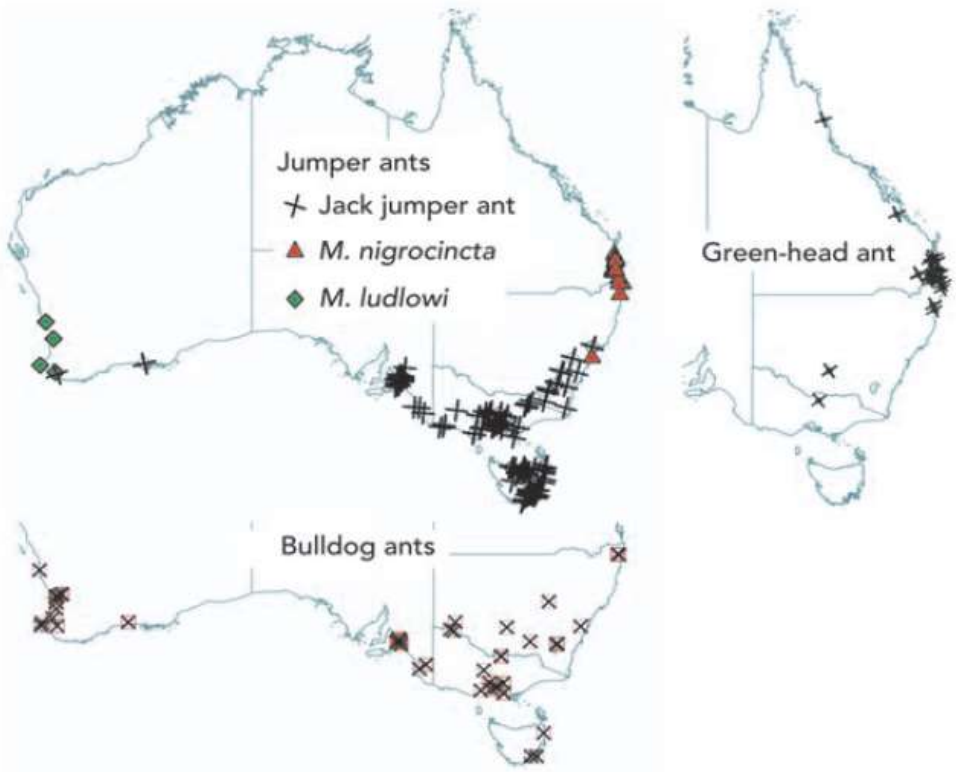
Jack jumper ant (JJA) venom allergy is an important cause of **anaphylaxis** in south-eastern Australia.

The jack jumper ant and its relatives in the genus *Myrmecia* are among the most dangerous ant genera and have fearsome reputations for their extreme aggression.

The *Guinness World Records* certifies the **bull ant *Myrmecia pyriformis*** as the world's most dangerous ant.

Deaths from Jack Jumper ant stings due to anaphylaxis have occurred in Australia. [6]

Epidemiology



Geographic distribution of ant sting allergic reactions in Australia, (2011). [2]

The prevalence of systemic allergy to native ant stings in Australia is as high as 3% in areas where these insects are commonly encountered, such as **Tasmania** and **regional Victoria.**

In one large Tasmanian emergency department study, ant sting allergy was the most common cause of anaphylaxis (**30%**), exceeding cases attributed to bees, wasps, antibiotics or food.

Biology

Most Australian native stinging ants are from the genus ***Myrmecia*.**

This group is broadly subdivided into:

1. **Jack Jumper ants**:

    - Jack Jumper ants are generally 10-15 mm long.

And:

2. **Bull (or bulldog) ants**:

    - Bull ants are generally around 15-25 mm long, but can grow up to 40 mm long, making them the largest ants in the world.

Other less dangerous ants that can cause painful bites or stings include:

3. **Green Tree Ants** (Oecophylla spp.)

4. Red Imported **Fire Ant** (RIFA), (Solenopsis invicta):

    - This species is not native to Australia, but has been imported from South America.

      It is currently confined to regions around Brisbane.

Stings versus bites:

A sting is delivered by a posterior, tapered, needlelike structure designed to inject venom.

In contrast, a bite is delivered with mouthparts.

Scorpions, ants, bees, and wasps have stings.

Ants may cause damage with both a venomous sting and a noxious bite.

Spiders and centipedes have venomous bites that inject venom through specialized oral structures such as fangs.

Jack Jumper Ants:

The Australian ant ***Myrmecia pilosula*** or Jack Jumper Ant (JJA) is highly aggressive and responsible for a majority of cases of anaphylaxis in areas where the ant is prevalent.

Like bees and wasps, Jack Jumper ants do not bite.

Rather, they grasp the victim in their jaws, then bend and **sting them**. Their sting is in the **tail**.

They are aggressive, typically walk with a hopping motion, and can sometimes jump from surrounding vegetation.

Jack Jumper ants live in underground nests. Although established nests can form massive mounds, they are often difficult to find, and may be present under rock, with the entrance surrounded by a pile of fine gravel.

Typically, a couple of sentry ants are present at the entrance.

The ants are aggressive, and often hunt alone. They will stray away from the nest, and at times find their way into people's houses and kitchens.

It is very difficult to avoid being stung by Jack Jumper ants in endemic areas, when nests are located close to human inhabitants.

Pathophysiology

Jack Jumpers have a retractable sting located in their abdomen, attached to a single venom gland connected by the venom sac, which is where the venom is stored.

Ant venom, as does bee and wasp venom contains a wide range of substances, including:

1. Biogenic amines:
    - Histamine, dopamine, noradrenaline, serotonin
2. Enzymes:
    - Phospholipase A_2, phospholipase B, hyaluronidase
3. Peptides:
    - These have allergenic effects as well as direct cytotoxic effects.

Jack jumper ants may have an empty venom sac and the time of attack, and so failure to display a sting reaction should not necessarily be interpreted as a loss of sensitivity.

Clinical features

In general terms there are different types of allergic reactions to stinging insects.

These include:

1. “Normal” local reactions:

In non-sensitized people, a single sting will rapidly produce:

- Local pain, swelling, (up to a few centimeters in diameter), erythema.
- Reaction is mild, localized, and self-limiting over a period of a few hours.

2. "Excessive" local reactions:

- Reaction here is inflammatory as above, but of a much greater degree.
- There may be some mild systemic symptoms.
- The inflammatory response remains localized but may be quite extensive.
- Symptoms tend to peak at about 48 hours and may persist for up to one week.

3. **True Anaphylaxis:**

- Reactions can range from mild to life threatening.
- Symptoms will usually develop within 20 minutes, occasionally longer.
- Shock and upper or lower airway obstruction or less commonly bronchospasm are the main modes of death following insect sting anaphylaxis.

4. Delayed Serum Sickness:

- This occurs only rarely.
- Symptoms of fever, rash, joint pains may occur up to 14 days following the sting.

5. Massive systemic envenomation:

- This may occur with multiple stings from **bee** or **wasp** species, (**see separate documents on Bee and Wasp Stings**).

Jack Jumper ant allergy does not disappear quickly

Follow up studies have shown that around 70 % of people with Jack Jumper ant allergy, will have another allergic reaction if they are stung again. This sensitivity to repeat stings appears to persist for many years.

Investigations

Blood tests:

Diagnostic blood testing can be done for venom-specific IgE (sIgE) to various ant species.

Skin testing:

Intradermal skin testing (IDT) can be done under the close supervision of an Allergy specialist to help determine a patient's sensitivity to a particular ant venom.

Management

1. Normal reactions:

   These need only simple symptomatic treatments, such as:

   - Antihistamines
   - Analgesics
   - Cold compresses
   - Steroid creams.

2. Severe local reactions.

   - Symptoms can be alleviated with anti-histamines or steroids, (oral and/or topical)
   - Patients need to be aware that symptoms may be prolonged over a number of days.
   - Follow up is necessary and the possibility of a secondary cellulitis should be kept in mind.

3. Delayed serum sickness may be treated with a course of oral steroids.

4. Anaphylaxis is treated in the usual manner (**see separate Anaphylaxis document**).

Disposition:

Those who have had an **anaphylactic / life threatening reaction** should have:

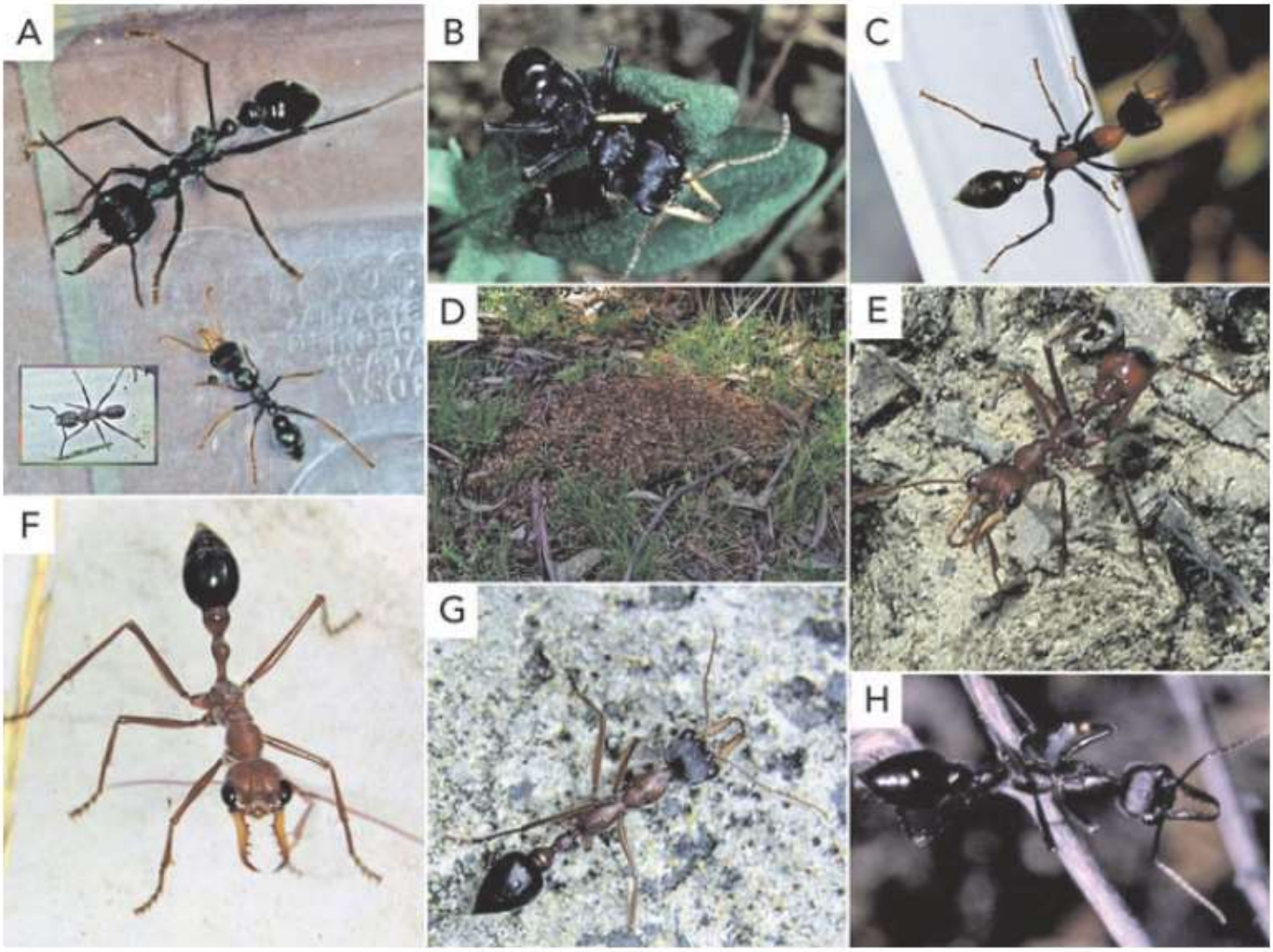
- An appropriate period of symptom free observation (6-12 hours) after successful treatment in the ED
- Follow up referral to an **Allergy Specialist**:

- ♥ **Lack Jumper venom immunotherapy (VIT) is an effective treatment that can desensitize allergic patients to the effects of Jack Jumper venom.**

- An Epipen (or similar device) should be provided.

In cases of diagnostic and/or management uncertainty, the case should be discussed with a **Clinical Toxinologist.**

Appendix 1



Australian ant species, known to cause allergic reactions. [2]

A: A large bulldog ant (Myrmecia pyriformis) and a smaller jumper ant and (inset) a green-head ant (~ 6mm long, dark black - metallic green).

Jumper ants can be further divided on the basis of colouration as either a jack jumper ant (JJA) or another jumper ant.

B: JJA, usually 10 - 12mm long, black body with orange - yellow mandibles, and moves with short jerks and jumps.

C: Another jumper ant, Myrmecia nigrocincta, which is similar in size and behaviour to the JJA but with bright red body segment(s).

The jumper ants Myrmecia ludlowi, Myrmecia swalei and Myrmecia chasei have similar body colouration.

D: A typical jumper ant nest, covered with small stones.

E- H: Bulldog ants of the Myrmecia gulosa species group, 20- 30mm long and a variety of colours.

E: Myrmecia gulosa, the prototype for the group

F: Myrmecia gratiosa, which predominates in the Darling Scarp area east of Perth, Western Australia.

G: Myrmecia nigriceps.

H: Myrmecia forficata, which predominates in Tasmania.

Left: Electron micrograph, Head of a bull ant. Right: Electron micrograph sting of a bull ant, (CSIRO 2010)

References

1. Australasian Society of Clinical Immunology and Allergy (**ASCIA**) Jack Jumper Ant Allergy; Education Document, January 2010

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5. Keith I McCubbin, John M Weiner; Fire ants in Australia: a new medical and ecological hazard. MJA Vol 176 (3) June 2002.

6. Simon G A Brown et al. Fatal anaphylaxis following Jack Jumper ant sting in southern Tasmania. MJA 2001; 175 (11): 644 - 647.

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