Distribution and bait preferences of *Vespula germanica* in South Africa

Haupt, K.[1*], Veldtman, R.[1,2] & Addison, P.[1]

[1]Department of Conservation Ecology and Entomology, Stellenbosch University, Private Bag X1, Matieland 7602, Stellenbosch, South Africa.

[2]Kirstenbosch Research Centre, SANBI, Private Bag X7, Claremont 7735, Cape Town, South Africa.

[*]karlahaupt@sun.ac.za

Introduction & Aim

V. germanica is a prominent invader worldwide, negatively affecting viticulture, apiculture, horticulture, tourism and outdoor activities. In South Africa, it is now established in the midst of the Cape Floristic Region - threatening a highly vulnerable biodiversity hotspot.

Compared to elsewhere, the wasp has spread slowly in South Africa. From the first record in 1974, it has been found in Ceres, 130 km away. It appears that the Cape Fold Mountain Range previously acted as a barrier to range expansion.

No universal bait exists in attracting *V. germanica*. This study assesses various local baits, to develop a sampling method to monitor the invasion of *V. germanica* in South Africa. This will allow determining the feasibility of eradicating the species.

Fig. 1. *Vespula germanica*.

Fig. 2. *V. germanica* feeding on grape bunch.

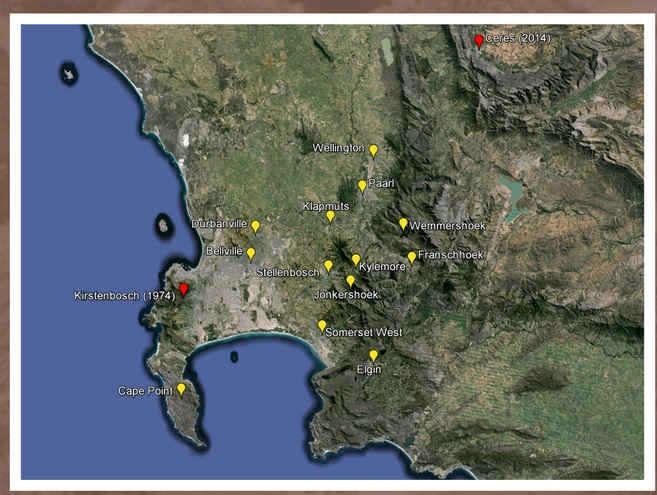

Fig. 3. Current distribution of *V. germanica* in Western Cape, South Africa.

Materials & Methods

- The attractiveness of different baits to *V. germanica* was determined through field-based preference trials.
- Trap locations were randomly selected, within pre-selected sites with known wasp activity and baits randomly assigned to traps.
- Traps were placed in trees, on fences or in vineyard rows 1,5 m high and 10 m apart, preventing the baits from interfering with each other. Sites were separated by at least 500 m.
- Protein baits were put directly onto a sticky pad and chemical lures were suspended. Sticky pads were replaced twice-weekly and the number of wasps counted.
- Each bait was tested at five localities per site in 2013 and at seven localities per site in 2014.

Table 1. Selection of baits tested in 2013 and 2014.

	March - April 2013: eight sites	February - March 2014: eleven sites
1	Control without bait	Control without bait
2	Lean beef mince	Lean beef mince
3	Smoked ham	Smoked ham
4	Heptyl Butyrate	Heptyl Butyrate
5	New Zealand bait (constituents unknown)	Isobutanol
6	-	Heptyl butyrate + acetic acid
7	-	Isobutanol + acetic acid

Fig. 4. Suspended delta trap.

Fig. 5. Sticky pad with bait and catch.

Results

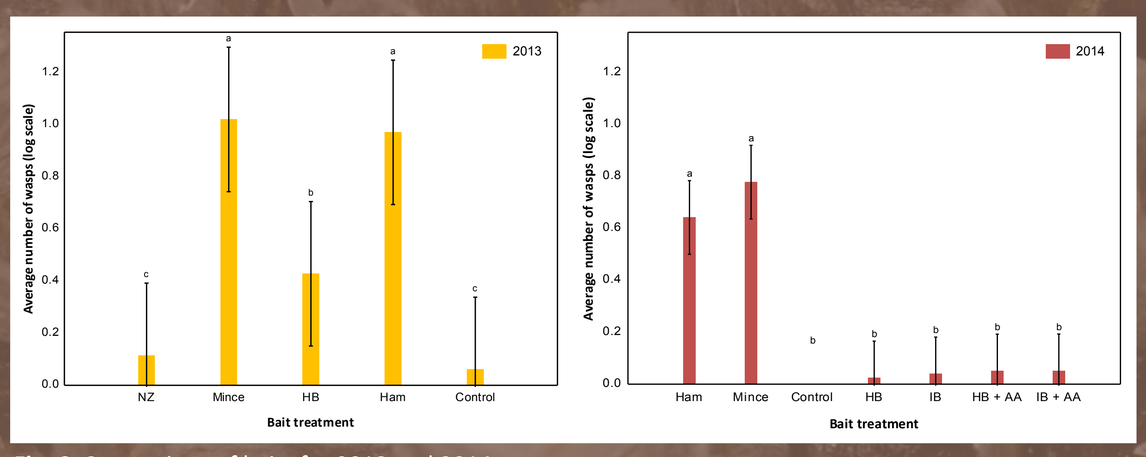

Fig. 6. Comparison of baits for 2013 and 2014.

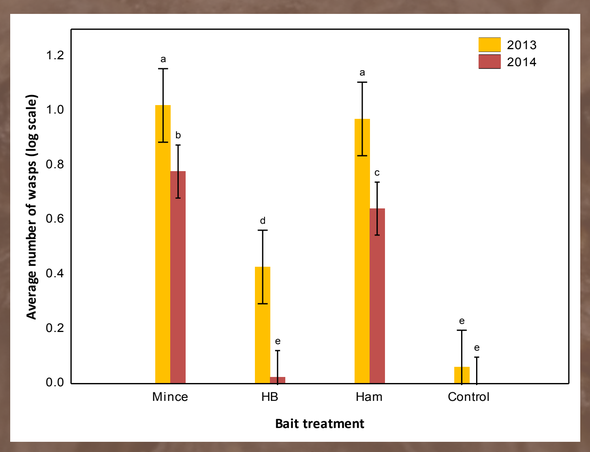

Fig. 7. Overall comparison of baits used in both 2013 and 2014.

Table 2. Abbreviations used on graph.

NZ	New Zealand bait, constituents unknown
HB	Heptyl butyrate
IB	Isobutanol
AA	Acetic acid

Discussion & Conclusion

The attractiveness of chemical lures compared poorly to that of meat baits. This constraint varied with wasp densities as indicated by lure performances in 2013 and 2014. Short-lived meat lures remained the most effective trap bait. Meat, however, rapidly dries - limiting its use. Determining the fine-scale distribution of the wasp occurring at low densities is thus problematic, complicating early detection and systematic eradication efforts. It is thus vital to develop a long lasting lure to determine the presence of *V. germanica* in new localities.

The search continues for a more effective bait to attract *V. germanica* in South Africa. It is currently preferable to focus on the wasps' awareness campaign for detection purposes. A follow-up study will determine the negative impacts caused by the wasp on the agricultural sector of the Western Cape.

Fig. 8. *V. germanica* nest in oak tree.

References:

Tribe, G. D., Richardson, D. M. 1994. The European wasp, *Vespula germanica* (Farbricius) (Hymenoptera: Vespidae), in southern Africa and its potential distribution as predicted by ecoclimatic matching. *African Entomology* **2(1)**: 1-6.

Landolt, P. J., Toth, M., Josvai, J. 2007. First European report of social wasps trapped in response to acetic acid, isobutanol, 2-methyl-2-propanol and heptyl butyrate in tests conducted in Hungary. *Bulletin of Insectology* **60 (1)**: 7-11.

Conservation Ecology & Entomology
UNIVERSITEIT STELLENBOSCH UNIVERSITY
SANBI Biodiversity for Life
EXPANDED PUBLIC WORKS PROGRAMME
WORKING FOR WATER
Environmental Affairs
Agriculture, Forestry and Fisheries
Water Affairs