

NAPPO

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Silverleaf Whitefly – *Bemisia tabaci*



Eretmocerus hayati



Environmental and Economic Impacts of Release

- 5.1 Known impact of the biological control agent on humans and other vertebrates.
- 5.2 Benefits of releasing this biological control agent (e.g., pesticide use, physical controls, no control, benefit-cost (see RSPM 40: 2014 for guidelines on cost-benefit analysis of management measures)).
- 5.3 Direct impact of the biological control agent on target pest and non-target species.
- 5.4 Indirect impact (e.g., potential effects on organisms that depend on the target pest and non-target species, including potential competition with resident biological control agents and other natural enemies)
- 5.5 Possible direct or indirect impact on threatened and endangered species in North America.
- 5.6 Proposed contingency plan to mitigate undesired environmental impacts.

5.1 Known impact of the biological control agent on humans and other vertebrates.

- No known impacts of *E. hayati*
- Predators such as exotic coccinellids can affect humans as nuisance pests, they can displace native coccinellids and affect vertebrate populations by providing a novel food source during winter when they are congregating in sheltered locations.

5.2 Benefits of releasing this biological control agent (e.g., pesticide use, physical controls, no control, benefit-cost (see RSPM 40: 2014 for guidelines on cost-benefit analysis of management measures)).

- *E. hayati* could increase control of *B. tabaci* in greenhouse production and substantially reduce the amount of neonicotinoid pesticides used for control. Physical controls are not effective because nymphal whitefly on cuttings used for propagation can be contaminated with *B. tabaci*, no control leads to increased pesticide use and damage to greenhouse crops

RSPM 40: 2014 for guidelines on cost-benefit analysis of management measures

5.3 Direct impact of the biological control agent on target pest and non-target species.

- *E. hayati* is a specialist on *B. tabaci*. Two decades after field release in N. America no non-target effects have been detected or documented.
- Predator species have a wider host range, potential for non-target damage is high as per exotic coccinellids
- Native Neotropical coccinellids may have a broad host range but likely not naturalize outside of N. American or EU greenhouses.

5.4 Indirect impact (e.g., potential effects on organisms that depend on the target pest and non-target species, including potential competition with resident biological control agents and other natural enemies)

- If pest is exotic, this is not an issue
- Competition with other native predators is a real concern.
- Neotropical predators avoid this issue.

5.5 Possible direct or indirect impact on threatened and endangered species in North America.

- There are 900 endangered species in N. America. Most of the invertebrates are Lepidoptera and cave dwelling Orthoptera. U.S. Fish and Wildlife would need evidence of no adverse impact on these species. Specialists are the most straightforward to permit.

5.6 Proposed contingency plan to mitigate undesired environmental impacts.

- Mitigation is possible if detected early. Broad-spectrum insecticides will effectively kill biocontrol agents, especially parasitoids. Release plans need to include monitoring of non-target impacts so they can be detected early. A biocontrol agent of the biocontrol agent is also possible, but has never been done.