CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profile for

***Perionyx excavatus* (Perrier): blue worm**

Haplotaxida: Megascolecidae

Previous Pest Rating: Q

Pest Rating: C as of 10/08/2021

Comment Period: 08/24/2021 – 10/08/2021

Initiating Event:

In June, 2021, nursery stock from a nursery in San Diego County, California was found in Minnesota to be infested with *Perionyx excavatus*. This worm has not been rated. Therefore, a pest rating proposal is needed.

History & Status:

Background: *Perionyx excavatus* are up to 2.75 inches in length and purple and red or brown in color. They are hermaphroditic and release lemon-shaped cocoons after mating. The cocoons each contain several eggs. Development from egg to adult is reported to take approximately 44 days. These worms are capable of regenerating large portions of their bodies (Bae et al., 2020; Selden et al., 2005). In an experiment, P. excavatus showed 100% mortality after exposure to 12 hours at 1.5° C (Greiner et al., 2011).

Perionyx excavatus is a popular vermicomposting worm and is widely available through the online sales.

Although some earthworms are known to be capable of having ecosystem-level impacts (James and Hendrix, 2004), *P. excavatus* has not been reported to have any environmental impacts. In addition,

despite its broad distribution worldwide and use as a vermicomposting worm (including being present in vermicomposting in the United States), it is not known to have become established in the environment in areas with Mediterranean or cooler temperate climate, and Greiner et al. (2011) reported that they were not aware of the presence of this species in any northern temperate forests.

Worldwide Distribution: *Perionyx excavatus* is probably native to tropical Asia and is reported from there as well as South America, the Caribbean (including Puerto Rico), and the southern United States (Selden et al., 2005). No convincing evidence was found that this species has become established outside of these areas. Finds in vermicomposting situations appear to have been cited in some cases as distributional records, and these were not considered here.

Official Control: *Perionyx excavatus* is not known to be regulated anywhere.

California Distribution: *Perionyx excavatus* is not known to be established in California (California Department of Food and Agriculture).

California Interceptions: In June 2021, *P. excavatus* was found in a nursery in San Diego County (California Department of Food and Agriculture).

The risk *Perionyx excavatus* poses to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** *Perionyx excavatus* is not known to be established in the environment anywhere with a Mediterranean or cool temperate climate. If it is able to become established in California at all, it will likely be limited to a very small area. Therefore, it receives a **Low (1)** in this category.

   – Low (1) Not likely to establish in California; or likely to establish in very limited areas.

– Medium (2) may be able to establish in a larger but limited part of California.

– High (3) likely to establish a widespread distribution in California.

2) **Known Pest Host Range:** *Perionyx excavatus* feeds on a wide variety of organic matter, although it is not known to be an agricultural pest. Therefore, it receives a **High (3)** in this category.

– Low (1) has a very limited host range.

– Medium (2) has a moderate host range.

– High (3) has a wide host range.

3) **Pest Reproductive and Dispersal Potential:** *Perionyx excavatus* does not appear to have exceptional reproductive or dispersal potential. Therefore, it receives a **Low (1)** in this category.

– Low (1) does not have high reproductive or dispersal potential.

– Medium (2) has either high reproductive or dispersal potential.

– High (3) has both high reproduction and dispersal potential.

4) **Economic Impact**. *Perionyx excavatus* is not known to have economic impacts. It is not reported to be an agricultural pest. Therefore, it receives a **Low (1)** in this category.

Economic Impact:

A. The pest could lower crop yield.

B. The pest could lower crop value (includes increasing crop production costs).

C. The pest could trigger the loss of markets (includes quarantines).

D. The pest could negatively change normal cultural practices.

E. The pest can vector, or is vectored, by another pestiferous organism.

F. The organism is injurious or poisonous to agriculturally important animals.

G. The organism can interfere with the delivery or supply of water for agricultural uses.

Economic Impact Score: Low

– Low (1) causes 0 or 1 of these impacts.

– Medium (2) causes 2 of these impacts.

– High (3) causes 3 or more of these impacts.

5) **Environmental Impact**. Earthworms have potential to have ecosystem-level impacts through changing soil structure and nutrient cycling. However, *P. excavatus* is not reported to have caused environmental impacts anywhere and it does not appear likely to become established in the environment in California. Therefore, *P. excavatus* receives a **Low (1)** in this category.

Environmental Impact:

A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.

B. The pest could directly affect threatened or endangered species.

C. The pest could impact threatened or endangered species by disrupting critical habitats.

D. The pest could trigger additional official or private treatment programs.

E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.

Environmental Impact Score: Low (1)

– Low (1) causes none of the above to occur.

– Medium (2) causes one of the above to occur.

– High (3) causes two or more of the above to occur.

Consequences of Introduction to California for *Perionyx excavatus*: Low (7)

Add up the total score and include it here.

–Low = 5-8 points

–Medium = 9-12 points

–High = 13-15 points

6) **Post Entry Distribution and Survey Information:** *Perionyx excavatus* is not known to be established in California. It receives a **Not established (0)** in this category.

–Not established (0) Pest never detected in California, or known only from incursions.

–Low (-1) Pest has a localized distribution in California, or is established in one suitable climate/host area (region).

–Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

–High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

Final Score:

7) The final score is the consequences of introduction score minus the post entry distribution and survey information score: Low (7)

Uncertainty:

There is low uncertainty regarding the potential (low) of *P. excavatus* to become widely established in California and its potential (low) to become an agricultural pest in this state even if it was able to become established. If it was able to become established in a limited area, it may have environmental impacts including changes to soil structure, although this has not been reported elsewhere. Lastly, *P. excavatus* may be present in California but not yet detected.

Conclusion and Rating Justification:

Perionyx excavatus is a worm of the tropics and subtropics that is not known to have negative economic or environmental impacts anywhere in the world and it appears unlikely to be able to

become established in California, except perhaps in a very small area. For these reasons, a "C" rating is justified.

References:

Bae, Y. S., Kim, J., Yi, J., Park, S. C., Lee, H. -Y., and Cho, S. -J. 2020. Characterization of *Perionyx excavatus* development and its head regeneration. Biology 9:1-12.

California Department of Food and Agriculture. Pest and damage record database. Accessed June 16, 2021: https://pdr.cdfa.ca.gov/PDR/pdrmainmenu.aspx

Greiner, H. G., Stonehouse, A. M. T., and Tiegs, S. D. 2011. Cold tolerance among composting earthworm species to evaluate invasion potential. The American Midland Naturalist 166:349-357.

James, S. W. and Hendrix, P. F. 2004. 5. Invasion of exotic earthworms into North America and other regions. pp. 75-88 *in* Edwards, C. A. (ed), Earthworm Ecology. CRC Press, Boca Raton, Florida.

Selden, P., DuPonte, M., Sipes, B., and Dinges, K. 2005. Composting worms for Hawaii. Accessed July 21, 2021: https://www.ctahr.hawaii.edu/oc/freepubs/pdf/HG-46.pdf

Responsible Party:

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***Comment Period: 08/24/2021 – 10/08/2021**

***NOTE:**

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at permits[@]cdfa.ca.gov.

Comment Format:

- Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

Example Comment:
Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to "Climate/Host Interaction" here.]

- Posted comments will not be able to be viewed immediately.

- Comments may not be posted if they:

  Contain inappropriate language which is not germane to the pest rating proposal;

  Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

  Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

  Violates agency regulations prohibiting workplace violence, including threats.

- Comments may be edited prior to posting to ensure they are entirely germane.

- Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

Pest Rating: C