



DATE: August 28, 2014
TO: All County Agricultural Commissioners
FROM: Plant Health and Pest Prevention Services
SUBJECT: **PEST EXCLUSION ADVISORY NO. 27-2014**
Egyptian Broomrape (*Orobanche aegyptiaca*) detected in Solano County

On July 14, 2014, Egyptian broomrape was detected in a field for processing tomatoes. This is the first detection of this species of broomrape in the United States. In response, the Department has formed an Incident Command with the USDA, Solano County Agricultural Commissioner, and the University of California Cooperative Extension. The infested field has been placed on hold and appropriate safeguards have been implemented to prevent the movement of Egyptian broomrape seeds on equipment and personnel leaving the field. The grower has voluntarily destroyed the tomato crop, along with Egyptian broomrape plants, by applying herbicides to the entire field. Regulatory agencies are working with the grower, commodity groups, and research organizations to develop a treatment program and process for verifying that the treatments have eliminated viable Egyptian broomrape seed from the field. Trace forward and trace back activities are being conducted on seed and equipment.

Egyptian broomrape is an obligate parasite of roughly 30 broadleaf crops, such as bell pepper, cabbage, carrot, tomato, and potato. This parasitic plant extracts all its nutrients and moisture from host plants, causing stunting, yellowing, and unthrifty host crops. Because it does not photosynthesize, it can only grow in the presence of appropriate host plants and spends the first portion of its life cycle underground, making it difficult to detect. When the flower spikes emerge from the ground, it is easier to detect. The flower spikes can produce viable seeds as soon as two weeks after the onset of flowering. A single plant can produce over 100,000 seeds that are tiny (~0.3 mm long). They are also sticky and can adhere to other seeds, plant material, fruit, farm equipment, clothing (especially footwear), and vehicles. These seeds can also be spread internally in livestock and during movement of water, soil, and air.

Broomrape should also be scouted for when conducting PQ field walks of host crops. This parasitic plant is more easily detected when the host plants are young or when the broomrape is in flower. Use the statistical method to collect broomrape samples as outlined in Section 3, Page 8 of the CDFA County Pest Exclusion Training Manual.

If you have any questions concerning this advisory, please contact Keith Okasaki at (916) 654-0312 or by email at keith.okasaki@cdfa.ca.gov.



FEDERAL NOXIOUS WEED LIST

Orobanche aegyptiaca Pers (*Phelipanche aegyptiaca* (Pers.) Pomel)

Common name: Egyptian broomrape

Damage

The genus *Orobanche* has approximately 150 species, all commonly called broomrape (Musselman, 1994). They cause reductions in crop yield, adversely affect crop quality, and result in loss of cultivated land due to reduced crop alternatives (Scher and Walters, 2010). *Orobanche aegyptiaca* infects roughly 30 broadleaf crops, including many economically important crops, such as bell pepper, cabbage, carrot, celery, eggplant, melons, potato, tomato, sunflower, and various legumes (CAB International, 2014). There are reports of 50% yield reduction of watermelon (Panchenko, 1974). The symptoms produced by *O.*

aegyptiaca are comparable to those of other *Orobanche* species; symptoms are not very distinctive but there may be some yellowing and necrosis of the foliage, general weakening of the plant and reduced fruit production (CAB International, 2014). The presence of broomrape in a field may force farmers to plant a less economical, non-host crop or to leave the field fallow (Nandula, 1998). The presence of broomrape in a shipment or production area can be a trade issue as many countries list non-native *Orobanche* as a quarantine pest.

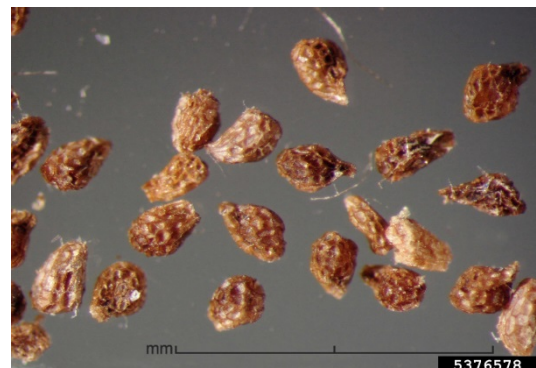


Occurrence

O. aegyptiaca is recorded as a 'serious' or 'principal' weed in Afghanistan, Kuwait, Saudi Arabia, Israel, Jordan and Italy. It is a major problem in at least 10 other countries of the Middle East and eastern Europe (Holm et al., 1991).

Biology

All *Orobanche* species are obligate parasites; they lack chlorophyll, thus cannot synthesize their own food. They typically grow to about 30 cm (1 ft.) tall. They germinate in response to host root exudates and the seedling must contact a host root immediately after germinating to survive. Some species may produce flowers within a week of emergence from the soil (Scher and Walters, 2010), with viable seeds appearing within a few days. Stems are yellow to straw-colored and leaves are small triangular flaps. Above ground stems appear from February to April, with the first flowers appearing about three days after the plant emerges. These flowers have 2 petals on the upper lip and 3 petals below. Colors can range from creamy-white to bright blue to violet. Seed pods contain numerous, tiny (0.3-0.4



mm), dust-like seeds. As seeds mature, they turn from tan to brown to very dark. In the absence of a germination stimulus, they can lie dormant in the soil for over 30 years (Anon., 2014).



APHIS Regulation

The Federal Noxious Weed Act of 1974 was put into regulation in November of 1976. At that time, APHIS added five *Orobanche* species to the Federal Noxious Weed list. In addition, parasitic plants are considered plant pests, and may be regulated under 7 CFR 330 whether or not they are listed Federal Noxious Weeds. The rest of the genus *Orobanche* (other than species native or widespread in the U.S.) was regulated June 3, 1983, because the genus reduces vigor of dicots by extracting nutrients. We based the listings on recommendations from the Technical Committee to Evaluate Noxious Weeds, composed of representatives from the USDA: Agricultural Research Service; Animal & Plant Health Inspection Service; Agricultural Marketing Service; as well as the Weed Science Society of America. *Orobanche* spp. were added to the Federal Seed list (7 CFR 361.6) effective August 11, 1995.

Sources:

- Anon. 2014. Decades old weed seeds trigger new plant parasite outbreak. *Haustorium: Parasitic Plants Newsletter* 62 4.
<http://www.parasiticplants.org/>.
- CAB International. 2014. Invasive Species Compendium: Egyptian broomrape (*Orobanche aegyptiaca*). CAB International.
<http://www.cabi.org/isc/datasheet/37742>. (Archived at Riverdale, P4P).
- Holm, L. G., J. V. Pancho, J. P. Herberger, and D. L. Plucknett. 1991. A Geographic Atlas of World Weeds.
- Musselman, L. 1994. Taxonomy and spread of Orobanche. Pages 27-35 in A. Pieterse, J. Verkleij, and S. ter Borg, (eds.). *Biology and management of Orobanche*. Proceedings of the third international workshop on Orobanche and related Striga research, Amsterdam, Netherlands, 8-12 November 1993. Royal Tropical Institute.
- Nandula, V. K. 1998. Selective control of Egyptian broomrape (*Orobanche aegyptiaca* Pers.) by glyphosate and its amino acid status in relation to selected hosts. Dissertation, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- National Plant Data Team. 2014. The PLANTS Database. USDA, NRCS. <http://plants.usda.gov>. (Archived at Riverdale, P4P).
- Panchenko, V. 1974. Micro-organisms in the control of Egyptian broomrape parasitizing water melons. *Mikol. Fitopatol* 8:122-125.
- Scher, J. L., and D. S. Walters. 2010. Federal noxious weed disseminules of the U.S. in. California Department of Food and Agriculture, and Center for Plant Health Science and Technology, USDA, APHIS, U.S.

Photo Credit

USDA APHIS PPQ Archive, 2014. USDA APHIS PPQ. Bugwood.org (plants 0686008; 0686009 Dr. Reuven Jacobsohn, Agricultural Research Organization; 5376578 seeds Julia Scher, USDA APHIS PPQ)