

## Weeds/Parasitic Plants

### Primary Pests of Soybean (Full Pest Datasheet)

None at this time

### Secondary Pests of Soybean (Truncated Pest Datasheet)

## *Alectra vogelii*

### Scientific Name

*Alectra vogelii* Benth.

### Synonyms:

*Alextra angustifolia*, *Alextra merkeri*, *Alextra scharensis*

### Common Name(s)

Yellow witchweed, cowpea witchweed

### Type of Pest

Hemiparasitic plant

### Taxonomic Position

**Class:** Magnoliopsida, **Order:** Scrophulariales. **Family:** Scrophulariaceae

### Reason for Inclusion in Manual

CAPS Target: AHP Prioritized Pest List - 2009

### Pest Description

Flowers: Flowers are five-lobed, sulfur yellow to pale orange (Fig. 1), bell shaped with large horseshoe shaped stigma. Plant height ranges from 30 to 45 cm tall, often as a single stem, but sometimes branch near ground level. Flowers are borne individually on short stems in the axils of the upper leaves. The corolla, formed of five petals which are fused into a tube for the bottom half, is bell-shaped when open, 1.6 to 1 cm in diameter, and somewhat longer than the calyx. Petals are generally pale yellow and may or may not have three deep red veins. Both flower forms can be found in the same stand of *A. vogelii*. Anthers and filaments are glabrous. After flowering, the corolla withers and remains covering the developing globose seed capsule, which eventually swells to approximately 5 mm in diameter.

Leaves: Leaves are 1.5 to 3.5 cm long by 0.3 to 1.5 cm wide and are hairy. Leaf margins vary from five or six sharp teeth to two to five widely spaced teeth, with some plants having entire margins.

The chromosome number (2n) is 38.

### Pest Importance

*Alectra vogelii* is a parasitic weed found in major leguminous crops, including chickpea, cowpea, soybean, and runner bean. In 1929, one report estimated a 20% loss in yield for cowpea crops in Kenya. In 1966, the Agricultural Department for Botswana reported a loss of 24,000 acres in cowpea due to 'yellow witchweed'. In 1977, on-farm trials in Botswana produced no cowpea yields in 6 out of 25 blackeye crops. In 1979, a blackeye cowpea trial had an average yield of 602 kg/ha and 100 kg/ha for the non-infested and infested fields, respectively. Yield losses of 15% are reported for peanut production in Nigeria, and a 30 to 50% reduction in bambara nut yields in South Africa. A ten year crop rotation study found that long-term rotation with non-crop hosts did not reduce the density of *Alectra* infestations.



**Figure 1.** Mature *A. vogelii* plant (left) and close up of flowers (right).  
Photos courtesy of C.R. Riches (CABI, 2007).

### Symptoms/Signs

Symptoms associated with *A. vogelii* include: stunted crop plants with smaller leaf area, shorter leaf petioles, and increased shoot/root ratios. Roots are bright orange below soil surface. Stems and leaves are conspicuously hairy. The dust-like seeds have a complex structure. An outer cell layer of the testa is modified into a cone or a 'trumpet-like' structure about 1 mm long, within which the 'kernel' of the seed, measuring about 0.15 mm by 0.25 mm, is suspended. The surface of the seed coat is covered in indentations.

## Known Hosts

### Major hosts

*Vigna unguiculata* (cowpea)

### Minor hosts

*Arachis hypogaea* (peanut), *Glycine max* (soybean), *Lablab purpureus* (hyacinth bean), *Mucuna pruriens* (Buffalobean), *Phaseolus acutifolius* (teparty bean), *Phaseolus coccineus* (runner bean), *Phaseolus radiata*, *Phaseolus vulgaris* (common bean), and *Voandzeia subterranea* (bambara groundnut)

### Wild hosts

*Acanthospermum hispidum* (bristly starbur)

## Known Distribution

*A. vogelii* is distributed throughout semi-arid areas of tropical Africa and subtropical southern Africa, from Swaziland and South Africa in the south, to Burkina Faso and Mali in the west, to Kenya in the east. This species is closely associated with cropping and is rarely found in natural areas. *A. vogelii* is distributed throughout semi-arid areas of tropical and sub-tropical Africa. In the Nigerian savannahs, it can be found in cowpea crops, which are also attacked by *Striga gesnerioides*, and it has been reported as the major parasite of the crop in the northern Guinea savannah (Lagoke, 1989). Elsewhere in West Africa, infestations tend to be more localized, as in southern Mali. *A. vogelii* has replaced *S. gesnerioides* as an important constraint to cowpea production in eastern, central, and particularly southern Africa.

## Potential Distribution within the United States

A recent host analysis by USDA-APHIS-PPQ-CPHST indicates portions of Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Tennessee are at the greatest risk of *A. vogelii* establishment based on susceptible host presence.

## Survey

**CAPS-Approved Method\***: Conduct a visual survey and collect suspected plants.

\*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at <http://caps.ceris.purdue.edu/>.

### **Literature-Based Methods:**

**Visual Survey:** Conduct a visual survey for *A. vogelii*. The plant is an annual; vine/climber; shrub; herbaceous; seed propagated. Flowers are five-lobed, sulfur yellow to pale yellow, and bell-shaped. Hairy stems and leaves on parasitic weed, combined with stunted crop plants.

As *A. vogelii* is largely dependent on annual cropping, environmental requirements mirror those of its major hosts cowpea, bambara, peanut and soybean in sub-Saharan Africa. By and large, infestations are found in semi-arid areas with a short growing

season of 4 to 6 months, below 1500 m altitude. The parasite is most commonly found in areas of mono-modal rainfall with a long dry season as in Botswana or the Guinea savannah of West Africa, but it is also a pest in bimodal rainfall areas as in north-west and coastal Tanzania. Although crops are not produced during the cold dry season in the range of the parasite, frost at the end of the growing season will kill host plants surviving in crop residue on residual moisture and will prevent further seed production by *A. vogelii*. Host crops are largely associated with free-draining sands and sandy-loams.

#### Climatic amplitude (estimates):

- Mean annual rainfall: 520 to 1000 mm
- Rainfall regime: summer; bimodal
- Dry season duration: 6 to 7 months
- Mean annual temperature: 19 to 26°C
- Mean maximum temperature of hottest month: 29 to 38°C
- Mean minimum temperature of coldest month: 6 to 16°C
- Absolute minimum temperature: -3 to 0°C

### Key Diagnostics/Identification

**CAPS-Approved Method\*:** Confirmation of *A. vogelii* requires morphological identification by a qualified botanist. Characteristics of the flowers, leaves, seeds, and roots can be used to distinguish *A. vogelii*.

\*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at <http://caps.ceris.purdue.edu/>.

**Literature-Based Methods:** The Federally Noxious Weeds Disseminules of the U.S. provides keys and fact sheets that can help identify seeds of Federally Noxious Weeds, including *Alectra* spp. (Scher and Walters, 2010). *A. vogelii* can be confused with *Striga* species and nutrient deficiencies.

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