

SENSITIVITY OF WEEDS AND VEGETABLE CROPS TO WATER SOLUBLE EXTRACTS OF HAIRY VETCH (*Vicia villosa*) AND COWPEA (*Vigna unguiculata*). Erin C. Hill and Mathieu Ngouajio, Graduate Student and Assistant Professor, Michigan State University, East Lansing, MI 48824.

Hairy vetch (*Vicia villosa* Roth) and cowpea (*Vigna unguiculata* (L.) Walp) are two leguminous cover crops that have been shown to affect the growth of vegetable crops and weeds both *in situ* and under laboratory conditions. Some studies have implied that water soluble allelochemicals from the residues may be responsible for the observed growth inhibition. A laboratory experiment, using a completely randomized design, was conducted to study the effects of water-soluble extracts of hairy vetch and cowpea on the germination and radicle elongation of six weed species and seven vegetable crops. Lyophilized water extracts of hairy vetch and cowpea were dissolved in distilled water to create seven concentrations: 0.00, 0.25, 0.50, 1.00, 2.00, 4.00, and 8.00 g·L⁻¹. Each treatment had 4 replicates and the full experiment was repeated. Overall, seed germination was not affected by extracts of either cover crop. However, radicle growth of all species tested (except common milkweed exposed to cowpea extract) was impacted by the cover crop extracts. Low concentrations of the hairy vetch extract stimulated the radicle growth of carrot, pepper, barnyardgrass, common milkweed, and velvetleaf. Similarly, low concentrations of cowpea stimulated the growth of corn, barnyardgrass, and velvetleaf. Species sensitivity to the hairy vetch extract, as determined by the IC₅₀ (concentration required to produce 50% radicle inhibition) values, fell from most sensitive to least in the following order: common chickweed > redroot pigweed > barnyardgrass 1 > carrot 1 > wild carrot > corn > carrot 2 > lettuce > common milkweed > tomato > onion > barnyardgrass 2 > velvetleaf > pepper > cucumber. For cowpea the order was as follows: common chickweed > redroot pigweed > corn > tomato > lettuce > wild carrot > pepper > carrot > cucumber > onion > barnyardgrass and velvetleaf. This research found that at low rates, the water-soluble extracts of hairy vetch and cowpea are stimulatory to some vegetable and weed species. However, at higher concentrations all species were negatively affected, a situation that is beneficial for weed control, but not for vegetable stand establishment. Future research should aim to identify, isolate, and test the affects of the responsible allelochemicals in hairy vetch and cowpea.