

Weed Management Potentials of Selected Cover Crops for Organic Vegetable Production¹

Oli G. Bachie² and Milton E. McGiffen²

²Botany and Plant Sciences, University of California, Riverside, CA

Abstract

The second year of a three year field experiment was conducted at the University of California's South Coast Research and Extension Center in Irvine, California. We measured weed populations and their biomass in organic broccoli planted after two summer cover crops, cowpea (*Vigna unguiculata*, cultivar UCR CC 36) and marigold (*Tagetes patula* cv. Single Gold). The population density of the dominant weed species, *Portulaca oleracea* (common purslane), peaked at 370 plants per m² just before the first hand weeding in broccoli planted after summer fallow. The fallow treatment had 5x as many purslane just before the first hand-weeding as when broccoli followed cowpea and 11x more than the marigold treatment. The population density of all weeds per m² of the 2007 trial ranged from 433 plants in fallow plots to 110 and 87 plants in broccoli ($p=0.0009$) planted after cowpea and marigold, respectively, just before the first weeding. Weed density wasn't significantly different between the treatments after the first weeding. However, by harvest, the population of all weed spp. was 4x higher in broccoli planted on previously fallow plots relative to those in the cowpea and marigold plots ($p=0.0291$). During the same trial year (2007), common purslane had the highest dry biomass for broccoli planted after summer fallow. Dry biomass of *Portulaca* was 11, 0.3 and 0.1 grams for broccoli planted after summer fallow, cowpea or marigold, respectively. There were no significant differences for weed population samples taken after the first hand weeding.

Weed population density prior to first hand weeding followed a similar trend in 2008. When sampled prior to hand weeding, there were 4x as many purslane plants in broccoli planted after the fallow treatment ($p=0.0251$) than for broccoli following either cowpea or marigold. However, 2008 harvest time samples found significant differences in weed populations, with 7x and 11x more common purslane ($p=0.0169$) when broccoli followed summer fallow then when broccoli was planted after cowpea or marigold, respectively. Biomass of all weeds for the 2008 trial was also greater for those collected from broccoli planted after summer fallow than those that followed summer cowpea or marigold plots ($p=0.0057$).

Broccoli height and canopy spread were greater following either cowpea, a nitrogen fixing legume, or marigold. Broccoli following cowpea or marigold had a higher number of heads and fresh weight when compared to those grown after summer fallow. Marketable broccoli heads were 115, 90 and 81 from cowpea, marigold and fallow plots, respectively. Similar trends were observed with the fresh weight of marketable broccoli heads. Broccoli plants grown after cover crops matured faster than those that were planted following a summer fallow. The lower densities and biomass of weeds in broccoli plants and better vegetable growth and marketable yields following summer cover cropping are good indications that summer cover cropping reduces the intensity of weed populations and their competitive ability with subsequent vegetable crop production. Grassy weeds were not affected by choice of cover crop. Although cover crops may not provide complete weed control, they may play a valuable role as a tool in any integrated weed management system, particularly for organic vegetables.

Key words: cover crops, weed population, weed biomass, organic farming

¹Submitted for the 2010 CWSS conference, Visalia, California. January 10, 2010