

## Relative Value of Cover Crop Species to Bees and Other Beneficial Insects

Cover Crop	Life Cycle	Seeding Rate (pounds/acre single species)	Seeding Depth (inches)	Honey Bee Value	Wild Bee Value	Beneficial Insect Value (predators and parasitoids)	Alternative Host of Crop Pests	Notes
<b>GRASSES</b>								
<b>Annual ryegrass</b>	Annual	10-20	½	None	None	Low	Unknown	Probably only useful to beneficial insects when included as part of a diverse seed mix
<b>Barley</b>	Annual	60-125	1½	None	None	Low	Oat and Russian wheat aphids, various small grain diseases	Best adapted to dry, cool (but not cold) climates
<b>Millet (foxtail, proso and pearl)</b>	Annual	5-25	½	None	None	Low	Unknown	Seeding rates for foxtail millet can be reduced to the lower end of the described range
<b>Oats</b>	Annual	60-120	1½	None	None	Low	Oat and Russian wheat aphids, various small grain diseases	Cool-season plant; limited cold tolerance with most varieties subject to winter kill in cold climates
<b>Rye, cereal</b>	Annual	60-120	1	None	None	Low	Russian wheat aphids, various small grain diseases	Potentially allelopathic to other crops
<b>Sorghum/sudangrass</b>	Annual	10-40	1	None	None	Moderate	Corn aphids	Attractiveness to grass-specific aphids may make this a useful insectary plant for attracting aphid predators (in non-grass crop systems); lower end of seeding rates are appropriate for sorghum and sorghum-sudangrass hybrids; potentially allelopathic to other crops
<b>Teff</b>	Annual	5-10	¼	None	None	Low	Unknown	Seed may have limited availability
<b>Triticale</b>	Annual	60-120	1	None	None	Low	Russian wheat aphids, various small grain diseases	Potentially allelopathic to other crops
<b>LEGUMES</b>								
<b>Alfalfa</b>	Perennial	10-25	¼	High	High	Moderate	Pea aphids	Top honey plant, also attractive to large numbers of diverse wild bees
<b>Birdsfoot trefoil</b>	Perennial	5-10	¼	Moderate	Moderate	Moderate	Spittlebugs, alfalfa plant bugs, potato leafhoppers and others	Can be weedy and invasive
<b>Clover, berseem</b>	Annual	8-20	¼	High	High	Moderate	Likely a host for various leafhoppers, true bugs and generalist aphids	Best adapted to Mediterranean climates
<b>Clover, crimson</b>	Annual	15-25	¼	High	High	Moderate	Pea aphids, tarnished plant bugs	Grows very well in combination with cereal rye and other cool season grasses
<b>Clover, kura</b>	Perennial	5-15	¼	High	High	Moderate	Various leafhoppers, true bugs and generalist aphids	Poor seedling vigor and slow to establish; considered a top honey plant

<b>Clover, red</b>	Perennial	5-20	¼	Moderate	High	Low	Various leafhoppers, true bugs and generalist aphids	Typically short-lived; high value for bumble bees
<b>Clover, rose</b>	Annual	10-25	¼	Moderate	High	Moderate	Various leafhoppers, true bugs and generalist aphids	Excellent bumble bee plant
<b>Clover, strawberry</b>	Perennial	5-15	¼	High	High	Moderate	Unknown	Can be weedy and invasive
<b>Clover, subterranean</b>	Annual	10-20	¼	None	None	Low	Pea aphids, tarnished plant bugs	Flowers are inconspicuous and do not attract pollinators
<b>Clover, white</b>	Perennial	5-15	¼	High	High	Moderate	Various leafhoppers, true bugs and generalist aphids	Considered a top honey plant
<b>Chickpea</b>	Annual	80-120	1½	Low	Low	Low	Pea borers, wireworms	Beneficial insects are attracted to extrafloral nectaries
<b>Cowpea</b>	Annual	30-90	1	High	High	High	Various stink bugs, leaf-footed bugs, aphids	Extensive extra-floral nectaries attract large numbers of beneficial parasitoid wasps as well as other beneficial insects
<b>Fava bean</b>	Annual	80-160	3	Low	Moderate	Moderate	Unknown	
<b>Lablab</b>	Annual	30-40	1-4	Moderate	Moderate	Moderate	Unknown	Vining growth habitat; more common in subtropical climates
<b>Lupin</b>	Annual	40-120	1-2	Low	Moderate	Moderate	Unknown	
<b>Medic</b>	Annual (a few species are perennial)	10-20	½	Low	Low	Low	Alfalfa weevils, pea aphids, tarnished plant bugs	Small, nondescript flowers attract few beneficial insects
<b>Partridge pea</b>	Annual	10-20	¼-¾	Moderate	High	High	Various leafhoppers	Extensive extra-floral nectaries attract large numbers of beneficial parasitoid wasps
<b>Pea, field</b>	Annual	50-100	2	Low	Low	Low	Tarnished plant bugs	
<b>Sainfoin</b>	Perennial	40-80	½	High	High	Moderate	Unknown	Considered a top honey plant
<b>Soybean</b>	Annual	35-120	1	Moderate	Moderate	Moderate	Wireworms, bean leaf beetles, potato leafhoppers and various others	
<b>Sunn hemp</b>	Annual	20-40	¾	Moderate	High	Moderate	Unknown	Attracts wild carpenter and leafcutter bees in tropical farm systems; supports parasitoids of corn earworm in the Pacific Islands region
<b>Sweet clover</b>	Biennial	6-20	½	High	High	High	Unknown	Considered a top honey plant; may be weedy or invasive in some areas
<b>Vetch</b>	Annual; perennial	15-30	½-2½	Moderate	High	High	Pea aphids, tarnished plant bugs, two-spotted spider mites	Standard options include common vetch, hairy vetch and purple vetch; may be weedy or invasive in some areas

**Relative Value of Cover Crop Species to Bees and Other Beneficial Insects cont.**

Cover Crop	Life Cycle	Seeding Rate (pounds/acre single species)	Seeding Depth (inches)	Honey Bee Value	Wild Bee Value	Beneficial Insect Value (predators and parasitoids)	Alternative Host of Crop Pests	Notes
<b>FORBS/BROADLEAVES</b>								
<b>Beet</b>	Biennial	6-10	1	Low	Low	Low	Unknown	Wind-pollinated flowers are only marginally attractive to bees
<b>Buckwheat</b>	Annual	30-80	1	High	High	High	Tarnished plant bugs	Top honey plant with nectar flow typically occurring in the morning; shallow flowers attract parasitoid wasps
<b>Canola</b>	Annual	3-10	½	High	High	High	Flea beetles	Excellent honey plant
<b>Chicory</b>	Perennial	3-5	½	Low	Low	Low	Unknown	Flowers are considered self-fertile and attract few insects
<b>Flax</b>	Annual	25-50	¾-1½	Moderate	Moderate	Moderate	Unknown	Reports of bee attractiveness vary; probably most valuable to pollinators as part of a diverse mix
<b>Kale</b>	Biennial	3-10	½	High	High	High	Cabbage loopers, flea beetles, cabbage aphids	Aphid-susceptible varieties likely support the more predatory insects such as lady beetles and lacewings; rapid-blooming varieties most beneficial to bees
<b>Mustard, tame</b>	Annual	5-20	½	High	High	High	Flea beetles	Can be weedy and invasive in California
<b>Phacelia</b>	Annual	5-15	Surface	High	High	High	Tarnished plant bugs	Major honey bee nectar plant; produces volunteer seedlings in moderate climates
<b>Radish</b>	Biennial	8-20	¼	High	High	High	Club root of brassicas, flea beetles, cabbage aphids, root maggots	Deep-rooted varieties are promoted for reducing compaction and adding soil organic matter; not tolerant of prolonged freezing
<b>Safflower</b>	Annual	25-35	1	Moderate	Moderate	Moderate	Sunflower head moths, tarnished plant bugs, wireworms	Relatively drought tolerant with surprisingly deep tap roots (in some cases exceeding 8 feet)
<b>Sunflower</b>	Annual	4-6	½	High	High	High	Sunflower head moths, various beetles, tarnished plant bugs	Both flowers and extra-floral nectaries attract huge numbers of pollinators and beneficial insects, in most cases outweighing any risk of attracting pests
<b>Turnip</b>	Biennial	2-12	½	High	High	High	Club root of brassicas, flea beetles, cabbage aphids, wireworms, cabbage loopers	Turnips tend to be more cold tolerant than radishes, allowing them to flower in the spring unless terminated