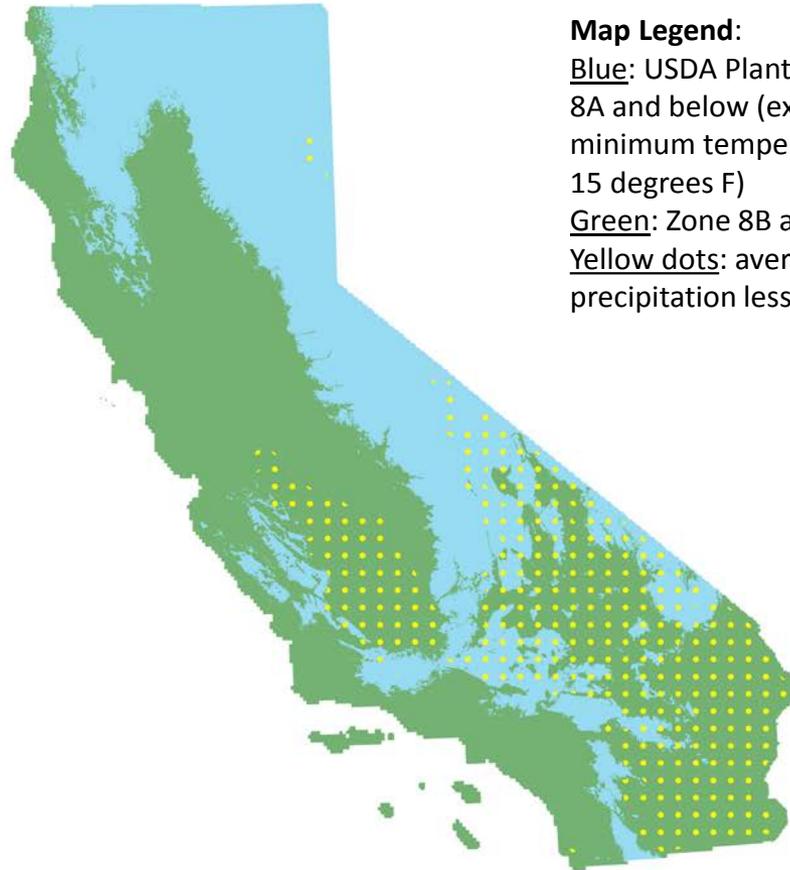


Cover Crop Chart: Common cover crops for California



Map Legend:

Blue: USDA Plant Hardiness Zone 8A and below (expected annual minimum temperature less than 15 degrees F)

Green: Zone 8B and above.

Yellow dots: average annual precipitation less than 10 inches



California Cover Crop Chart*

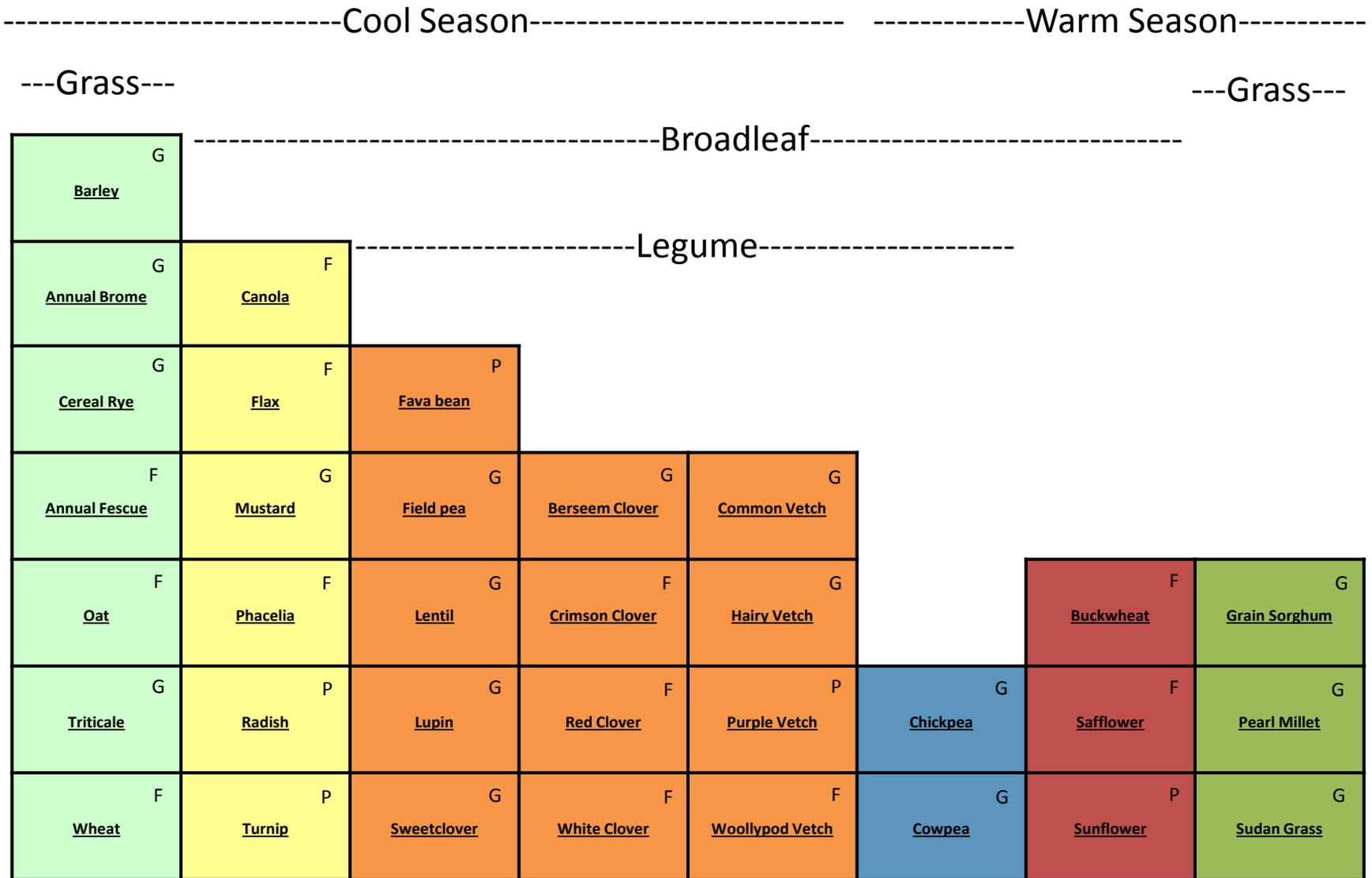
The California Cover Crop Chart is designed to give NRCS planners a relatively easy-to-access resource that provides an overview of commonly used California cover crop species. It is not intended to be a replacement for, or duplication of eVegGuide, but is offered as a planning aid that compliments the details in eVegGuide. The Cover Crop Chart includes information that is not included in eVegGuide and that may be helpful to the planner such as growth form, relative drought and salinity tolerance, establishment and management concerns and considerations, the primary and associated benefits, and external sources for additional species information. The Cover Crop Chart can be used as a “first step” in the cover crop planning process to help identify species that may meet the goals of the grower, and work within the constraints of the system. The crop-specific information page can be accessed by clicking on the plant name in the chart.

Not all species and varieties that can be useful as cover crops in California are included, but only those that are most commonly used across the state. Also, not all species included in the Chart can be grown equally well in all parts of the state. The two primary constraints on growth are temperature and moisture. The figure on page 1 provides the approximate locations where cold temperature (‘blue’) or lack of moisture (‘yellow dots’) are particularly severe and will likely limit growth of some species. Planting dates may need to be modified in colder areas, and supplemental irrigation may be required in drier areas. The upper case letters in the top right corner of the box for each species on the Chart indicate the relative drought tolerance of that species, G=relatively GOOD drought tolerance; F= relatively FAIR drought tolerance; P= relatively POOR drought tolerance.

Another consideration when selecting cover crops is potential for invasiveness, and whether the species may serve as a crop pest host. The information in the Cover Crop Chart should not be used prescriptively to replace planner discretion. Each farm and field are unique and should be planned accordingly. NRCS California has determined that eVegGuide is the authoritative source of information when planning and implementing any vegetative conservation practice in the state, and the planner should defer to it if there is a discrepancy with the Cover Crop Chart, and for details such as seeding rate.

*The concept and format for the California Cover Crop Chart is taken directly from the cover crop chart created by Mark Liebig, Holly Johnson and others at USDA-ARS in Mandan, ND (<http://www.ars.usda.gov/Services/docs.htm?docid=20323>).

Cover Crop Chart



Relative Drought Tolerance: G = "Good", F = "Fair", P = "Poor"

Click on plant name to learn more

Barley (*Hordeum vulgare* L.)

- Cool Season, grass
- 2 – 4 feet tall
- Good drought tolerance
- Good salinity tolerance
- Biomass: 6,800 – 12,900 lb./acre (seeding rate: 60 – 90 lb./acre)
- Benefits from arbuscular mycorrhizal associations
- Seed/lbs.: 13,600
- Typically planted : early fall
- Seeding depth: 0.75 – 2 inches
- Maturity date:
 - Early maturing varieties: UC 937, Belford, Hayes, Gwen
 - Late Maturing varieties: Endeavor (95Ab2299), Thorobred, Valor, Veredant
- Termination Strategies:
 - Mowing at mid- to late- bloom
 - Applying grass herbicide in late spring
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture.



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<http://www.sarep.ucdavis.edu/database/covercrops>

Annual Brome

- Cool season grass
- 1 – 3 feet tall
- Good drought tolerance
- Seeds/lbs.: 251,800
- Typically planted : Early fall
- 'Cucamonga': native early maturing variety
- 'Blando': medium to early maturing variety
- Termination Strategies:, must be prior to seed set or plants may regenerate next fall and may be weedy.
 - Mowing at mid- to late- bloom
 - Applying herbicide in late spring
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture.

['Blando' brome Release Brochure](#)

['Cucamonga' California Brome Release Brochure](#)



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Cereal rye (*Secale cereale* L.)

- Cool Season, grass
- 3 – 6 feet tall
- May be allelopathic to small-seeded species
- Good drought tolerance (extensive root system)
- Fair salinity tolerance
- Biomass: 4,000 – 10,000 lb./acre (Seeding rate is 60 – 90 lb./acre)
- Will form arbuscular mycorrhizal associations
- Seeds/lbs.: 18,080
- Typically planted : mid-fall
- Seeding depth: 1 – 2 inches
- Maturity date: early
- Termination strategies:
 - Mow or roll right after flowering
- Purpose: Erosion control, add organic matter, nitrogen scavenging,
suppress weeds, manage soil moisture.

<http://www.ag.ndsu.edu/pubs/plantsci/rowcrops/a1636.pdf>

<http://asi.ucdavis.edu/sarep/database/covercrops>

<http://www.sarep.ucdavis.edu/database/covercrops>



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Annual Fescue (*Vulpia myuros* L.)

- Cool Season, grass
- Annual
- 1 – 2 feet tall
- Fair drought tolerance
- Biomass: 6,000 – 8,000 lb./acre (seeded at 6 -10 lb./acre)
- Seeds/lbs.: 990,000
- Typically planted: October 1 – November 15
- Seeding depth: .5 – 1 inch
- Flowers: March – June (4 to 5 month elapsed time from seeding and flowering)
- Termination strategies:
 - Mow before maturation
 - Herbicides (resistant to glyphosate and other herbicides)
- 'Zorro' is a commonly used variety in California
- Potential for weediness – very difficult to eradicate once established
- Purpose: Erosion control, add organic matter, nutrient cycling,
- suppress weeds, manage soil moisture.

http://plants.usda.gov/plantguide/pdf/pg_vumy.pdf

http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/capmcrb11064.pdf

['Zorro' Annual Fescue Release](#)

[Brochure](#) \ <http://www.sarep.ucdavis.edu/database/covercrops>

<http://www.sarep.ucdavis.edu/database/covercrops>



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Oat (*Avena sativa* L.)

- Cool Season, grass
- 24 – 60 inches tall
- Allelopathic: Can slow the germination of lettuce, cress, timothy, rice, wheat, and peas
- Fair drought tolerance
- Fair salinity tolerance
- Biomass: 8,000 – 12,000 lb./acre (seeding rate: 60 – 90 lb./acre)
- Will form arbuscular mycorrhizal associations
- Seeds/lbs.: 12,700
- Typically planted : mid-fall to early winter
- Seeding depth: 1 – 2 inches
- Maturity date: late
- Termination Strategies:
 - Roller crimper at dough stage (In no-till systems)
 - Spraying or mowing soon after the vegetative stage (milk or soft dough stage)
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture.



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<http://www.sarep.ucdavis.edu/database/covercrops>

Triticale (*x Triticosecale* Wittm.)

- Cool Season, wheat rye hybrid
- Drought tolerant
- Good salinity tolerance
- Deep root system, arbuscular mycorrhizal associations
- Seeds/lbs.: 12,000
- Typically planted : mid-fall
- Seeding depth: 0.5 – 2 inches
- Maturity: variable with cultivar
- Termination strategies: Mowing
 - Roller crimper at soft dough
 - Herbicide
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture.

http://www.advancecovercrops.com/portfolio_item/triticale/



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Wheat (*Triticum aestivum* L.)

- Cool Season, grass
- ~ 40 inches tall
- Fair drought tolerance
- Fair to good salinity tolerance
- Biomass: 4,500 lb./acre to 12,500 lb./acre
- Benefits from arbuscular mycorrhizal associations
- Seeds/lbs.: 12,000
- Typically planted : fall to early winter
- Seeding depth: 0.5 – 1.5 inches
- Maturity: late
- Termination strategies: (safest to kill 3 weeks before planting your cash crop)
 - Roller crimper at soft-dough stage or later
 - Grass herbicide
 - Plowing, disking, or mowing before seed matures
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture.



oregonstate.edu

<http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Nonlegume-Cover-Crops/Winter-Wheat>

Canola (*Brassica napus*)

- Cool Season broadleaf, non-legume
- Annual (Spring-type) or Biennial (Winter-type)
- 3 – 6 feet tall
- Fair drought tolerance
- Good salinity tolerance
- Biomass: 6,000 lb./acre
- C:N ratio: leaf 12 – 16, stem 21 – 37, root 24 – 43
- Deep tap root
- Does not form arbuscular mycorrhizal associations
- Seeds/lbs.: 156,960
- Typically planted : mid-fall
- Seeding depth: 0.25 – 1 inch
- Maturity date: Early
- Termination strategies:
 - Herbicide
 - Mowing before full flower
 - Incorporation by tillage before full flower
 - Flail mowing
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce compaction
- Flowers attract pollinators



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<http://www2.ca.uky.edu/agc/pubs/id/id114/id114.htm>

<http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Nonlegume-Cover-Crops/Brassicac-and-Mustards>

<http://www.sarep.ucdavis.edu/database/covercrops>

Flax(*Linum usitatissimum*)

- Cool Season broadleaf, non-legume
- 1 – 3 feet tall
- Fair drought tolerance
- Fair salinity tolerance
- Benefits from arbuscular mycorrhizal associations
- Seeds/lbs.: 70 – 90,000
- Typically planted : mid-fall to early winter
- Seeding depth: 0.5 – 1.5 inches
- Typical Life cycle of flax:
 - 45- to 60-day vegetative period
 - 15- to 25- day flowering period
 - 30- 40-day maturation period
- Termination strategies:
 - Mow
- Purpose: Add organic matter, nutrient cycling, increase biodiversity, suppress weeds, manage soil moisture.
- Flowers attract pollinators



wrir4ucdavis.edu

<http://www.flaxcouncil.ca/english/index.jsp?p=growing10&mp=growing>

Annual Mustard (*Brassica* spp.)

- Cool Season broadleaf, non-legume
- 3 to 6 feet tall
- Allelopathic: brown and black varieties may suppress wheat and some weed species
- Good drought tolerance
- Poor salinity tolerance
- Biomass: 8,500 – 12,000 lb./acre
- N content of 3.5% and a C:N ratio: 10 – 30
- Strong taproot (1 – 3 ft.)
- Does not form arbuscular mycorrhizal associations
- Potential nematode and disease suppression
- Seeds/lbs.: 150,000 – 200,000
- Typically planted: mid-fall to early winter
- Seeding depth: 0.25 – 0.5 inches
- Maturity: Intermediate
- Termination strategies: Herbicides
 - Mowing before full flower
 - Incorporation by tillage before full flower
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce compaction.
- Flowers attract honeybees, lygus bugs, and hoverflies

<http://www.sarep.ucdavis.edu/database/covercrops>



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Phacelia (*Phacelia tanacetifolia* Benth.)

- Cool Season broadleaf, non-legume
- 1 – 3 feet tall
- Fair drought tolerance
- Low salinity tolerance
- Biomass: 3,300 – 6,000 lb./acre (seeded from 11 – 18 lb./acre or 7 – 12 lb./acre if drilled)
- Will form arbuscular mycorrhizal associations
- Seeds/lbs.: 824,000
- Typically planted: mid-fall to early winter
- Seeding depth: 0.25 inches
- Maturity: Late
- Termination strategies:
 - Mow prior to flowering
 - Herbicide
- Purpose: Add organic matter, nutrient cycling, increase biodiversity, suppress weeds, manage soil moisture.
- Flowers attract pollinators
- Should not be intercropped with lettuce



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http://seriousaboutcamo.typepad.com/files/phacelia_farm_version.pdf

<http://www.sarep.ucdavis.edu/database/covercrops>

Radish (*Raphanus sativus*)

- Cool Season broadleaf, non-legume
- 2 – 3 feet tall
- Poor drought tolerance
- Poor salinity tolerance
- Biomass: above ground 8,000 lb./acre
- Major types: Oilseed (var. *oleiformis*)
 - Forage (var. *niger*)
- Large tap root,
- Does not form arbuscular mycorrhizal associations
- Good N scavenging and weed control; N released rapidly
- Seeds/lbs.: 28,500
- Typically planted: mid-fall
- Seeding depth: 0.25 – 0.5 inches
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce soil compaction.
- Flowers attract pollinators



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<http://mosesorganic.org/farming/farming-topics/soils-systems/radishes-a-new-cover-crop-for-organic-farming-systems/>

Turnip (*Brassica rapa* L. var. *rapa*)

- Cool Season broadleaf, non-legume
- Biennial
- 12 – 14 inches tall
- Poor drought tolerance
- Poor salinity tolerance
- Large tap root
- Seeds/lbs: 160,000
- Typically planted: mid-fall
- Seeding depth: 0.25 – 0.5 inches
- Maturity: 30 to 60 days
- Termination options:
 - Herbicides
 - Mowing before full flower
 - Incorporation by tillage before full flower
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce soil compaction.
- Flowers attract pollinators



www.unco.edu

http://www.advancecovercrops.com/portfolio_item/turnips/

Fava bean (*Vicia faba* L.)

(also, broadbean, bell, tick, horse, or field bean)

- Cool season, legume
- Upright growth form
- 2 – 6 feet tall
- Deep-rooted, noted for reducing compaction
- Seeds/lbs.: 3000
- Typically planted: mid-fall
- Maturity: Late
- Low drought tolerance
- Somewhat tolerant of poor drainage
- Attracts beneficial insects
- May host root-knot nematode
- Not tolerant of temperatures below 15° F
- Performs best in mixtures with grasses and other legumes
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture, reduce soil compaction

<http://www.sarep.ucdavis.edu/database/covercrops>



Field pea (*Pisum sativum arvense* L.)

(also known as Austrian winter pea)

- Cool Season, legume
- 20 – 28 inches tall
- Good drought tolerance
- Poor salinity tolerance
- Biomass: 6,000 – 8,500 lb./acre
- N fixation around 150 lb./acre
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 1800 – 3000
- Typically planted: early Fall to late Fall
- Maturity: Late
- Termination strategies:
 - Herbicide
 - Disking or mowing after full bloom
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture.
- Flowers attract bees

<http://www.sarep.ucdavis.edu/database/covercrops>

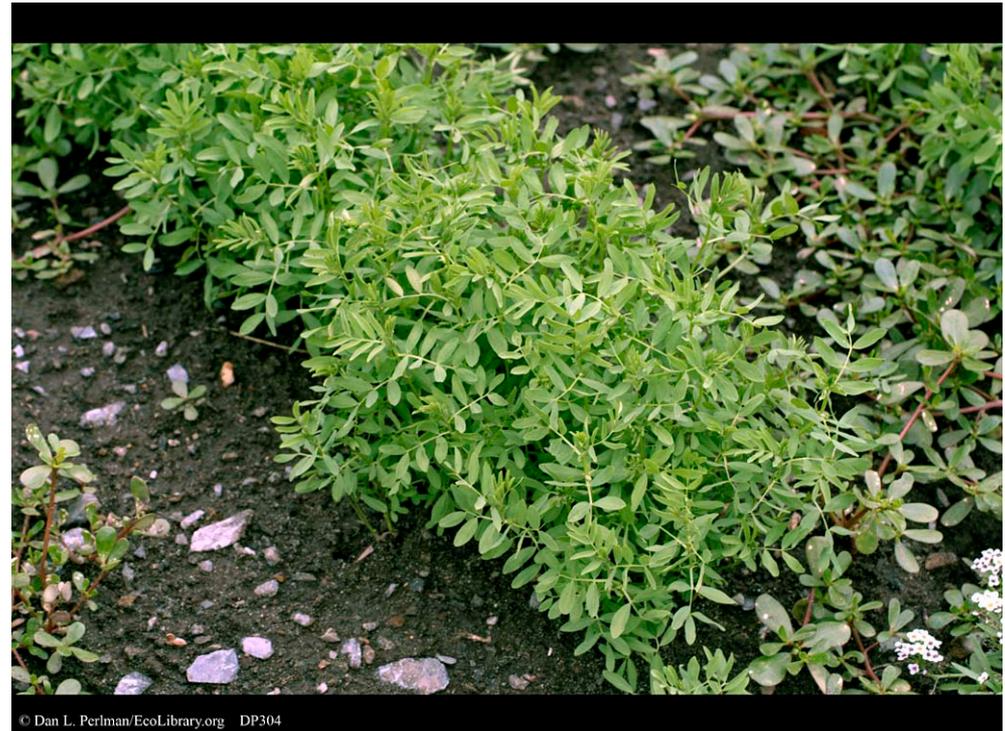


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Lentil (*Lens culinaris* Medik.)

- Cool Season, legume
- Good drought tolerance
- Poor salinity tolerance
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 5600 – 15,000
- Typically planted: mid-Fall
- Seeding depth: 1 – 1.5 inches
- Maturity: intermediate
- Termination strategies:
 - Mow
 - Will dry out and die
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Self pollinated, but flowers may attract pollinators

<http://www.ag.ndsu.edu/pubs/plantsci/rowcrops/a1636.pdf>



Lupin (*Lupinus spp. L*)

- Cool Season, legume
- Height: white lupin 47", yellow lupin 10 – 31", blue lupin 8 – 59"
- Good drought tolerance
- Prefers acid soils
- Deep taproot
- Does not form arbuscular mycorrhizal associations
- Seeds/lbs.: 1500 – 4000
- Typically planted: early to late Fall
- Seeding depth: 0.25 – 0.5 for native species
- Maturity: Late
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture, reduce compaction.
- Flowers attract bees



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<http://www.sarep.ucdavis.edu/database/covercrops>

Sweetclover (*Melilotus sp. L*)

- Cool Season, legume
- Annual or biennial
- Good drought tolerance (best of all clovers)
- Fair salinity tolerance
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 262,000
- Typically planted: early to mid-Fall
- Seeding depth: 0.25 inch
- Maturity: Late
- Termination strategies:
 - Mowing, cultivating, or disking once it reaches late bloom stage
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators

http://www.sarep.ucdavis.edu/database/cover_crops



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Berseem clover (*trifolium alexandrinum* L.)

- Cool Season, legume
- Up to 24 inches tall
- Good drought tolerance
- Fair salinity tolerance
- Biomass: up to 15,500 lb./acre
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 206,900
- Typically planted: mid-Fall
- Seeding depth: 0.5 – 1 inch
- Maturity: Early
- Termination strategies:
 - Wait for it to die after blooming
 - Herbicides
 - Multiple diskings
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract bees

<http://www.sarep.ucdavis.edu/database/covercrops>

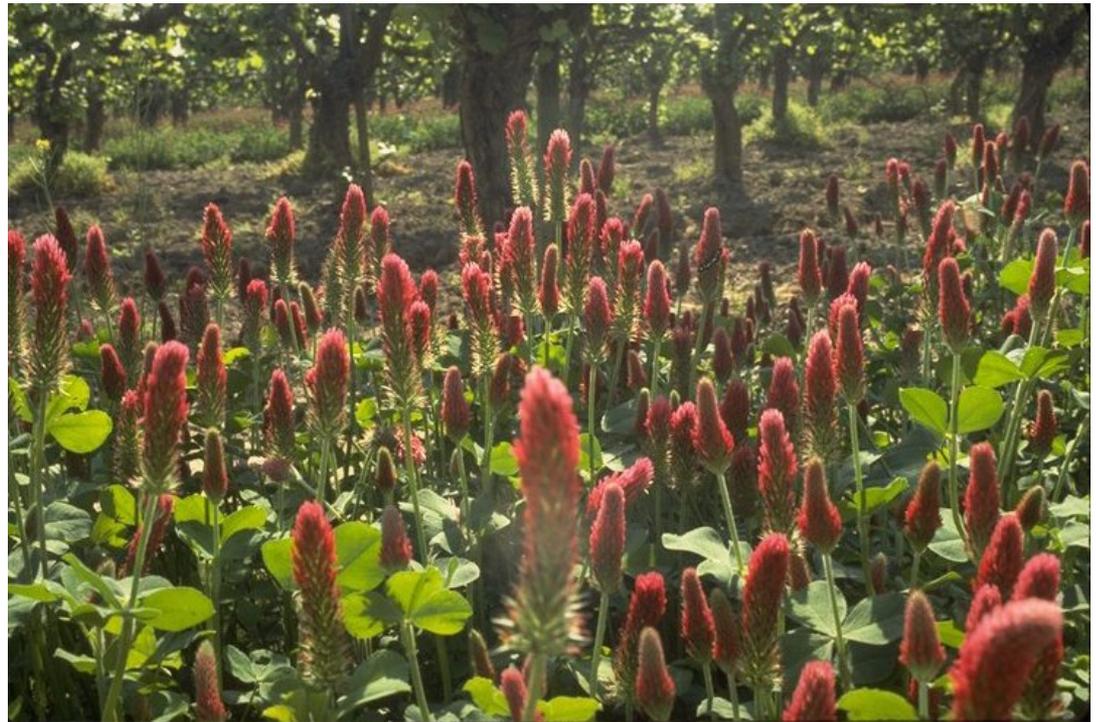


www.uwyo.edu

Crimson Clover (*Trifolium incarnatum* L.)

- Cool Season, legume
- 12 – 20 inches tall
- Biomass: 4,500 – 5,000 lb./acre
- Seeds/lbs.: 150,000
- Typically planted: mid-Fall
- Seeding depth: 0.5 inches
- Maturity: early to intermediate
- Termination strategies:
 - Mowing after early bud stage
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators
- Can harbor flower thrips

<http://www.sarep.ucdavis.edu/database/covercrops>



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Red clover (*Trifolium pratense* L.)

- Cool Season, legume
- Biennial, short-lived perennial
- Seeds/lbs.: varies by cultivar
- Typically planted: mid-Fall
- Fair drought tolerance
- Poor salinity tolerance
- Forms arbuscular mycorrhizal associations
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract bees



<http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Legume-Cover-Crops/Red-Clover>

www.uwyo.edu

White clover (*Trifolium repens* L.)

- Cool Season, legume
- Perennial, but behaves as an annual in warm climates
- 8 – 10 inches tall
- Fair drought tolerance
- Poor salinity tolerance
- Biomass: 11,100 – 22,2000 lb./acre
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: varies by cultivar
- Typically planted: early to mid-Fall
- Seeding depth: 0.25 inches
- Maturity: Late
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract bees
- May attract lygus bug

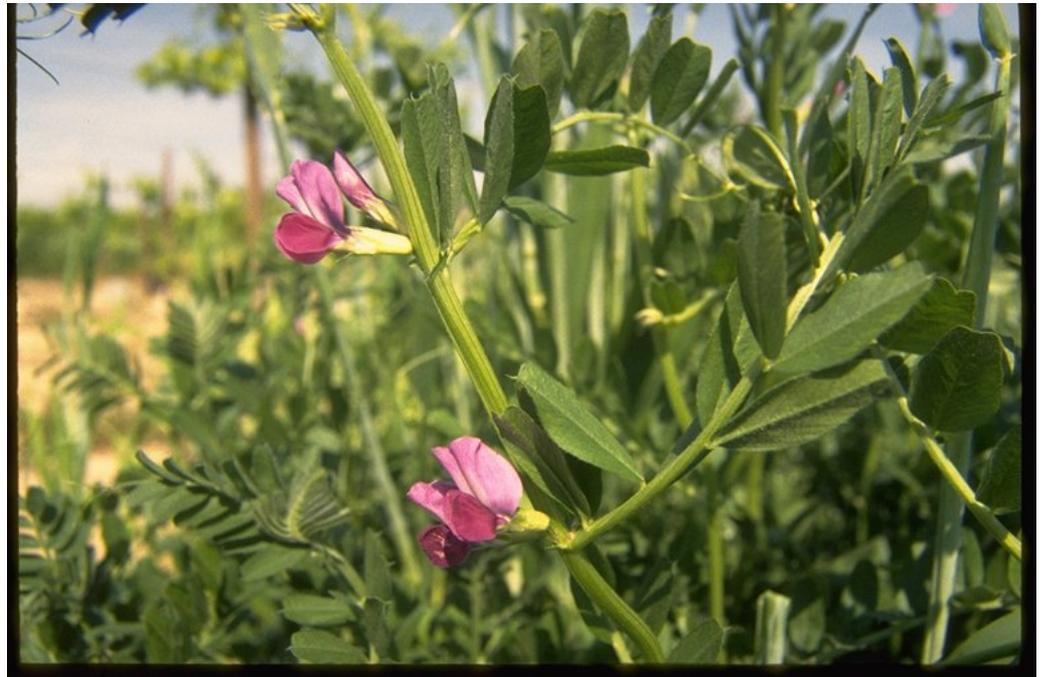


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<http://www.sarep.ucdavis.edu/database/covercrops>

Common Vetch (*Vicia sativa* L.)

- Cool Season, legume
- Annual
- Height ranges: 2 feet in monoculture and up to 6 feet if supported by large cereal grain
- Good drought tolerance
- Poor salinity tolerance
- Biomass: 8,000 – 9,000 lb./acre
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 8000
- Typically planted: mid-Fall
- Seeding depth is 0.5 – 2 inches
- Maturity: Late
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators
- Can reseed

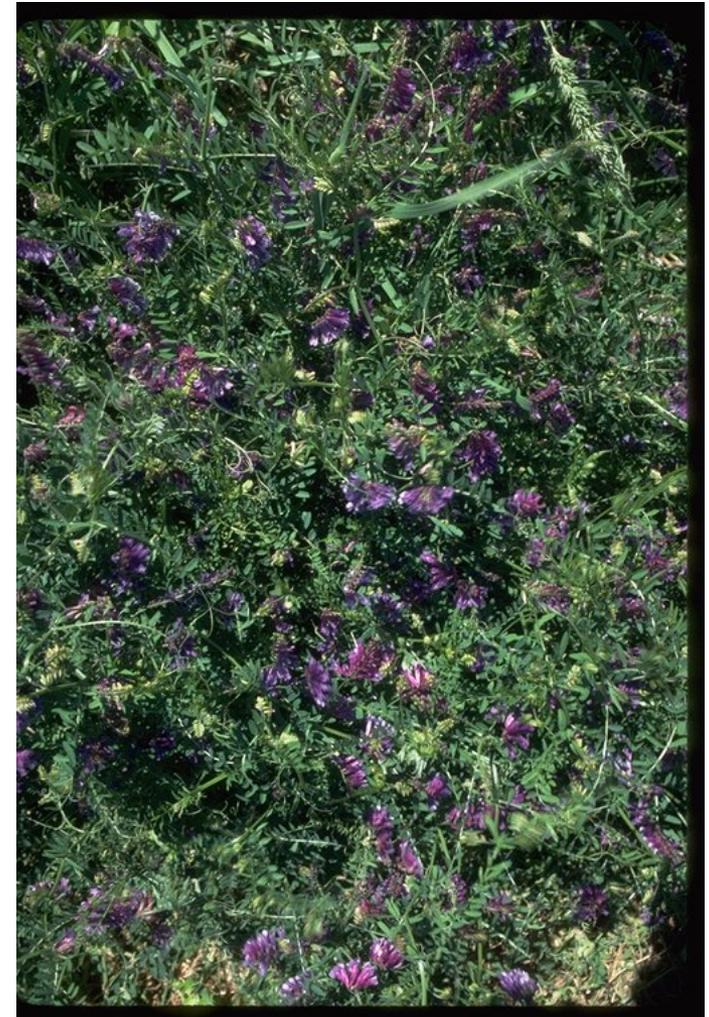


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Hairy Vetch (*Vicia villosa*)

- Cool Season, legume
- Annual
- 12 – 20 inches tall
- Good drought tolerance
- Biomass: 4,300 – 7,000 lb./acre
- Taproot that reaches depths of 1 -3 ft.
- Seeds/lbs.: 16,300
- Typically planted: late Summer to mid-Fall
- Seeding depth: 0.5 – 1.5 inches
- Maturity: Late
- Termination strategies:
 - No-till vegetable transplanting: rolling stalk chopper
 - No-till delayed kill: roller/crimper and an undercutter
 - Herbicides will kill vetch in 3 – 30 days (Depending on materials used, rate, growth stage, and climate)
 - Cutting vetch close to the ground at full bloom stage
- Management Cautions:
 - About 10 -20% of Hairy Vetch seed is hard
 - Flowers can harbor flower thrips and minute pirate bug
 - Can harbor pea aphid
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators
- More drought resistance than other vetches



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<http://www.sarep.ucdavis.edu/database/covercrops>

Purple Vetch (*Vicia benghalensis* L.)

- Cool Season, legume
- 23 inches tall but will climb
- Poor drought tolerance
- Biomass: 3,000 – 7,000 lb./acre
- Seeds/lbs.: 10,000
- Typically planted: mid-Fall
- Maturity: Late
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators
- Can reseed



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[http://www.sarep.ucdavis.edu/
database/covercrops](http://www.sarep.ucdavis.edu/database/covercrops)

Woollypod Vetch (*Vicia villosa* subsp. *varia*)

- Cool Season broadleaf, legume
- Annual
- 18 -27 inches tall, but will climb
- Fair drought tolerance
- Biomass: 6,000 lb./acre
- 'Lana' vetch can contribute 100 -300 lb N/acre
- Seeds/lbs.: 11,400
- Typically planted: early to mid-Fall
- Seeding depth: 0.75 inches
- Maturity: early
- Termination strategies: Roller crimper, prior to seeding
- Herbicide
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators
- Pesticide tolerance: glyphosate herbicide
- Hard seeded and will persist, naturalized in Central Valley

['Lana' Woollypod Vetch Release Brochure](#)

<http://www.sarep.ucdavis.edu/database/covercrops>



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Chickpea (*Cicer arietinum* L.)

- Warm Season broadleaf, legume
- 1 – 3 feet tall
- Good drought tolerance
- Poor salinity tolerance
- Forms a taproot
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 800 – 1500
- Grows best when daytime temp. is 70 – 80 F
- Seeding depth: 1.5 – 2 inches
- Matures from 95 – 110 days
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract bees



Agr.mt.gov

http://www.agmrc.org/media/cms/ec183_435DBB048F8C5.pdf

http://www.harvesttotable.com/2009/04/how_to_grow_chickpeas_garbanzo/

<http://www.hort.purdue.edu/newcrop/cropfactsheets/Chickpea.html#Crop%20Culture>

Cowpea (*Vigna unguiculata* L.)

- Warm Season broadleaf, legume
- Annual
- 19 – 24 inches tall in a monoculture
- Good drought tolerance
- Poor salinity tolerance
- Biomass: 3,800 – 4,800 lb./acre
- Can fix up to 100 – 150 lb. N/acre
- Forms arbuscular mycorrhizal associations
- Seeds/lbs.: 3600
- Typically planted after last threat of frost
- Seeding depth is 0.5 – 1 inch
- Maturity vary on variety, early varieties mature in as little as 90 days and late varieties mature in 240 days
- Termination strategies:
 - Mowing at any point stops vegetative development
 - Herbicides
 - Shallow tillage may be required
- Purpose: Add organic matter, nitrogen fixation, suppress weeds, manage soil moisture
- Flowers attract pollinators



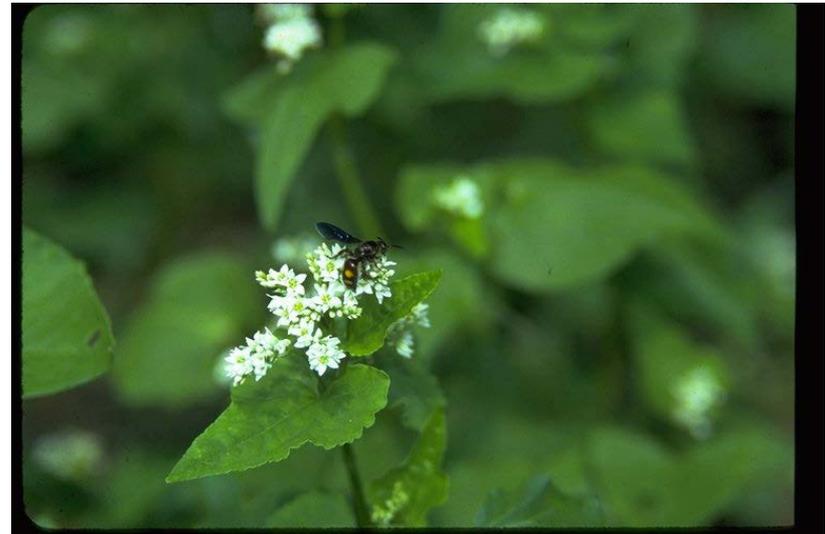
www.mccc.msu.edu

<http://www.sarep.ucdavis.edu/database/covercrops>

Buckwheat

(Fagopyrum esculentum Moench; Fagopyrum sagittatum Gilib)

- Warm Season broadleaf, non-legume
- Annual
- 12 – 22 inches tall
- Fair drought tolerance
- Poor salinity tolerance
- Biomass: 2,000 – 3,000 lb./acre
- Mobilizes phosphorus
- Deep taproot
- Does not form arbuscular mycorrhizal associations
- Seeds/lbs.: 20,400
- Typically planted after last frost
- Seeding depth: 0.5 inches
- Matures around 14 days after flowering begins, or around 50 – 70 days after sowing
- Termination strategies:
 - Kill 7 – 10 days after flowering begins
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce soil compaction
- Flowers attract pollinators



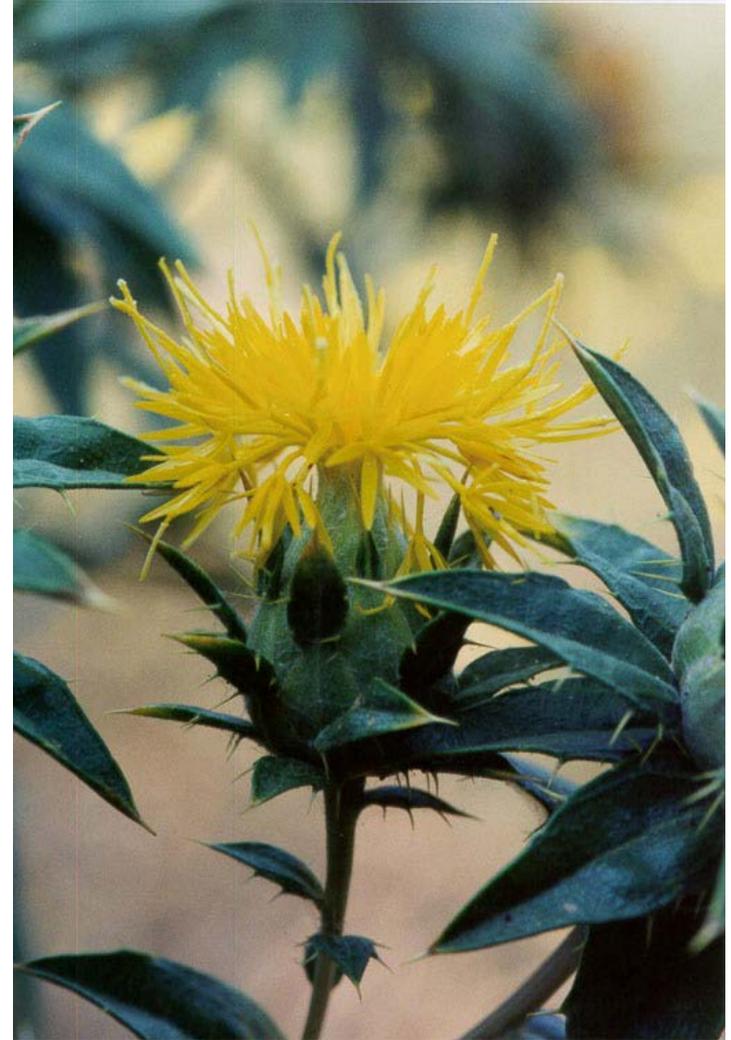
SARE – ASI at UC Davis

<http://www.sarep.ucdavis.edu/database/covercrops>

Safflower (*Carthamus tinctorius* L.)

- Warm Season broadleaf, non-legume
- Fair drought tolerance
- Good salinity tolerance
- Strong taproot (8 – 10 ft.)
- Will form arbuscular mycorrhizal associations
- Seeds/lbs.: 14,900
- Typically planted: early to late spring
- Seeding depth: 1 – 1.5 inches
- Typically matures four weeks after the end of flowering season
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce soil compaction
- Flowers attract pollinators

<https://www.hort.purdue.edu/newcrop/afcm/safflower.html>



Calflora – James B. Gratiot

Sunflower (*Helianthus annuus* L.)

- Warm Season broadleaf, non-legume
- Can reach heights upwards of 9 feet
- Poor drought tolerance
- Fair salinity tolerance]
- Strong taproot (can be 6.5 ft. deep)
- Will form arbuscular mycorrhizal associations
- Seeds/lbs.: 47,000
- Typically planted: after the last frost
- Seeding depth: 1 – 2.5 inches
- Matures in 85 – 95 days
- Purpose: Add organic matter, nutrient cycling, suppress weeds, manage soil moisture, reduce soil compaction
- Flowers attract pollinators

<https://www.hort.purdue.edu/newcrop/afcm/sunflower.html>



Calflora – Tony Morosco

Grain Sorghum (*Sorghum bicolor* L. Moench)

- Warm Season, grass
- 3 – 7 feet tall
- Good drought tolerance
- Fair salinity tolerance
- Benefits from arbuscular mycorrhizal associations
- Seeds/lbs.: 14,000
- Typically planted when soil reaches 60 – 65 degrees F
- Seeding depth: 0.5 – 2 inches
- Typically matures in around 90 – 120 days
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture



www.aerc.ca

<https://www.hort.purdue.edu/newcrop/afcm/sorghum.html>

<http://www.sarep.ucdavis.edu/database/covercrops>

Pearl Millet (*Pennisetum glaucum* L.)

- Warm Season, grass
- Good drought tolerance
- Poor salinity tolerance
- Will form arbuscular mycorrhizal associations
- Typically planted when soil reaches 60 – 65 degrees F
- Seeds/lbs.: 220,000
- Seeding depth: 0.5 – 1 inch
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture

http://forages.oregonstate.edu/php/fact_sheet_print_grass.php?SpeciesID=34&use=Forage

<http://www.sarep.ucdavis.edu/database/covercrops>



Sudan Grass (*Sorghum bicolor* L. Moench)

- Warm Season, grass
- Annual
- 5 – 12 ft. tall
- Good drought tolerance
- Fair salinity tolerance
- Biomass: 15,000 – 20,000 lb./acre
- Benefits from arbuscular mycorrhizal associations
- Seeds/lbs.: 44,000
- Typically planted: after last threat of frost
- Seeding depth: 1 inch
- Purpose: Erosion control, add organic matter, nutrient cycling, suppress weeds, manage soil moisture



SARE – ASI at UC Davis

<http://www.farminfo.org/forage/sorsudan-m.htm>

http://cals.arizona.edu/fps/sites/cals.arizona.edu.fps/files/cotw/Sudan_Seed.pdf

<http://www.sarep.ucdavis.edu/database/covercrops>