

# Cover Crop Planning Guide



## Planting Date

The biggest factor in deciding the planting date of the cover crop is **water**. For much of California, planting in **early to mid-October** is best to take advantage of seasonal rains and provide the longest growing period. For many cover crop mixes, **planting in early October** is necessary to **ensure cover crops are blooming for the honey bees** brought in for the **almond bloom**.

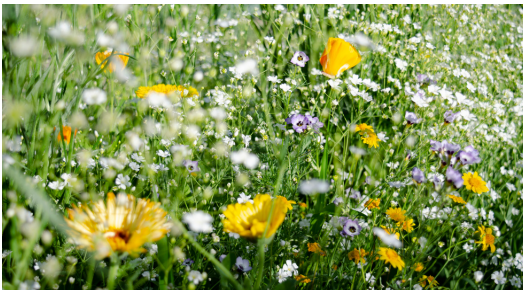
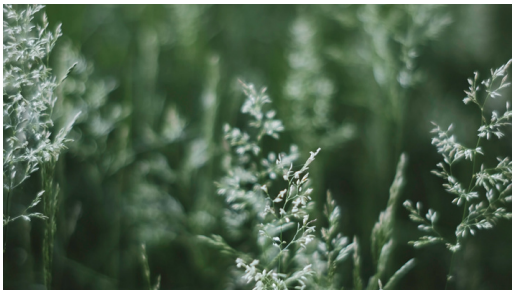
In drier regions of the state or in cash crops with a late fall harvest, planting in October may not be feasible. If so, then it is advisable to plant around the first rains for the region. In arid locations farmers may wait as late as December to begin planting. **In these cases, it is best to select rapidly growing cover crop species.**

## Seed Mix Selection

Selecting a cover crop depends on the grower’s goals. Goals can be met through different types of plants. The most common groups are: Brassicas, Legumes, Grasses, and Broadleaves.

### Seeds for Bees® Mixes

Seeds for Bees® has a variety of mixes tailored to meet specific goals which can be accessed at: [projectapism.org/sfb-seed-mixes](http://projectapism.org/sfb-seed-mixes)



### Brassicas

“Mustards”

#### PAm Pollinator Brassica Mix

- Early season pollinator forage
- Break up compacted soils
- High biomass producers
- High protein source for livestock
- Suppress weeds
- Toxic to nematodes when terminated

### Grasses

“Wheat & Rye”

#### PAm Nitrobuilder Mix

- Fibrous roots reduce erosion
- Can establish rapidly
- Suppress weeds
- Fill in canopy gaps
- Can encourage broad leave roots to grow deeper
- Can provide scaffolding for vining plants

### Broadleaves

“Wildflowers”

#### PAm Purple Sun Mix

- Diversify and prolong pollinator forage
- Support and attract natural enemies
- Increase soil microbial diversity
- Reduce nutrient leaching
- Provide unique ecosystem services

### Legumes

“Beans and Clovers”

#### PAm Annual Clover Mix

- Fix nitrogen
- Crude protein source for livestock
- Provide pollinator forage
- Vining species can stitch the cover crop together, reducing lodging


# Seed Mix Selection

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## Density


Density is an important controller of cover crop performance. A dense planting increases all the cover crop benefits. Density is particularly important in organic fields where weed suppression is required.

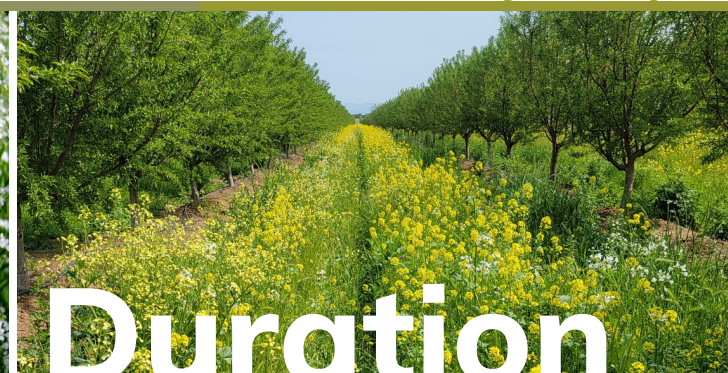
 **Fact:** High density is good for pollinator forage by providing more flowers in one area, reducing the distance bees must travel for food.



## Diversity


The more diverse the cover crop the more ecosystem benefits it can provide. This can have a direct impact on pests, nutrient sequestration, and bee health. If the grower has a specific goal like nitrogen fixation it is important not to make the mix so diverse that it dilutes that goal.

 **Fact:** A diverse mix can provide a more long-lasting, stable, and nutritionally complex food source for honeybees and other pollinators.



## Duration

Cover crop benefits are magnified over time. Longer growing seasons can be achieved through an early planting and a late termination. If weediness is a concern, terminate the cover crop before it sets seed.

 **Fact:** Providing pollinator forage that lasts a long time is a lifeline for pollinators and other beneficial insects.

### Acreage

Determining the acreage of an unplanted field can be simple however calculating cover crop acres in an orchard or vineyard has an additional step and can be done with the formula below.

**(Planting width ÷ tree-to-tree spacing) X total field acres = cover crop acres**

### Required Amount of Seed

To calculate the amount of seed required to plant a field multiply the number of acres by the seeding rate of the mix.

Seed mixes typically have 2 seeding rates. The higher seeding rate is for less efficient planting methods such as broadcasters. The lower rate can be used with more precise tools such as seed drills.

### Designing a Custom Seed Mix

To find the seeding rate of a custom mix, take the rate for each plant species and divide it by the number of species in the mix. Add the results to determine the seeding rate.



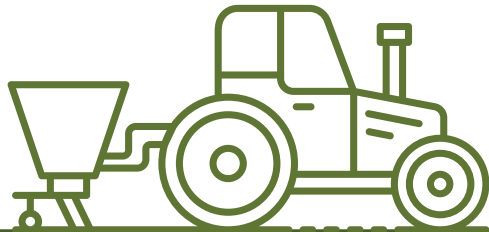
# Seed Planting Methods



## Broadcaster

**What** A broadcast seeder is a mechanized device that is used to evenly scatter seeds or materials over the soil surface.

- Why**
- Versatile and easy to use method
  - Available in a variety of sizes and applications
  - Best for beginning cover croppers and small size farms



### Pros

- Generally more affordable than other options
- Easy to use and calibrate
- Lower maintenance costs
- Widely available
- Can be used for other tasks

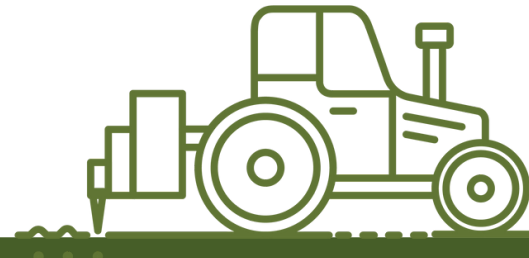
### Cons

- Typically requires more seed than seed drills
- Can have lower germination rates than drills
- Requires seed to be incorporated into the soil
- Less control over seed placement than seed drills
- Requires a clean, well prepared seed bed

## Seed Drill

**What** A seed drill plants seeds for crops by positioning them in the soil and burying them at a specific depth.

- Why**
- Offers precision control over seed placement
  - Can increase seed germination rates
  - Can save on seed costs for large acreages



### Pros

- Greatest level of control in seed placement
- Generally offers better germination
- Requires less seed
- Permits for a rougher seed bed
- Can allow for later planting in the season

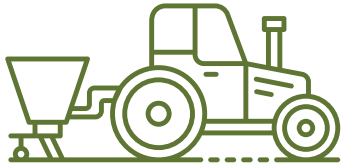
### Cons

- Typically more expensive than broadcasters
- Harder to use and maintain
- Not widely available in California
- Emitters can clog, leaving unplanted areas
- Can be difficult to road transport

# Compare Methods



# Seed Planting Methods

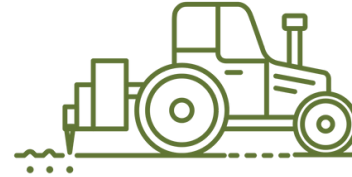


## Broadcaster

When using a broadcaster, ground preparation and seed incorporation are very important, and the grower will have to bury the seed with another device. One popular solution is to drag a piece of chain link fence behind the unit to mix the seed with the soil.

Planting to a specific width can be difficult to achieve using a broadcaster. Depending on the unit, bumpers or wings can be attached to the sides of the spreader to limit the width of the cover crop strip. For axel-powered broadcasters, driving speed can greatly impact the width of the cover crop strip. No matter the system selected it is important to factor in speed when calibrating.

Broadcasters come in a variety of shapes and sizes, making them versatile units for the farm. Sizes and applications are typically as follows: Small handheld or pushed units such as lawn seeders and spreaders; small to medium seeders and bait spreaders which can be attached to an ATV; medium to large units which are pulled behind a vehicle or tractor such as fertilizer and compost spreaders.



## Seed Drill

Seed drills are much more complex than broadcasters and vary less in size and function. These units are specialized for planting and offer the greatest level of control over seed placement. Drilling results on higher germination rates and generally is the best option for large seeds such as peas and beans.

### Special Capabilities:

Many seed drills provide growers with additional options. For example, a grower can decide to plant a shorter growing species on the edge of their cover crop strips and a taller species in the center of the rows. Seed drills with separate grain boxes can also can be used to plant cover crop mixes that have high seed size variability with great success. Blends with very small seeds like mustards and large seeds like beans can be planted together without fear of seed separation or mechanical jams.

Seed drills have been used in the Midwest to interplant seed in established pastureland, and ground preparation isn't as important for these units. With that said, having a clean seed bed will produce the best results.

### Calculation for Amount of Seed Required

$$\begin{array}{ccccc} \text{Acres to Be Planted} & \times & \text{Seeding Rate} & = & \text{Total Seed Required for Planting} \end{array}$$

### Calculation to Determine Cover Crop Acreage

$$\begin{array}{ccccccc} \text{Planting width} & \div & \text{Tree-to-Tree Spacing} & \times & \text{Total Field Acres} & = & \text{Cover Crop Acres} \end{array}$$

# Cover Crop Termination Guide



## Mowing/Flail Mower

- ✓ Most common method to terminate cover crops
- ✓ Flail mower tears and shreds plant biomass
- ✓ Increases speed of decay
- ✗ Higher fuel cost than other methods
- ✗ Large cover crops can wear out parts quickly



## Rolling/Crimping

- ✓ Biomass can protect the soil from drying out
- ✓ Reduce weeds (acting as a green mulch)
- ✓ Roller crimpers suggested
- ✓ Uses less fuel than mowing
- ✗ Cover crop may grow back



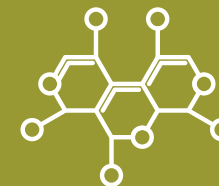
## Grazing

- ✓ Improves soil health and offers low cost animal feed
- ✓ Decreased fuel usage
- ✗ Added management of livestock
- ✗ Food safety concerns with specific crop types



## Chemical

- ✓ Efficient
- ✓ Typically used in the mid-west before planting an annual row crop
- ✗ High costs
- ✗ Potential honey bee contamination
- ✗ Potential risk to cash crop in perennial systems



## Termination Dates

Termination dates rely on two main factors: the needs of the cash crop and the climate in which the cover crops are grown. A good example is if your cash crop is a ground-harvest tree crop (such as almonds and walnuts), you should terminate in April or May to avoid the risk of trash during harvest. Another example is if your cash crops are annual row crops; in that case, you should terminate two to four weeks before planting the cash crop to allow residues to dry and become brittle.

## General Rule

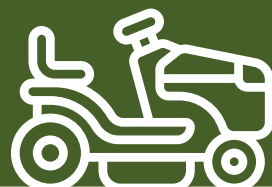
The longer the cover crop is allowed to grow the greater the benefits it provides.

# Cover Crop Termination Guide



## Mowing

Mowing can be accomplished any time during the growing season. This method does have some drawbacks in that it can be costly in fuel and machine maintenance. Dense cover crops can burn through machinery parts such as belts and blades. One way to deal with tall and dense cover crops is to first cutting down the top few feet and then returning to mow down to the ground. Another method is to knock down the cover crop with a bucket attached to a tractor and then back mow.



## Rolling/Crimping

Rolling the cover crop is time sensitive. Roll too early and the cover crop may continue to grow. Roll too late and it will be difficult to terminate and the crop may go to seed. The best time to roll is before the plants become fibrous, while the stems can still be easily snapped in half.

Some cover crops don't terminate well with rollers, such as clovers. Some farmers use this to their advantage, using a roller to terminate large cover crop species. This permits clovers to grow through the biomass, extending their cover cropping season.



## Grazing

There are many factors to consider when terminating a cover crop through grazing such as protecting the cash crop and managing for food safety. Most cover crops can be successfully terminated when grazed below 2 to 4 inches. If left taller there is an increased chance that the cover crop will regrow or set seed.

In soggy soils there is a risk that animal traffic will increase soil compaction or create ruts. Always check if there are toxic species in your cover crop before grazing, as bloat and nitrate poisoning can be a concern in some mixes.



## Chemical

When using a chemical spray to terminate a cover crop it is important to note that most application rates indicated on the label are intended for controlling young weeds and require good coverage. The larger the cover crop, the less effective a chemical control will be. Spraying a cover crop is most effective when the plants are young and of a manageable size. Be aware misapplication of herbicides can damage perennial crops as well as pollinators. Consult with your PCA for timing and selecting a product.

