



Cover Crop Grower's Guide

Characteristics of Popular Species +

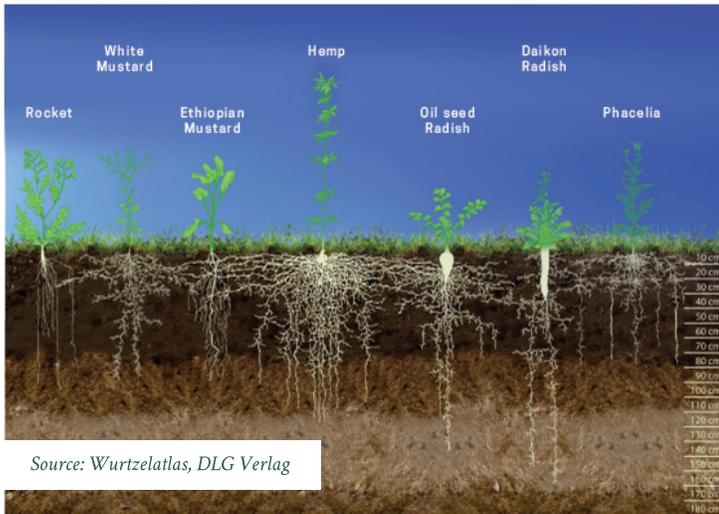
Overall Benefits of Cover Crops +

A cover crop mix that includes crimson clover, daikon radish and turnips.

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CHARACTERISTICS OF POPULAR COVER CROP SPECIES



Source: Wurtzelatlas, DLG Verlag



Crimson Clover



Daikon Radish, Forage Turnip and Crimson Clover Mix

Annual Ryegrass: Although many farmers are cautious of annual ryegrass, it remains a very effective and economical cover crop. Certain varieties have excellent winter hardiness, produce massive root systems that can penetrate 5 feet deep and break deep compaction, establish easily and quickly, increase organic content, suppress weeds, reduce erosion, recycle nutrients, and if desired, produced excellent forage. Additionally, some studies have shown that annual ryegrass can significantly reduce soybean cyst nematodes. In published material, Ohio State University claimed that one growing season of annual ryegrass reduced soybean cyst nematode egg populations by 30 to 50 percent. The overall cover crop benefits of annual ryegrass often far exceed those of cereals.

- **King Annual Ryegrass:** King helped jumpstart the cover crop movement more than 10 years ago. In extensive 2006-08 University of Illinois tests, King proved to be one of the most cold-tolerant varieties. As a result, plants grew deeper root systems and thicker foliage, which better suppressed cool-season weeds.

- **Grits Annual Ryegrass:** Three-year University of Illinois tests of numerous annual ryegrass varieties revealed Grits was one of the top entries for the depth of root penetration.

Crimson Clover: One of the more cold-tolerant annual clovers, crimson can be planted throughout the United States and often overwinters even in the northern locations, especially with a little snow cover. It is a popular legume for cover crop enthusiasts because it is inexpensive, cold tolerant and provides good forage quality.

Daikon Radish: Daikon radishes are a fantastic cover crop option, if planted at least 45 days prior to a killing freeze. The benefits greatly improve if there are 60 or more days prior to a freeze. Consequently, many growers cannot plant their cover crop that early in the fall. However, those that can plant early (after wheat or corn silage, for example) can experience the many benefits of daikon radishes – large tubers and taproots that break soil compaction, substantial nutrient recycling, increased organic content, and more.

Oilseed Radish: Lesser used than daikon radishes, but that may be changing. Oilseed radishes do not produce the big tuber as daikon radishes, but they do produce a more massive root system in the top 18 inches while still producing a taproot that can reach 55 inches in depth. The massive root system enables oilseed radishes to sequester more nutrients for recycling than daikon types while still breaking soil compaction. Oilseed radishes are widely used throughout Europe for the control of certain nematodes. It is yet unknown if oilseed radishes will exhibit the same control of nematode pests in soybeans and corn but early indications are positive.

Rape: A large, leafy brassica with a strong taproot and large foliage, rape is a very popular option for cover crops. Along with turnips, rape is usually the cheapest cover crop option (even cheaper than cereals). As a bonus, rape can produce quality forage.

Turnips: Very closely related to rape, turnips look similar but produce a tuber, which is valued by some growers. Like radishes, the turnip tuber is excellent at recycling nutrients and increasing organic content. Turnips, however, can be planted several weeks later than radishes. Turnips are incredibly affordable to establish.

- **Purple Top Turnips:** The “original” variety of globe-type turnips, purple tops are usually the cheapest turnips to establish.

- **7 Top Turnips:** An improved turnip variety, 7 Top turnips are categorized as a forage turnip. It still has a large tuber but produces more foliage and faster growth than purple tops. The increased growth is beneficial for both cover crop and forage use, and when planted in a pure stand, the cost is often only one or two dollars per acre more than purple tops.

Vetch: Two types of vetch are used for cover crop purposes, and both are annuals – common vetch and hairy vetch. As legumes, both types are vigorous nitrogen producers, producing more nitrogen than other annual legumes. For example, tests have shown hairy vetch can produce up to 180 lbs of nitrogen per acre in one growing season. Common vetch is often priced lower, but the seeding rate is higher, usually making it more expensive to establish. Hairy vetch is the more cold tolerant of the two.

Winter Peas: A legume option for cooler climates, winter peas can provide an easy-to-establish cover crop. Peas often germinate faster than clovers and vetch, and they provide decent forage.



Cover Crop Characteristic Ratings

Species	Seeding Rate, lbs/acre (pure stand, for cover crop purposes)	Cold Tolerance	Root Depth	Organic Content Production	Erosion Control	Nutrient Recycling	Nitrogen Production	Speed of Established	Cost of Establishment
Annual Ryegrass	20-25	3	4	3	4	3	none	4	3
Common Vetch	15-20	2	1	2	1	1	3	1	1
Crimson Clover	12	3	2	2	2	1	2	2	3
Daikon Radish	8	1	3	4	3	4	NA	3	3
Hairy Vetch	10	4	1	2	1	1	4	1	2
Oilseed Radish	8	1	2	3	2	3	NA	1	2
Rape	4	3	3	2	3	2	NA	2	4
Turnips	4	3	3	4	3	3	NA	2	4
Winter Peas	20-25	3	2	1	3	1	1	4	3

Some ratings are educated guesses and seed prices are subject to change. Other than seeding rate, characteristics are rated 1-4, with 4 being the best.

THE REASON FOR COVER CROPS

Cover crops provide numerous benefits to cash crop growers. As more growers utilize cover crops and as more studies are done, the economic advantage is becoming apparent.

Cover crops are promoted by different agencies and groups for different reasons. Therefore, all the time and costs associated with establishing cover crops need to result in a positive economic return for the grower. Fortunately, the rapidly increasing percentage of farmers using cover crops and scientific studies around the world are proving the economic case for using cover crops.

Listing the many benefits of popular cover crops species is important in understanding how all the benefits work together to increase a grower's net profit.

Soil Compaction: Many species are superior to cash crops, and tillage equipment, in breaking soil compaction. The breaking of hardpans allows the subsequent cash crop to grow deeper roots, which allows the cash crop to mine more (and previously unavailable) nutrients and water. This improves yields and/or drought tolerance.

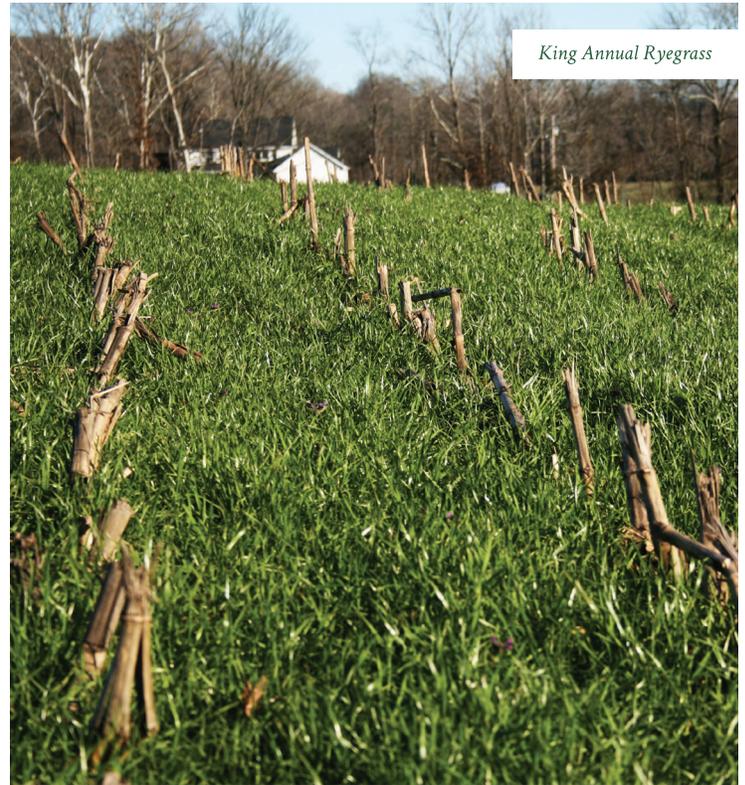
Erosion Control: University studies have shown that the average U.S. cash crop acre loses between 2 and 3 tons of topsoil per year to wind and water erosion. That is the most productive soil, which also holds a lot of nutrients/fertilizer.

Organic Content: Selected cover crop species, after a relatively short time of use, have shown to increase soil organic content by one to two percent. For every one percent increase, the soil can hold an additional one acre inch of water, which increases crop drought tolerance and also improves drainage in wet periods. Additionally, organic content is vital for beneficial microbial populations.

Weed Control: Cover crops have shown to decrease the use of herbicides prior to the planting of cash crops.

Microbial Populations: Beneficial bugs and worms usually need living, or freshly decaying, roots to thrive. A fallow field does not provide that environment.

Pest Control: Some cover crop species appear to decrease nematode populations by functioning as a non host or as a trap crop while other cover crop species actually increase nematode populations by functioning as a host. Therefore, it is important to identify what your purpose is in utilizing a cover crop. If for pest control, then it is well worth your time to investigate which cover crops provide the best defense.



King Annual Ryegrass

Nutrient Recycling: Radishes, turnips and annual ryegrass are especially good at absorbing nutrients and holding them in their tubers and/or massive root systems. The nutrients then do not leach over the "off season" and are slowly released back into the soil as they decay.

The combination of all these benefits often results in more drought-tolerant and flood-tolerant crops while allowing the grower to decrease fertilizer, herbicide and pesticide inputs. Therefore, it becomes apparent that increased yields with decreased inputs produces higher net profits.

Many studies have shown that, with cover crop use, the net profit per acre increases \$20 to \$100 per acre, even after just one year of cover crop use. After multiple years of consecutive use, the net profit increase can even exceed \$100 per acre, and those numbers have been substantiated by many farmers. The benefit of "free," high-quality forage is another financial benefit of cover crops to consider for those with livestock or sell hay/silage into the livestock market.

Website Links:

ryegrasscovercrop.com

sare.org

mccc.msu.edu

nracs.usda.gov

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