

Ten Reasons To Plant Cover Crops

Cover crops are on the ground a short time, providing a splash of green to the bleak winter landscape. But these crops also nurture the land, and there are sound reasons the culture of cover crops should be a vital component of many farm operations.

✓ **Protect Program Benefits**

Crop-residue management is the umbrella term being used by the Soil Conservation Service (SCS) for all residue-management practices. Conservation tillage, one of the most popular residue-management practices, requires at least 30% ground-cover at planting time. Cover crops can help supply a good deal of this residue.

John Becherer of the Conservation Technology Information Center notes that crop-residue management is planned for about 75% of the acres covered by the conservation plans for highly erodible land.

As a result, SCS Chief William Richards has made crop-residue management a top priority for his agency. "By Jan. 1, 1995, conservation compliance is expected to almost double the acreage under crop-residue management," he says. "That means going from the current 79 million acres of conservation tillage to about 140 million acres in barely three years."

Many conservationists and agronomists say cover crops are essential in certain residue-management systems. That's because low-residue crops such as peanuts, tobacco, cotton, soybeans, and corn silage seldom leave enough residue to meet groundcover requirements.

Without additional residue from cover crops, groundcover requirements may not be met, jeopardizing the eligibility of many producers for Government farm programs.

Doc Davis and his son Danny use wheat as a cover between crops of cotton on their farm at Canute, Okla. Planting cotton directly into the stubble has kept them in compliance. Danny says, "Adopting conservation tillage was the best management move we've ever made."

✓ **Control Soil Erosion**

Whether land is highly erodible or not, cover crops reduce soil erosion, especially during heavy rainfalls when primary crops do not furnish adequate cover.

J.D. Bilbro, a research agronomist with the USDA Agricultural Research Service at Big Spring, Tex., says cover crops effectively control wind erosion on the High Plains. In his tests, forage sorghum planted in 5-inch rows was especially helpful. The sorghum also performed well in alternate rows with rye.

Adding rye is a good idea because

it keeps growing after a hard freeze kills forage sorghum. And if rye competes for scarce soil moisture, it can be killed with herbicides.

✓ **Legumes Add Nitrogen**

When you consider the seed, labor, and equipment needed for legume cover crops, you'd be as well off buying and applying a commercial nitrogen fertilizer (see tables).

Bill Hargrove, a University of Georgia agronomist, says a legume that furnishes 80 to 100 pounds of N is worth \$20 to \$25 per acre in nitrogen fertilizer value. This is about the

Tips on Managing Cover Crops

Don't burn straw. "It hurts the people and the land," says Jimmy Dean, a Georgia SCS agronomist.

Burning not only destroys organic matter and the nutrients contained in the mulch but also encourages the germination of weed seedlings.

A better option is to kill cover crops with a herbicide two or three weeks before planting. This especially helps keep cover crops from competing for moisture.

University of Kentucky agronomists have shown benefits in killing rye three weeks prior to corn planting. If cover crops prove hard to kill, starting early gives you time to apply more herbicides if needed.

Researchers are also making progress in mowing cover crops to kill them ahead of planting. Mowing is most effective when the cover crop is near maturity and is not likely to regrow. USDA researchers in Mississippi used a combination of flail mowing and

rolling coulters to kill legume cover crops.

They found that the flail mower, which cut the cover crops at a height of 1½ inches, was the most effective control. This was followed by coulters set 4 inches apart and coulters set 8 inches apart.

Mowing followed by an application of atrazine resulted in at least 97% control of all the cover crops. Even when control by mowing was incomplete, this mechanical treatment weakened the cover crops to the point at which they could be easily killed by the atrazine.

Michael Heller, manager of the Chesapeake Bay Foundation's Clagett Farm in Upper Marlboro, Md., has successfully mowed hairy vetch stands. He cuts viney growth of the vetch with his corn planter, then pulls his mower to further decompose the cover crop.

"Hairy vetch breaks down fairly quickly," he says, "and releases nitrogen."

same as the cost of establishing the legume.

After evaluating a number of legumes, University of Tennessee agronomists Bob Duck and Don Tyler found that hairy vetch produced the equivalent of 98 pounds of N per acre. In these studies, corn and sorghum yields were not much different from those of corn and sorghum grown after wheat and fertilized with 90 pounds of N per acre.

It isn't hard to find farmers who are pleased with the N contribution of legume covers. Phillip Davis of Old Fort, N.C., uses hairy vetch as a cover before planting no-till corn. Over the past few years, he has cut his N fertilizer rate from 165 pounds per acre to 72 pounds, and he is still producing 200 bushels per acre.

✓ **Let Legumes Reseed**

The cost of legume establishment can be cut, and saving your own seed is one way. Hargrove also suggests cutting legume seeding rates in half. But the best way is to get the legume to reseed.

For low-cost reseeding, try planting a legume such as crimson clover along with small grains. By planting about 5 pounds of seed per acre, the legume should mature and not hurt the yield of the small grain. In early fall, the clover seed should begin sprouting without hurting the yield of the summer crop.

Crimson clover is one of the best legume cover crops for Southern producers, but it doesn't mature and produce seed before the ideal time for planting most field corn hybrids. However, it matures in time to plant grain sorghum. And it matures in time to help corn, if you plant a tropical hybrid.

Wayne Reeves, a USDA agronomist based at Auburn University, likes this approach. In early October, just prior to harvesting the tropical hybrid, his plot ground was covered with residue of the previous crimson clover crop and with newly emerging clover seedlings.

Hargrove offers another way to get reseeding. It involves killing strips of clover with a herbicide, then planting corn in the killed strips.

Although this allows clover in row middles to mature and reseed, the growing clover competes with young

corn for moisture. So it's probably a good idea to limit this practice to irrigated land.

✓ **Restore Your Soils**

"Cover crops always pay off in the long term," says George Langdale, a USDA researcher at Watkinsville, Ga. He and his colleagues have proved that cover crops go a long way toward restoring productivity to eroded soils. The key is to build up organic matter on the soil surface.

It is difficult to increase organic matter by growing summer crops, but Langdale says you can boost organic matter with winter cover crops.

"This primes the soil's biological system," he says. The result is improved structure of soil granules, more earthworm activity, and more infiltration of rainwater.

Langdale says cover crops need to be grown for at least three years before you begin seeing results of restored soil productivity in crop yields.

University of Kentucky agronomists have obtained impressive results using hairy vetch as a cover before planting corn. Over a five-year period, corn yields increased at a rate of 8 bushels per acre per year, compared to planting into corn residue alone.

✓ **Improve Water Quality**

Langdale says water infiltration is especially important during the summer months when every drop of rainfall is needed for crops to make good yields. Cover crops that reduce runoff will naturally increase water infiltration, and a cover over the soil reduces water evaporation.

Carl Pachek of the SCS in Phoenix, Ariz., has seen cover crops and conservation tillage make a big impact on moisture conservation in cotton fields. He says a ground cover of wheat cools the soil surface and allows farmers to reduce the frequency of irrigation.

"Just by having wheat residue cover, farmers can go for 30 days rather than 14 days between irrigations," he adds.

One amazing aspect of small-grain crops is their ability to recycle nutrients. Grass covers such as wheat, rye, and oats use surplus N applied to previous crops and thus prevent the leaching of nitrates into groundwa-



ter. But legumes make their own N and do little to existing soil nitrates.

So if nitrates show up in groundwater, growing a grass cover during the winter will keep the problem from getting worse. Scientists say cover crops grown for this purpose should be planted as early as possible. Of the grass crops that have been studied, rye appears to be superior in improving water quality, probably because of its deep root system.

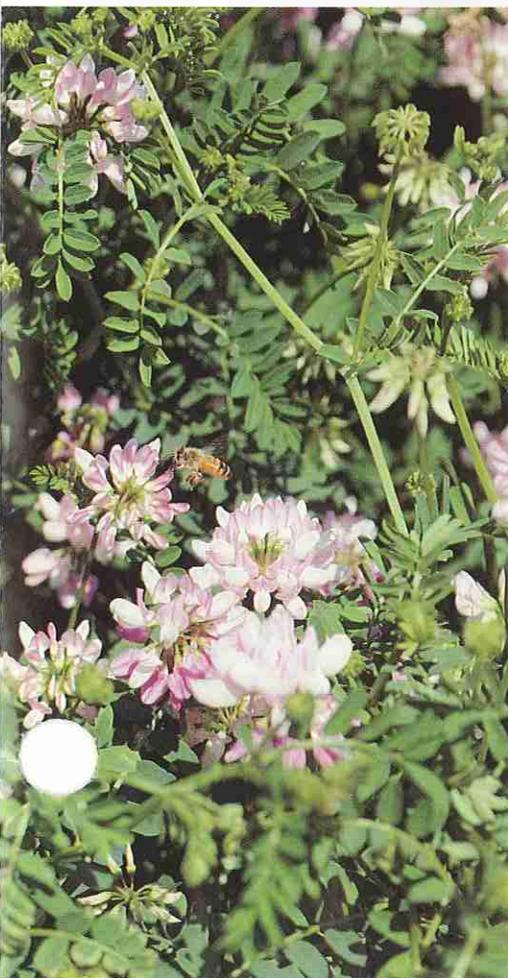
✓ **Get Natural Weed Control**

Cover crops do much more than just shade ground to restrict growth of weed seedlings. Doug Worsham, a weed scientist at NC State, is an expert in the study of allelopathy. That's a fancy name for the acids and other natural compounds that suppress weed germination. These compounds are produced by straw from rye, wheat, and other cover crops.

Cover crops and plant residues may allow farmers to reduce use of preemergence herbicides, according to Worsham. This idea runs counter to the notion that more herbicides are needed when farmers switch to



On the Davis farm in western Oklahoma, strip-tillage equipment prepares a clean seedbed ahead of planting, while allowing wheat cover-crop residue to remain in row middles. PHOTO: KIM ALLEN



(Above) The benefits of reseeding crimson clover can be seen in a corn stand just prior to grain harvest. Note the young seedling clover germinating among the previous year's clover residue.

(Left) Vetch is a legume capable of producing as much as 100 pounds of N for crops that follow. PHOTOS: JOHN LEIDNER

conservation tillage.

"We have grown soybeans, tobacco, corn, sorghum, and sunflowers in killed, heavy mulches of rye without herbicides other than a non-selective one to kill the rye," says Worsham. Early-season control of annual broadleaves such as sicklepod, morningglories, cocklebur, prickly sida, and pigweed has been 80 to 90%.

Among small grains, rye can best suppress weeds, Worsham notes. And among legumes, subterranean clover stands out.

This natural weed suppression is adequate only for the first few weeks of the growing season, according to Worsham. Postemergence herbicides are still needed later.

✓ Plant in Standing Crops

Clemson University researchers have developed special equipment that plants soybeans into standing wheat.

Interseeding takes advantage of the ideal mid- to late-May planting dates for full-season beans.

An added bonus is the establish-

ment of permanent wheel tracks, which go a long way toward reducing soil compaction.

Another benefit is reduced weed competition. Researchers report that most weeds are effectively controlled with postemergence herbicides.

✓ Harvest All the Cover

An obvious payoff from cover crops comes if you can harvest them as grazing, haylage, or hay crops.

But removing the cover also removes nutrients that must eventually be replaced. The Potash and Phosphate Institute reports that a 40-bushel wheat harvest removes about 10 pounds of P and 10 pounds of K. Removal of the straw results in an additional loss of 2 pounds of P and 66 pounds of K.

Also, keep in mind that harvesting cover crops may reduce the ground cover below the critical 30% level needed to qualify as crop-residue management.

✓ New Crops on the Way

There is no one ideal cover crop that will provide nitrogen to follow-

ing crops, while using surplus N applied to previous crops. But some exciting new cover crops are being evaluated.

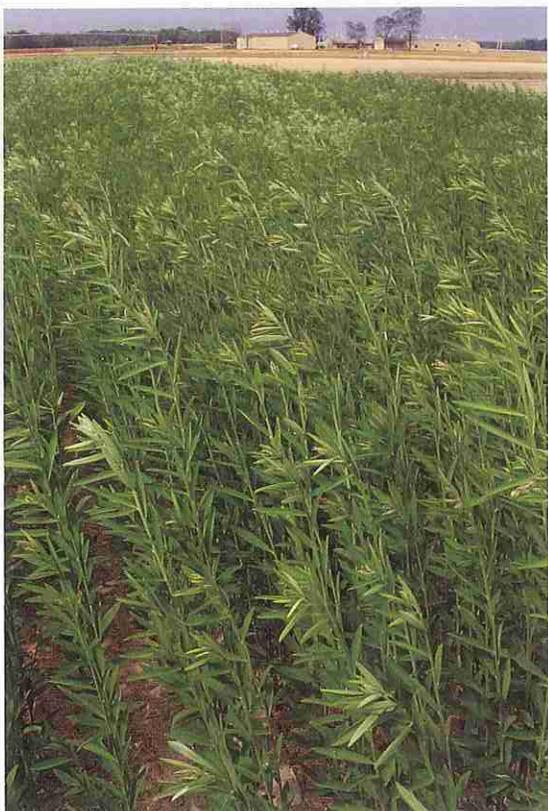
One is sunn hemp, a nontoxic legume related to crotalaria. It's not very cold tolerant, but Auburn researchers have grown 6-foot-tall plants before frost killed them. Lupines also show some promise as grain-producing winter legumes.

The SCS is evaluating early maturing vetches and new varieties of caley peas and button clover. Even weeds give fairly effective cover.

Mississippi SCS conservationists have looked at native cool-season weeds as an alternative to buying expensive grass and legume seed. Using the volunteer weeds eliminated seed and planting expenses and cut the rates of burndown herbicides applied at planting.

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Crop	Seed Cost*	Seeding Rate (Per Acre)	Equipment and Labor Costs (Per Acre)
Wheat	\$ 8.00 per bushel	2-3 bushels	\$8.00
Rye	13.00 per bushel	2-3 bushels	8.00
Oats	6.50 per bushel	3-4 bushels	8.00
Crimson clover	0.95 per pound	15-20 pounds	8.00
Hairy vetch	0.70 per pound	15-20 pounds	8.00
Common vetch	0.75 per pound	40-50 pounds	8.00

*Seed cost includes cost for legume inoculant.
Source: Perry Wilkerson, Soil Conservation Service agronomist

N Source	Costs	Cost Per Pound of N
Ammonium nitrate (34% N)	\$150.00 per ton	\$0.22
Crimson clover (80 pounds N per acre)		
At low seed rate	\$22.50 per acre	\$0.28
At high seed rate	\$27.00 per acre	\$0.34

Source: Perry Wilkerson, Soil Conservation Service agronomist