

A host of benefits from no-till and cover diversity

ALEX MILNER-SMYTH

Using permanent ground cover to manage weeds has led to a significant increase in soil fertility rates for North Carolina farmer Ray Styer.

Maximum biomass production is the primary objective of Ray Styer's operation, which feedlots up to 180 cattle a year on 32 ha near Rockingham, North Carolina.

Originally used to grow tobacco and cotton, the property was home to a dairy farm until Ray moved to the stocker steer business in 1989.

At that time the soil had notoriously low organic matter levels and hard pans consistent with conventional farming practices that included mouldboard ploughing and discing paddocks twice before seeding.

Ray adopted a no-till system in 1994 in an effort to save time and quickly realised he was also seeing soil health benefits and a significant saving in fuel.

The next step was a move to permanent ground cover and integration of cover crops. That was more than 20 years ago.

With cover cropping well established, Ray has stopped applying synthetic fertiliser.

His first venture into cover cropping was a stand of vetch sown to suppress weeds after a crop of corn was forage harvested for silage. Encouraged by positive initial results he experimented with mixes of vetch and rye and a vetch, rye and crimson clover mix in following years.

For the past 12 years he has grown a variety of highly diverse cover crops as an integral part of his rotation, with 'cocktails' of up to eight varieties sown in August using a no-till drill. A common mix includes Abruzzi cereal rye, crimson clover, hairy vetch, Austrian winter pea and radishes, sometimes with canola and turnips depending on seed availability.

Cover is terminated in the middle of April by rolling it with an ancient-looking culti-packer. A follow up dose of glyphosate (1.7 L/ha) is applied for



RAY STYER IN A HEALTHY CROP OF HIGH FEED-VALUE CORN GROWN WITHOUT SYNTHETIC FERTILISER IN A PRODUCTION SYSTEM THAT FEATURES DIVERSE COVER CROPS AND CATTLE MANURE APPLIED EVERY SECOND YEAR.

additional knockdown, as Ray has found legumes especially hard to kill mechanically.

During the third week of April cattle manure from the feedlot is added as fertiliser and Roundup Ready silage corn is planted directly into cover crop residue, with glyphosate applied when the corn crop is about 30 cm high.

With cover cropping well established, Ray has stopped applying synthetic fertiliser.

Initially, he gradually reduced rates of his 'old recipe', which in 1994 was 100 kg/ha DAP plus 200 units of UAN and cattle manure. Then one year the chain on his spreader skipped on the cog and nitrogen was not applied to part of the field. Noting there was no yield penalty where fertiliser wasn't applied, he quit it altogether. "I wondered – if I didn't need fertiliser, why buy it?"

Today he fertilises only with cattle



GLYPHOSATE, APPLIED USING THIS BASIC SPRAY RIG, IS THE ONLY CHEMICAL INPUT TO RAY STYER'S PRODUCTION SYSTEM, THANKS TO HEALTHY SOILS HE ATTRIBUTES TO EXTRA CARBON AND BIOLOGICAL ACTIVITY CONTRIBUTED BY MULTI-SPECIES COVER CROPS.

Input costs – No-till with cover cropping			Input costs – Standard no-till		
Rye	62 kg/ha	\$15	DAP	18 units	\$58
Vetch	20 kg/ha	\$39	UAN	162 units	\$135
Radish	4 kg/ha	\$10	Round Up		\$7
Crimson Clover	5 kg/ha	\$8	simazine & atrazine	2 kg each	\$12
Round Up		\$7			
Planting/ rolling/ spraying cover crop		\$25			
Total / ha		\$257	Total		\$523

(FIGURES COURTESY RAY ARCHULETA, USDA. FERTILISER PRICES BASED ON 2007 VALUES.)



CEREAL RYE, CLOVER, VETCH, PEAS, RADISH, CANOLA ... THE DIVERSITY OF HIS COVER CROPS MEANS RAY STYER'S SEEDER HAS TO BE ABLE TO HANDLE MIXES CONTAINING SEEDS THAT ARE VERY DIFFERENT IN SIZE AND DENSITY.



EXTENSIVE, HEALTHY ROOT SYSTEMS ARE JUST ONE POINTER TO THE ATTRIBUTES OF RAY STYER'S SOILS AFTER 20 YEARS OF NO-TILL AND 12 YEARS OF DIVERSE COVER CROPS.

manure, but only has enough to spread on half his farm each year. However, there is no yield penalty in the crops grown on the area without manure applied that year, indicating the soil is providing adequate nutrition for the plants.

The weed suppression effect of his cover crops has led to a significant reduction in Ray's reliance on herbicides, which formerly included atrazine and simazine. The only chemical he now uses is glyphosate, which he applies at half the recommended rate, mainly to control Johnson grass.

Ray calculates that cover cropping has reduced his input costs by more than 50%, and improved soil health has increased the feed value of his pastures, with acid detergent, fibre, crude protein, total digestible nutrients and net energy of his corn silage all in the upper percentile of the desired ranges.

He has found in recent years that his cattle are putting on more weight in the same time – up to 45 kg more than the 363 kg target weight – which since he is paid per kilogram, means he is making more money simply from increased feed quality.

Ray is certain that cover cropping has contributed significantly to the renovation of his farm's soils. Increasing soil organic matter rates are the driving force behind his cover crops and field observations indicate his soils are able to store moisture.

Before I left his property I asked Ray what his farming neighbours thought of his methods. "They think you've gone crazy, then they want to copy you. It amuses me in a way".

