

No-till: Innovation brings progress

By Izak Hofmeyr

The rise of the no-till movement over recent decades has led to a fresh approach in terms of modifying existing technology and equipment to simplify no-till. This resulted in innovation in multiple areas.

Hendrik Odendaal junior of the farm Klippoort, on the banks of the Vaal River between Standerton and Villiers, says the term 'no-till' should be replaced with the term 'conservation agriculture'. "No-till has evolved over time and no longer describes the philosophy behind the practice."

According to Hendrik, conservation agriculture rests on several pillars, namely:

- Minimal soil disturbance.
- Maximum organic soil cover.
- Building a healthy micro-population in the topsoil.
- Having living roots in the soil year-round.
- Using livestock to deposit manure and urine on the soil.
- Doing away with chemicals as far as possible.

Adaptation of planters

Hendrik believes that modernisation can be seen at each of these points. "Advances were first noticeable in



A new-generation no-till planter.

planters. As fields are no longer ploughed, planters must be adapted to plant fields covered by a layer of organic mulch and with varying soil densities. No-till planters must be adapted to meet these challenges. Equipment manufacturers all approach these challenges differently.

"The new planters must be equipped with blades that can cut through the organic mulch layer. The pressure on each planting unit must be controlled to maintain uniform pressure across all planting units. Furthermore, each planting unit must be able to distribute seed evenly and at a consistent depth, despite varying soil densities."

He explains that the aim during planting is to allow every seed to germinate within 24 hours of one another. This can only happen if all the seeds are planted evenly and uniformly.

Compacted soil layers

The second aspect to be modernised is the way compaction layers in the soil are addressed. Initially, the use of a tine implement was considered inevitable. However, with the development of new cover crop cultivars, the trend is to penetrate and counteract compacted layers slowly and deliberately. The

roots of different cover crop species, each of which react differently in the soil, is used to accomplish this task.

According to Hendrik, this new approach is still in its early stages. "Its effectiveness will have to be proven over time. Yet initial results are very positive. When studying such a compaction layer, small roots that penetrate the soil are visible. These roots will hopefully form channels that new plants with larger and stronger roots can utilise to break through the soil.

"You need to maintain a balance between the economic realities, which make a good crop non-negotiable, and long-term goals to enhance your soil structure."

Structure of soil

He says one of the key goals of conservation agriculture is soil structure development. "Soil structure development is based on minimal soil disturbance and having green, photosynthesising plants on your fields for as long as possible. In addition, the organic mulch layer on the soil must be built up and the livestock factor incorporated into your management.

"However, all these elements are subject to the farmer's ability to adapt. Nothing is set in stone. The farmer must



A luscious multi-species cover crop stand.



Cattle on a cover crop in a high-density grazing system.

be able to apply the principles in different ways depending on circumstances.”

Cover crops have been in use for some time and their existence is certainly not due to conservation agriculture. However, conservation agriculture has provided the impetus for the development of various new cultivars.

Use of chemicals

The use of chemicals – such as fertilisers, fungicides, insecticides and herbicides – is another area in which a marked change occurred.

Hendrik says using cover crops in rotation with a row crop such as maize, wheat or soya beans has a noticeable effect on the soil. “The field gets a chance to rest because no chemicals are used when planting a cover crop. We find that predators

and beneficial insects found on the plants, multiply rapidly. We also see an increase in fungal and dung beetle activity, and earthworms returning in large numbers.”

Even distribution

While there are no dedicated combines for no-till, combine heads had to be adapted to accommodate narrower planting rows. Heads that can handle any row width and harvest across rows have now been developed.

One of the requirements of a combine under no-till conditions is that maize residues need to be distributed as evenly as possible on the soil after the cobs have been removed. Combine heads have been adapted to meet this requirement. Plant material is distributed as evenly as possible during harvesting

to prevent too much variation (density and depth) in the mulch layer.

Although portable electrified fences are not a new concept, the increasing focus on conservation agriculture has led to innovation in this area. The accompanying effort of providing cover crops to cattle in a high-density grazing system, was a contributing factor.

“One of the forerunners in the development of this technology was André Lundt of Beaufort West, who developed it to suit veld conditions in the Karoo. His patents or variations thereof are increasingly being marketed by manufacturers on a commercial scale.

“Examples include solar-powered pulsators of different capacities, material for fences, portable poles, pulleys that can be used to roll up fences, and electronic gates to simplify the movement of livestock,” he says.

Marketing of livestock

One last aspect to consider is marketing opportunities for cattle, which is likely receiving more attention in the United States (US) than locally. Because cover crops ensure the year-round availability of good feed, the US market for so-called ‘nutrient-dense food’ has developed by leaps and bounds.

According to Hendrik, the Americans utilise cover crops to meet the growing demand for healthy food, known as nutrient-dense food. “These types of food allegedly have several health benefits for humans. Naturally, the origin of this food is traced.

“What the livestock that eventually end up as meat on consumers’ plates are fed, plays an important role in classifying those meat cuts as nutrient-dense food. The carbon footprint associated with the production process is also a contributing factor. However, we will have to see if this movement gains traction in South Africa on a large scale.

“There is also the issue of livestock production’s carbon footprint. In this instance conservation agriculture can potentially create a carbon-neutral footprint, which may even develop into a positive carbon footprint over time,” he says. 🌱

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A combine head that can harvest across rows.