RADIUM Engineering

summer '11 NEWSLETTER

January - April 2011

Advanced technology

ploughed into SA farming market by Radium

Radium Engineering has developed a cost-effective tillage solution that complies with increasingly-stringent environmental legislation.

Figure 1: 17 Tine Trailed Combination Ripper

A revolutionary new tillage machine, which is specifically-designed to increase soil productivity, has been introduced to the South African farming industry by specialist agricultural engineering firm, Radium Engineering.

The Pretoria-based company, which has been manufacturing and supplying agricultural machinery nationwide since 1976, has launched the state-of-the-art Radium Combo Ripper, a cost-effective soil preparation machine that minimises the damaging effects that ploughing and turning have on soil.

The machine is an upgrade of Radium's tried-and-trusted heavy-duty chisel plough – with coulters added to the front in order to cut through surface debris so that the tines and hammerhead sheares can pass through the soil without packing, as well as a roller on the rear to level out the worked area and to break up unwanted clods.

Radium Engineering general manager Grant Roest explains: "Conventional, intensive tillage farming systems have greatly-increased crop production

To page 2

In this issue ...

Radium Engineering 30 Third Street, Babelegi, Hammanskraal
Tel: 012 719 9062/3
Fax 012 719 9064
Email sales@radium.co.za
www.radium.co.za

From page 1 **Advanced technology**

and labour efficiency. However, serious questions are being raised about the energy-intensive nature of these systems, and their adverse effects on soil productivity and environmental quality. By making use of Radium Engineering's new Combo Ripper, farmers can more effectively reduce soil erosion in the long-run and; ultimately, improve soil productivity. The machine is also designed to eliminate operations such as discing and cultivating."

The Combo Ripper has been designed to:

- compliment natural soil biodiversity,
- create a healthy soil micro-environment that is naturally aerated and able to receive,
- hold and supply available water to plants, and
- provide enhanced nutrient cycling; thereby, enabling the decomposition of organic materials.

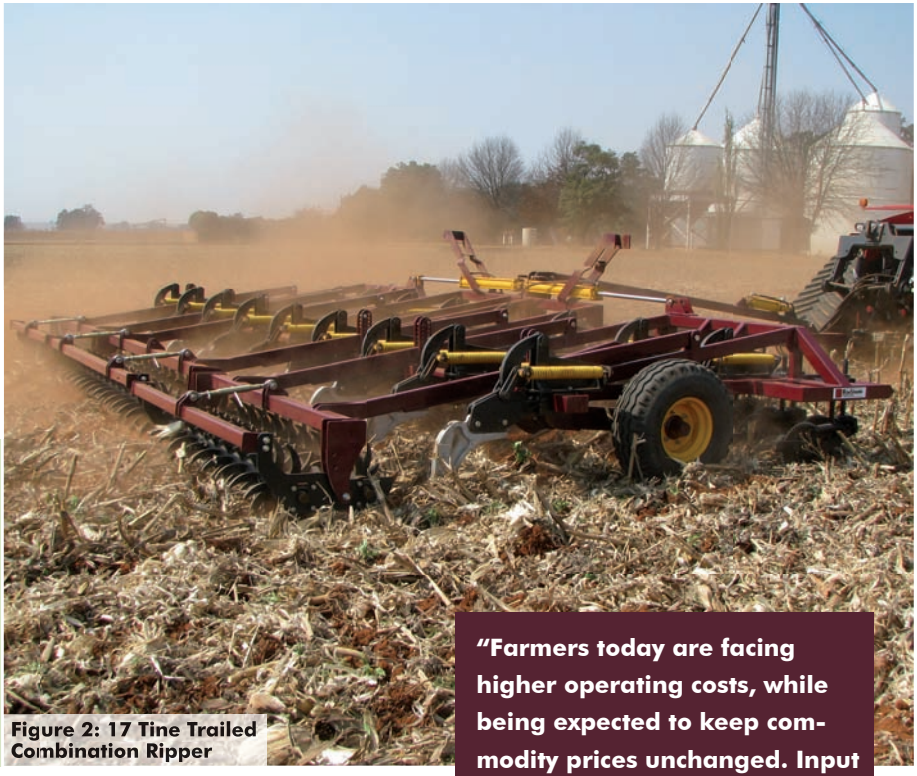

Figure 2: 17 Tine Trailed Combination Ripper

"Farmers today are facing higher operating costs, while being expected to keep commodity prices unchanged. Input costs; therefore, need to be reduced to remain profitable in the long-run, and the minimum-tillage Radium Combo Ripper is the perfect solution to this problem," says Roest.

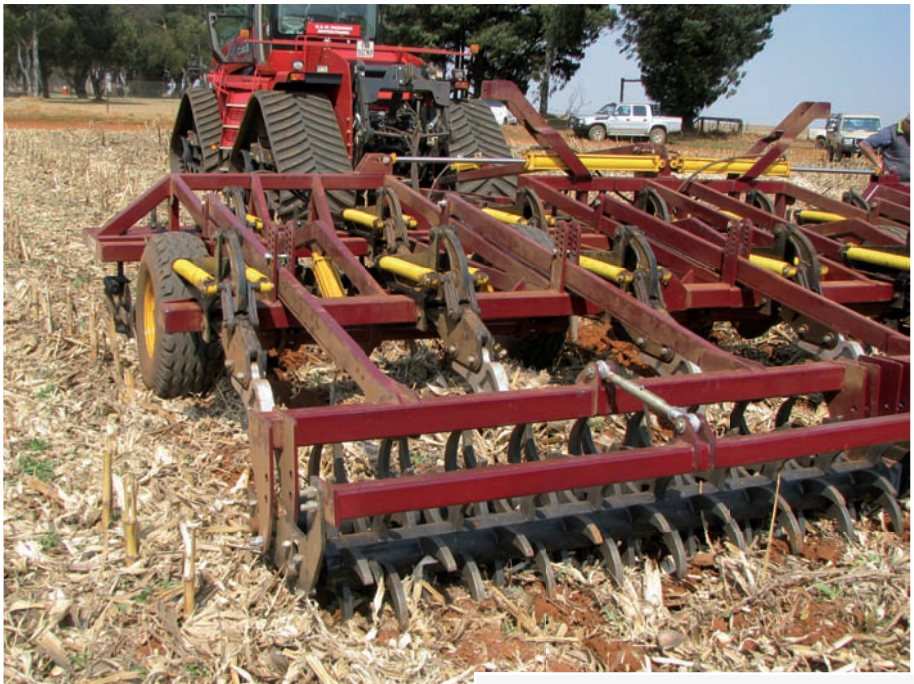

Figure 3: 17 Tine Trailed Combination Ripper

All Radium Combination Ripper models are trailed, while ridged models are available from 5 tines to 17 tines, or 2.5m to 8.5m. Hydraulically-folded models range from 15 tines to 21 tines, or 7.5m to 10.5m. Standard features on the Combo Ripper include hydraulic levelling, heavy-duty axles, hammer-head shears and 500 mm tine spacing. The machine can be built-up from a basic ridged machine, to having coulters every 500 mm or 250 mm, with a standard crumbler roller or dual-acting finger-roller. ■

Roest points out that the machine does not compromise on working depth, working width and tractor horse-power. "The number of coulters is increased up front by having one placed every 250 mm in a staggered configuration to increase the effective cutting of any leftover material on the lands," Roest explains. "Radium's heavy-duty chisel plough was incorporated with a lengthened frame and 500 mm tine spacing to increase and improve material flow and to increase the working width."

Roest notes that the new chisel plough tines also allow the farmer to work up to depths of 500 mm. "What's more, Radium has also developed a double-acting roller, equipped with numerous hard-wearing fingers that pass through each other in order to prevent any packing of the soil," he concludes.

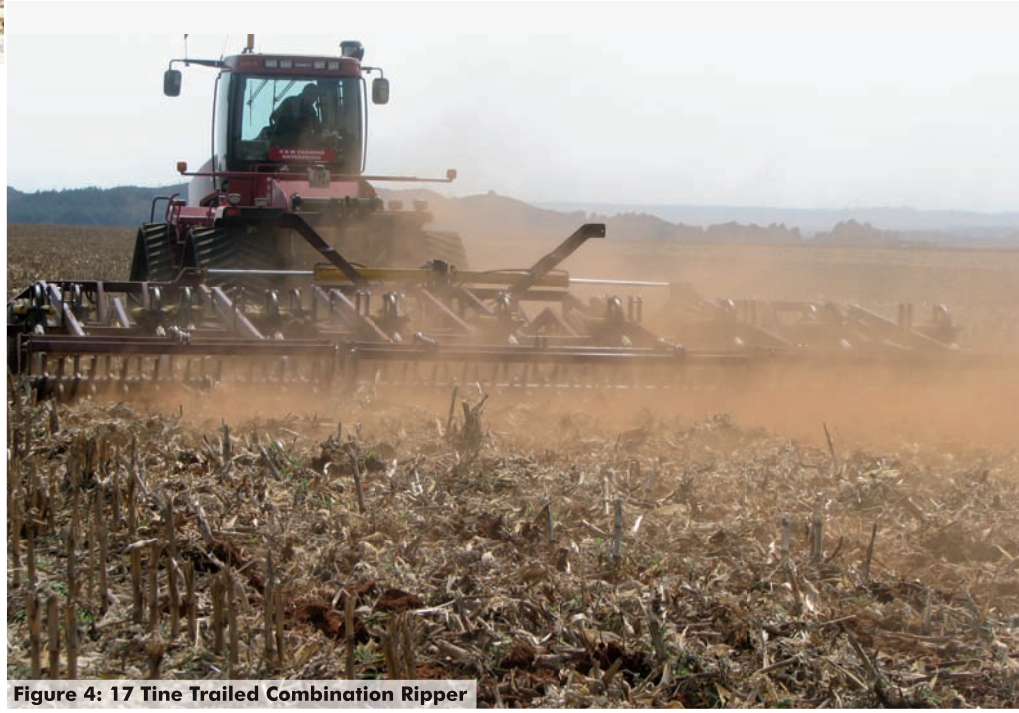

Figure 4: 17 Tine Trailed Combination Ripper

Biological farming:

Re-balancing the soil

The term "biological farming" is at first glance contradictory, because farming in fact always has to do with the health of the soil, plants and animals. However, many farmers know from bitter experience how many things can go wrong in their lands. Global warming and the dangers of greenhouse gases together with the overuse of manmade chemicals and abuse of the earth have placed the spotlight on a return to an earth-friendly approach to farming.

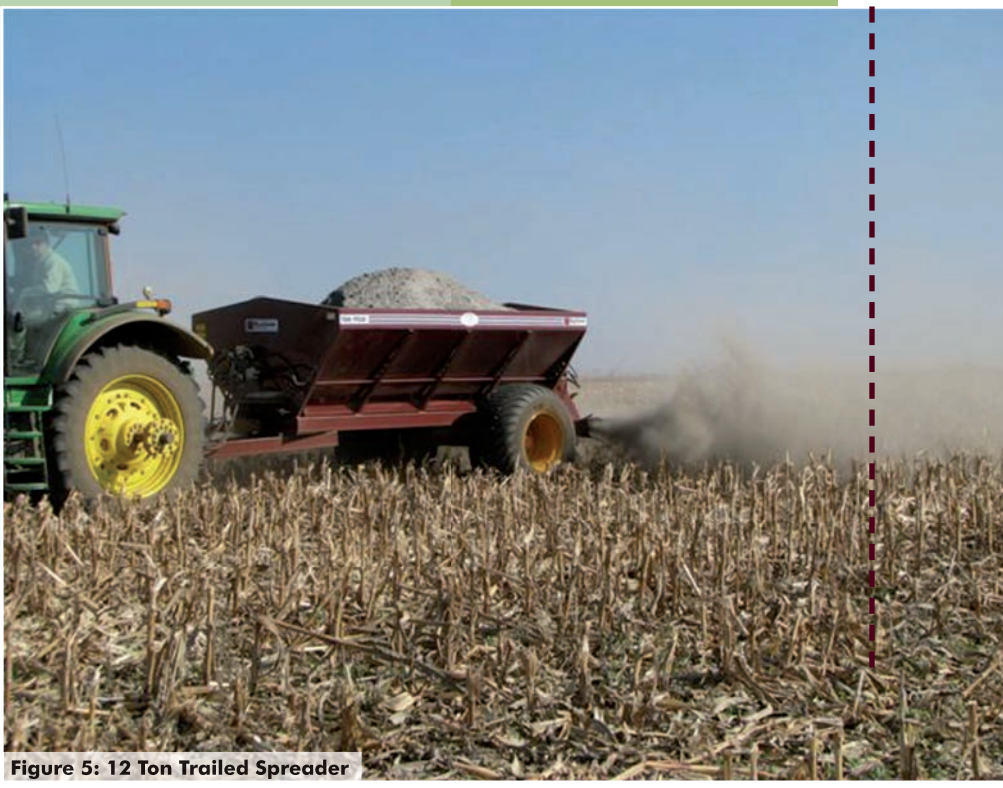

Figure 5: 12 Ton Trailed Spreader

Generations of farmers have intuitively followed biological farming approaches. Nowadays, biological farming is a focused method that uses nature and science to build the quality of the soil, with the logic that healthy soil will be able to support healthy crops and livestock. A farm's productivity and yield is in direct proportion to the number, activity and balance of soil organisms (*American Journal of Alternative Agriculture*, 1992:7). A balance between effective farming methods, the use of fertilisers and agricultural equipment, and scientific knowledge is essential. Balance is the key to successful biological farming.

Successful bio farming consists of:

- Increasing soil cover and organic matter
- Balancing soil nutrients
- Using environmentally friendly sprays and fertilisers
- Correct tillage operations

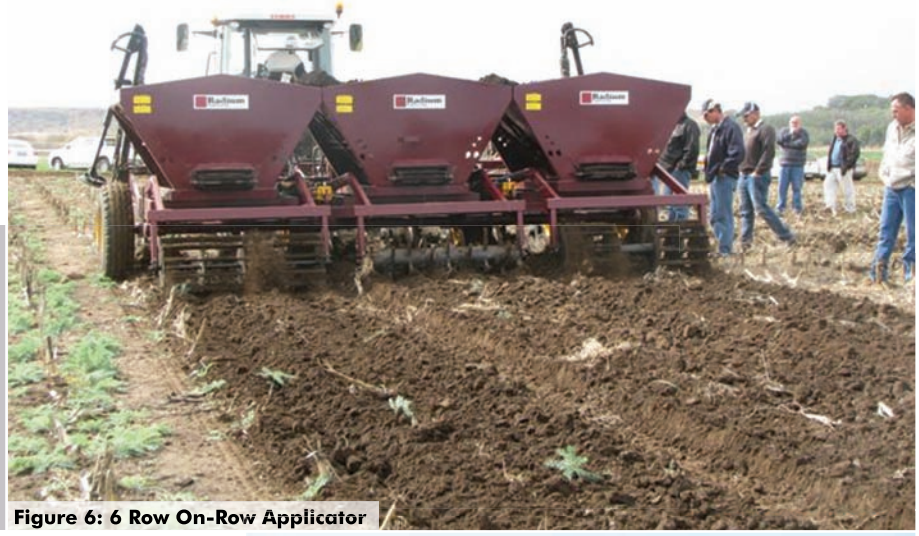

Figure 6: 6 Row On-Row Applicator

Skilful biological farmers have learned how to grow and make their own fertilisers, using animal and green manures. They know what fertilisers are environmentally safe and work best on their farm. They follow practices aimed at encouraging living organisms to live in the soil. However, the soil balance is often ruined by the excessive use of chemical fertilisers and pesticides. It can be restored with the use of beneficial, naturally derived fertilisers (*Journal of Agriculture, Ecosystems and Environment*, 2007:118).

An ecological or sustainable Agri-system maintains the resource base upon which it depends. The ecological use of soil, water and non-renewable resources consists of a number of interlinked processes. The farmer uses all off-farm input such as chemicals and machinery efficiently. Leakages or losses are found and eliminated, erosion is managed, and the quality of the soil is maintained or enhanced. The informed farmer is aware of and attends to risks of environmental degradation through water pollution and emission of

To page 4

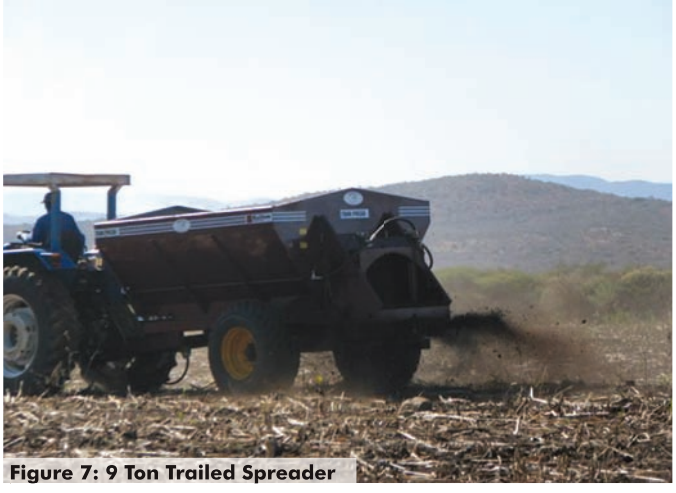

Figure 7: 9 Ton Trailed Spreader

From page 3 **Biological farming**

greenhouse gases into the atmosphere (*Food and Agriculture Organization*, 1993; Agricultural Systems, 2001:68).

Healthy soil is made up of a balanced mix of organic particles that serve as plant food, and living organisms such as bacteria, fungi, algae and earthworms. These living organisms process and decompose the inert mineral and organic materials, which feed the plants. An ideal productive soil contains a perfect balance of inorganic minerals, organic (carbon-based) materials, and living organisms, all enclosed within a physical structure that absorbs and holds water to enable natural chemical reactions that feed plants perfectly. Nutrients in the soil need to be exchangeable or available [*Journal of Renewable Agriculture and Food Systems*, 2009:24(4)].

Using the correct tillage equipment is essential for preserving and improving the health of the soil. Tillage should not disrupt the basic composition of a good soil. Good tillage limits disturbance of the micro-organisms and leaves a maximum area intact so that moisture is not lost unnecessarily (*Journal of Agricultural and Biological Science*, 2010:5). Radium Engineering partners the farmer with its chisel ploughs, rippers, on-row applicators and fertiliser/lime/organic material spreaders which are scientifically designed and tested to obtain the maximum yield in the most ecologically sound way.

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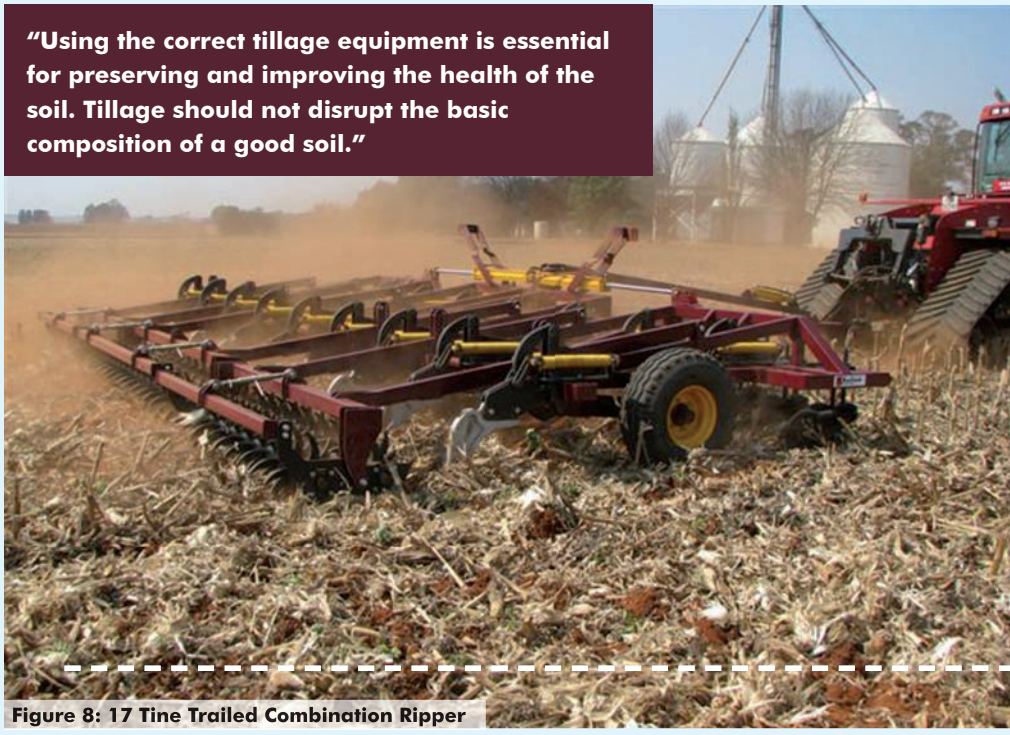

Figure 8: 17 Tine Trailed Combination Ripper

Figure 9: 17 Tine Combination Ripper

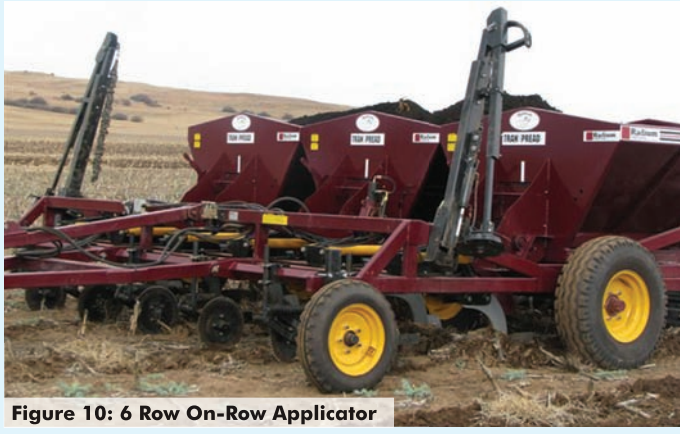

Figure 10: 6 Row On-Row Applicator

Radium's heavy duty chisel ploughs in conjunction with their hammerhead shear work the soil profile with minimal disturbance to the micro organisms. The principle of the hammerhead shear is that it lifts the soil only two inches and as the soil flows over the shear, the soil breaks into its natural state.

With Radium's PowerZone models, the farmer is able to work only the soil in the planting zone, leaving the soil in between each zone undisturbed. This encourages faster movement of the micro-organisms back into the worked area and also allows the farmer to work a greater area with less energy (kilojoules).

Radium has over the last 15 years manufactured the Transpread spreaders which have unrivalled spread ability and versatility. They are able to apply most materials consistently and evenly across the land surface, and have standard high flotation wheels that ensure that the least possible soil compaction occurs during spreading operations.

The Radium on-row-applicator was introduced in 2009. It is a very efficient piece of equipment that allows a farmer to work on the 'planting' row up to 450mm deep and at the same time apply organic fertilisers to a required depth – generally between 80 and 150mm – thus reducing the volume of organic materials by placing the materials where the organisms can best utilise them as well as reducing conventional operations thus reducing the traffic over the lands.

Farming the biological way makes economic sense (*Scientific American*, 1990). The use of expensive fertilisers and pesticides are reduced, as the plants are healthier and disease and pest-resistant. The benefits are endless, for example healthier stock, increased nutrient cycling and increased soil/water-holding capacity. The biological approach to farming yields soil that is healthy and capable of supporting healthy, nutrient-dense crops. Nutrient-dense crops contain higher concentrations of plant sugars, minerals and amino acids, which make them nutrient-rich and extends' their shelf life.

Biological farming is by no means the most stress-free method of farming, but the results are worth it. Following a biological approach means that nature will always be there to lend a hand; and with Radium Engineering's innovative concepts and products the farmer can be assured that during the biological practices taking place on the farm, the farmer will have reliable products and unrivalled service from the Radium team. ■

Figure 11: 17 Tine Trailed Combination Ripper