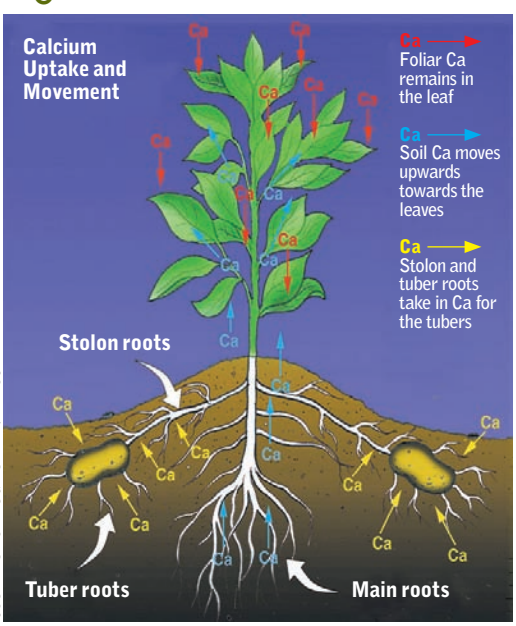
ABOVE: A fertiliser spreader at work. COURTESY OF AMAZONE

Figure 6



COURTESY OF HUGH SMITH/KYNOCH

in the 2009/2010 summer 8,9% more and in the 2010/2011 summer 1,4% more.

In another study by Dr Farina (***see Figure 3***), it was found that in the uncovered land, the percentage of moisture content in the topsoil to a depth of 60mm was 7,7% 28 days after planting; 7,2% 73 days after planting; and 12,9% 135 days after planting.

The results in the covered land were significantly better: 95%, 90% and 61% more moisture respectively.

EARTHWORMS

Figure 4 shows the results of an earthworm study by Dr Farina. During the 2009/2010 summer season, the uncovered soil contained 4,75 earthworms per square metre, while the covered soil had 22,1 earthworms per square metre – a 365% difference. Over the 2010/11 season, the difference, as can be seen, was 191% in favour of covered soil.

As part of the study, it was demonstrated that during the 2009/2010 season, 20ℓ of water took 13,6 minutes to infiltrate uncovered soil while the same amount of water took just 3,8 minutes to infiltrate covered soil – a 257% difference. During the 2010/2011 season, the contrast was even more dramatic: the water took 70,5 minutes to infiltrate uncovered soil and only 13,1 minutes to infiltrate covered soil – a 438% difference.

Dr Farina also found that a maize crop grown in soil that had previously had its soil cover burned off by a runaway fire yielded 3,1t/ha compared with 9,4t/ha yield of maize in a section of the same land that had not been burnt (***see Figure 5***). Also, it took 20ℓ of water 52 minutes to infiltrate the burned section while it took just

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BIO MONITOR

Sunflower gene to boost soya bean

WYNAND VAN DER WALT

Argentina has suffered drought in recent years, with this past summer being particularly severe.

Now ongoing research by Argentinian scientists has provided a solution to drought damage in soya beans through the insertion of a well-studied gene from sunflowers.

Soya beans, Argentina's biggest cash crop, have established the country as the largest international supplier of soya meal and oil, and the third-biggest exporter of soya beans.

The drought damage in 2008/2009 reduced the soya bean crop by as much as 37%.

Sunflowers have more built-in tolerance to heat and water stress, and a specific gene, coded HAHB4, has been identified as the major contributor to this tolerance.

The gene produces a protein of so-called HD-Zip proteins that respond to drought stress by assisting with the uptake of zinc, an essential trace element required for plant cell growth.

In green plants, carbonic acid is chemically converted into CO_2 by way of a zinc enzyme.

The sunflower drought-tolerant gene had been studied by various scientists and a team of Argentine researchers took the process further by first inserting the gene into *Arabidopsis*, a model plant for genetic studies as it was the first to have its genetic code sequenced.

The team then signed an agreement with an Argentine biotech company, co-owned by 230 farmers, for further technology development.

The gene was inserted into soya beans, wheat and maize, and initial results showed increases in yield of between 10% and 100%, depending upon the severity of drought.

- *Source: AFP and Jour. Exp. Bot.*
- *Email Wynand van der Walt at farmersweekly@caxton.co.za with 'Biomonitor' in the subject line.* ■FW