

# Potassium for soya beans

By the Potash and Phosphate Institute (PPI)

*No other crop produces protein like soya beans, in both quantity and quality. It is therefore not surprising that hectares planted with soya and production continue to grow. As with many high-protein crops, soya beans are rich in potassium. It is important to consider replacing what soya beans remove.*

The North American soya bean crop removes more than twice as much potassium as it receives in the form of fertiliser. Every bushel (27,2kg) contains almost 800g potash. Planted following maize, the high removal has rarely been a problem, as maize leaves behind more than two-thirds of the potassium it takes up from the soil. The potassium left behind becomes available when rains between growing seasons wash it out of the crop residues and back into the soil. However, the incidence of soya beans following crops other than maize is increasing.

Potassium fertility therefore needs more attention. It is often observed that soil fertility determines only a small part of yield for a successful soya bean crop. That is true when soil fertility has been managed well for maize. Yet as new rotations involve potassium-hungry soya beans

more frequently, the importance of soil fertility will be increasing.

Conservation tillage systems also change potassium needs. In such systems, potassium builds up near the soil surface and is depleted further down. In addition, soils may become more compacted and cooler, restricting root growth. With less roots exploring the soil volume, potassium uptake can be reduced. In clay-textured soils, wet or flooded conditions can make potassium less available by increasing soil fixation.

### Increased resistance to pests

While soya beans will respond to broadcast potassium, they respond more often when the fertiliser is placed in a band a short distance away from the seed. The most frequent responses in Iowa and Minnesota have occurred with deep banding, where potash have been placed approximately 15cm deep.

In other areas, responses were more common when the band was 5cm away from and 5cm below the seed. Fertiliser in the seed furrow does not work well. Soya bean seeds are sensitive to fertiliser salts, even with the sulphate sources that have a lower salt index.

Potassium increases plant resistance to pests and diseases that often reduce soya bean yield and quality. When soya bean plants have a low potassium status, their ability to assemble proteins from

amino acids is reduced. The amino acids that accumulate make the plant more attractive to pests and disease organisms. Higher potassium levels can reduce pod rot and purple seed stain. Maintaining high soil test levels is part of an effective management strategy to reduce the impact of the soya bean cyst nematode.

### Replacing potassium is key

Deficiency symptoms are often confused with other crop stresses. Soya beans affected by ozone air pollution, leafhoppers, or cyst nematodes often show the same yellowing of leaf margins that potassium deficiency produces. Diagnose the real cause with soil and tissue tests for potassium.

Soya beans often respond to the residual potassium applied to previous crops. Even where soya beans do not respond directly to applied fertiliser, it is worth considering for the crop that follows. Base your decision on up-to-date, site-specific soil tests, and don't forget to include any diagnostic observations from last year's crops.

Replacing the potassium that soya beans remove is a key component of long-term stewardship of soil fertility. 🌱

For more information, contact Dr Tom Bruulsema, Eastern Canada and Northeast US Director, PPI, at [tom.bruulsema@ppi-far.org](mailto:tom.bruulsema@ppi-far.org).