

## **Future Directions for Soybeans on NSW North Coast**

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In the proceedings of the previous Australian Soybean Conference in 2000, the history and current status of the soybean industry in the NSW northern coastal area were discussed (Desborough, 2000). The future direction of the industry was outlined, using the information and trends existing in 2000. In this paper, I intend to revisit these topics and see where the experiences over the three seasons since that conference have led to changes in our thinking and what our predictions for the soybean industry in this coastal area are for the next five years. These were, as stated in 2000:

*The coastal region should become the principal crushing bean area in Australia, but should also develop a dual role in providing some high quality, light hilum culinary soybeans. With the development of earlier maturing varieties, the industry can expand more rapidly further south along the coast and into higher rainfall Tablelands areas. Insect, weed and disease control needs more attention, both from research and producers, and the benefits of the current production systems need to be better promoted. Coupled with this, more R&D is required into the non-soybean components of the rotations, such as winter cereal production, pasture species selection and integration of soybean into sugarcane.*

### **The Current Soybean Industry**

On the North Coast of NSW, raingrown soybeans have been successfully integrated into agricultural systems for the past thirty years. These systems include the beef, sugar and cropping (maize and cereal) industries. It is this diversity of enterprises that has been a major contributor in this region to the stability of soybean production, relative to other soybean producing areas of Australia. Traditionally, only dark hilum varieties have been grown, possibly because good weathering tolerance had not been available in a light hilum background. Varieties suitable for the culinary markets grown elsewhere proved to be risky without strong weathering tolerance.

Sugar cane is a major crop in the region, being produced in the near-coastal areas of the three northern river valleys (Tweed, Richmond and Clarence). The opportunity to grow soybeans has increased as the number of ratoon crops possible from modern sugar cane varieties has decreased. Sugar cane is usually harvested each two years (Richmond and Clarence) with one or two ratoon crops, followed by a fallow for one year. Traditionally, green manure crops, such as lablab, have been used in this fallow period, but increasing numbers of growers are sowing soybeans for grain production. Soybeans can be very profitable in this rotation, where high rainfall and moderate temperatures can result in high yields (frequently 4.5 to 5.5t/ha). Input cost are mostly low compared to other soybean areas, with no fertiliser used and herbicide infrequently needed. Improvement to soil structure, as sugar cane operations can lead to decline, and nitrogen residual are most often quoted as the main benefits from soybeans. The occasional loss of a soybean crop from excessive wet weather or flooding is not viewed as much of a disaster as in other areas due to the beneficial effects on the following sugar crop. Benefits often quoted by growers are approximately 40 kg/ha of nitrogen carried over to and 20 t/ha yield increase in the next sugar crop.

Growing soybeans are a proven way on the North Coast to obtain better quality cattle feed and make money at the same time from cash crops. Soybeans have been grown very successfully on all but the poorer soil types in this area over the past twenty years, including no-tilled crops in hilly beef country. The beef cattle rotation program (coined Beef 'n Beans) commences with the no-tilling of soybeans into run down or unimproved pasture. Due to the high rainfall of the region and the opportunity to double crop, the soybean crop is followed by either a forage (ryegrass, oats or a mixture) or cereal grain crop (barley or triticale) in the cool season. These can be either aerially sown or no-tilled after harvest. This program is repeated for 3 years then sown to an improved pasture mix, using perennial summer grasses such as kikuyu, Rhodes grass or setaria, plus legumes such as white clover. Fertiliser inputs can be high on these low fertility soils, with as much as 1500kg/ha of superphosphate and 100 kg/ha of muriate of potash over the three soybean crops. The major attraction of this system is that the soybean crop is self-funding, at the same time covering all fertiliser inputs for the forage and pasture phases, meaning cash flow is maintained. Pasture improvement programs without soybeans require large cash outlays on seed and fertiliser, which can take longer than 5 years to recover through cattle sales, even longer if cattle prices are depressed.

On the more traditional cropping country, mainly on alluvial soils of the river valleys, soybeans have been grown for over 20 years. Winter crops, such as barley for grain and oats or ryegrass for grazing are frequently double cropped with soybeans. Maize is often used as an alternative summer crop to break disease and weed cycles. The alluvial soils in these areas are capable of high soybean yields (4 to 5 t/ha), as long as rainfall is favourable. No-till is not required to lessen soil erosion on these relatively flat areas, but has been shown in long term trials at Grafton to have major benefits in terms of soil structure and moisture conservation

Much of the strong confidence in soybeans in recent years can be attributed to weathering tolerance in the varieties used in the majority of sowings. These varieties, bred and released by NSW Agriculture, are Dune, Manta, Zeus and Poseidon. They show high tolerance to pre-harvest weather damage in an environment where wet weather at harvest time in April-May can be, and has been in the past, a cause of extensive crop losses. Prior to the availability of weathering tolerance (pre-1991), losses of this nature, particularly in consecutive seasons, lead to serious declines in confidence and areas sown. No such decline, rather a major increase, occurred after the very wet harvest of 1996.

### **Current factors influencing soybean production**

In recent years the major factors influencing the area of soybeans in coastal NSW has largely been influenced by price and weather. The returns from soybean have been depressed since 2000-01 with lower world prices, with many growers seeking alternative crops (maize) or concentrating more on beef cattle production, no doubt helped by buoyant beef prices. Whilst weathering tolerance has been one of the major selection criteria for coastal varieties, recent seasons have been characterised by droughty conditions rather than wet harvests. In fact 2002-03 has seen the driest start to any season since soybean cultivation started 30 years ago, with estimates of sown area less than 3,000ha. Most of this area is in rotations with sugarcane, close to the seaboard where rainfall has been higher.

The first significant occurrence and loss in coastal NSW soybeans from silverleaf whitefly in 2001-02 has raised another issue that may have considerable influence on future soybean acreage (discussed more fully earlier in this conference). However, it is impossible at this

stage to predict what effect this pest will have in subsequent seasons and in which areas. The initial problem was only in areas very close to the seaboard and it is not known whether the significant damage will spread further inland in the future.

The release of Cowrie soybean in 2002 will be a major boost to culinary soybean production in coastal areas, once normal seasonal conditions return. Cowrie is the first variety released that is suitably adapted to the coastal environment and is already receiving good acceptance by the soymilk industry. Further gains can be made in breeding with the objectives of increasing weathering tolerance and a wider range of maturity. Cowrie needs to be sown in early-mid December on the Northern Rivers, which means there is a requirement for a soymilk variety able to be sown late December to early January. Significant advances have been made by the two soybean breeders in lifting weathering tolerance in light hilum genotypes.

Programs to promote soybean production in coastal areas will have significant impact when conditions conducive to their uptake are present. These include favourable seasonal conditions and commodity prices. Another factor that will have considerable bearing on the shape of the soybean industry in the next five years is the requirements listed in the various Catchment Management Blueprints. Fortunately, the soybean industry has a good track record in adopting sustainable practices, such as no-till, IPM and sensible rotations and should not have great difficulties in satisfying these requirements.

### **The Future**

Given a return to more favourable seasons (weather and prices) over the next five years, the area sown to soybeans will increase markedly in the coastal and favourable Tableland areas of northern NSW. The benefits of having a well adapted and lucrative cash crop in many of the important agricultural and grazing industries will ensure this. Variety releases over this period will concentrate on culinary types, as well as being suitable for crushing soybeans. The emerging organic market will grow rapidly, catering for the increased demand for this product.

### **Reference**

Desborough, P.J. (2000). Soybeans in coastal New South Wales. Pp 14-16. *In* Proceedings of the Eleventh Australian Soybean Conference