EXPERIENCES OF GROWING SUNFLOWER IN NORTHERN NSW, AUSTRALIA

Loretta M. Serafin, NSW Agriculture, PO Box 546, Gunnedah NSW, 2380 Australia
E-mail: loretta.serafin@agric.nsw.gov.au

Stephanie C. Belfield, NSW Agriculture, PO Box 209, Moree NSW, 2400 Australia
Email: stephanie.belfield@agric.nsw.gov.au

Abstract

New South Wales is the second largest producer of sunflower in Australia. However, sunflower (*Helianthus annuus* L.*)* production area in northern NSW has been declining despite sunflower yields increasing since 1980. This has led to a decline in exports and production tonnages not meeting domestic demand. An outline of the farming systems of northern New South Wales, Australia establishes the suitability of a larger sunflower industry to this cropping zone. Agronomic practices of the last decade are compared to current practices from the 2003-4 season based on data collection from seventeen commercial crops. Data collected from crops includes plant population, plant height, head diameter, row spacing, sowing depth, fertiliser application, paddock history and weed species. Preliminary analysis of this data suggests there is no correlation between plant height and head diameter at physiological maturity. Data collated shows variation in established plant populations, weed density and weed species between cropping regions. This paper also discusses current limitations to the expansion of the sunflower industry and makes recommendations for the future of the industry.

Introduction

The Australian sunflower industry is centred in the two eastern states of Queensland and New South Wales. Other states including Victoria and South Australia make only a minor contribution to annual production.

Australian sunflower acreage in the period between 1991and 2003 has fluctuated dramatically between states and years as shown in Figure 1. Of concern is the marked decline in area since the peak of 167,000 ha in 1998/99.

New South Wales is the second largest producer of sunflower, contributing a significant proportion of the overall production in Australia. Production in NSW is centred in the northeastern cropping zone, around the towns of Moree and Gunnedah. Isolated pockets of sunflower production occur in other parts of New South Wales, however these are very minor.

Results and Discussion

Northern New South Wales: The Farming System. Moree (Lat. 29”28’ Long. 149”50’) and Gunnedah (Lat. 30”58’ Long 150”14’) are similar sized country towns, located 750 and

550 km respectively northwest of Sydney surrounded by diverse agricultural cropping activities. The average annual rainfall in Moree is 584 mm with an elevation of 212 m; Gunnedah has a slightly higher average annual rainfall of 620 mm and a higher elevation of 306m. Both areas are in the summer dominant rainfall zone of New South Wales, where high intensity summer storms are common.

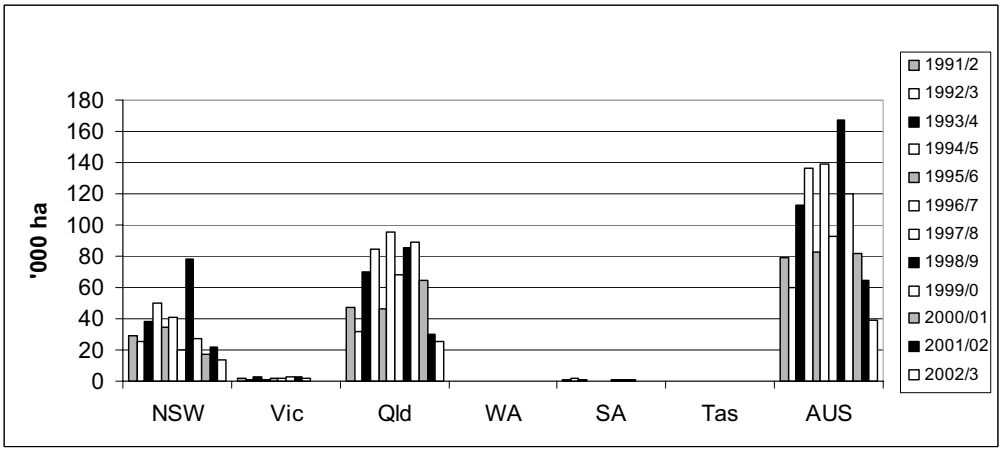

Figure 1. Sunflower production in Australia, 1991-2003. Source: Australian Commodity Statistics (1998) and NSW Grains report (2000-2003).

The dominant soil types are black and grey vertosols which have high water holding capacities, of the order of 200-300 mm of plant available water in 1.8m of soil (Dalgliesh and Foale, 1998). These soils have an alkaline pH in the range of 7- 9 (CaCl2) and an ability to crack and hence repair themselves which aids in alleviating compaction, increasing water infiltration and also in some instances allowing them to fill 'from the bottom up.' In addition these soils are highly erodible; hence stubble retention is critical.

Climate in northern NSW is typified by high summer temperatures, high evaporation rates and summer storms. Moree has a hotter, drier climate than Gunnedah which usually equates to a lower yield potential and oil content in sunflower and in most oilseed crops.

The farming systems in these areas have largely progressed to minimum and zero tillage, with stubble retention to provide ground cover. Typical rotations include wheat, sorghum and chickpeas in the Moree district and wheat, sorghum and canola in the Gunnedah district, with sunflowers being incorporated usually following wheat or sorghum.

The potential to double crop sunflower is a distinct advantage in good seasons. For example, early sown sunflower is harvested in mid to late January, leaving several months of fallow if sufficient rain falls, to fill the soil profile again for a winter crop, such as wheat or barley. Not only does this improve the economic return of the farming system, it also has the benefit of quickly providing ground cover to the paddock. This option allows a smooth transition from a summer crop back to a winter crop on a short fallow which maximises water use, thus reducing the potential for deep drainage.

Alternatively double cropping with sunflowers out of a winter cereal harvested in late October/early November is also considered. The late planting window for sunflowers enables

sowing up to the end of January as in the December/January period, northern NSW frequently experiences heavy rains to refill profiles, enabling this double crop option to be successful.

Sunflower offers an alternative summer cropping option for growers, with a wider sowing window. However, sunflower only accounted for on average 17% of the total summer cropping area in northern NSW in the period between 1992 and 2001. This compares with sorghum, the region's largest summer crop, which accounted for 71%. The remainder of the summer cropping area is split between maize, cotton and legumes including soybeans and mungbeans, which are minor crops.

The sunflower industry in northern NSW has a volatile history with both crop areas and yields varying significantly between seasons. However the general trend has been a decline in crop area and an increase in average crop yields as shown in Figures 2 and 3.

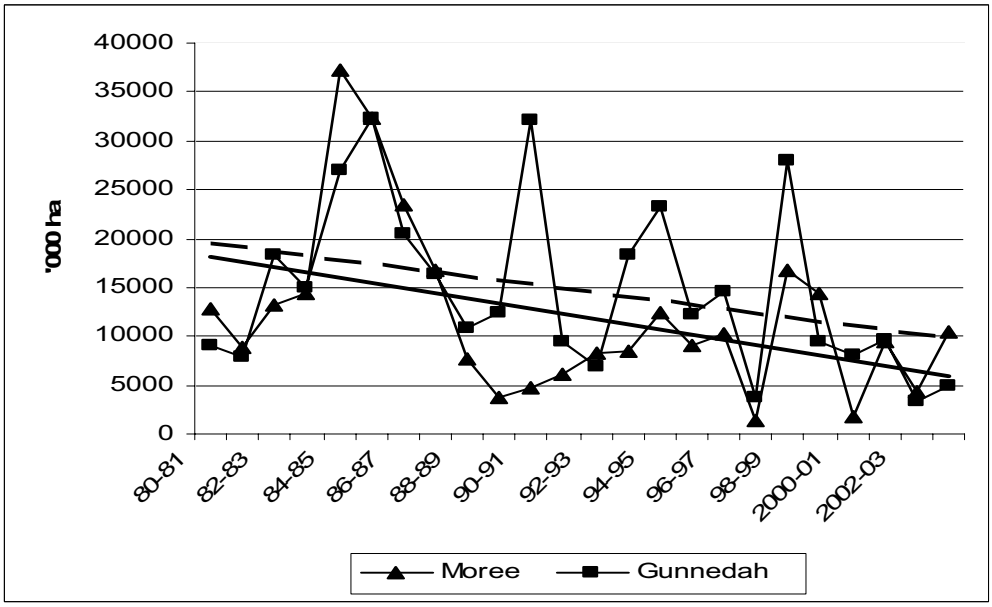

Figure 2. Sunflower production in northern NSW, Australia, 1992-2000. Data source: Fitzsimmons, R.W. (2001).

Past Agronomic Practice. A review of past agronomic practice demonstrates the changes which have occurred. Northern NSW experienced a rapid expansion in area grown to wheat during the 1960s and 1970s as grazing country was cleared and farmed. Large scale production of sunflower commenced in 1969 in response to the introduction of wheat quotas. The crop also proved useful as a rotation crop for weed and disease control. The following few years coincided with a series of wet summers, attractive sunflower prices and corresponding low wheat prices.

However, sunflower required more management and precision than the standards of the wheat industry. Farmers quickly learnt about interrow cultivation and realised uniform plant populations were critical for a successful crop. This was achieved through the adoption of precision planters.

Sunflower practices in the Gunnedah district have been largely recorded only during the last decade. During that time sunflower in the rotation followed wheat or sorghum. In this situation the opportunity for low cost grass weed control was provided with sunflower, whereas wheat and sorghum offered the opportunity to reduce the population of broadleaf weeds.

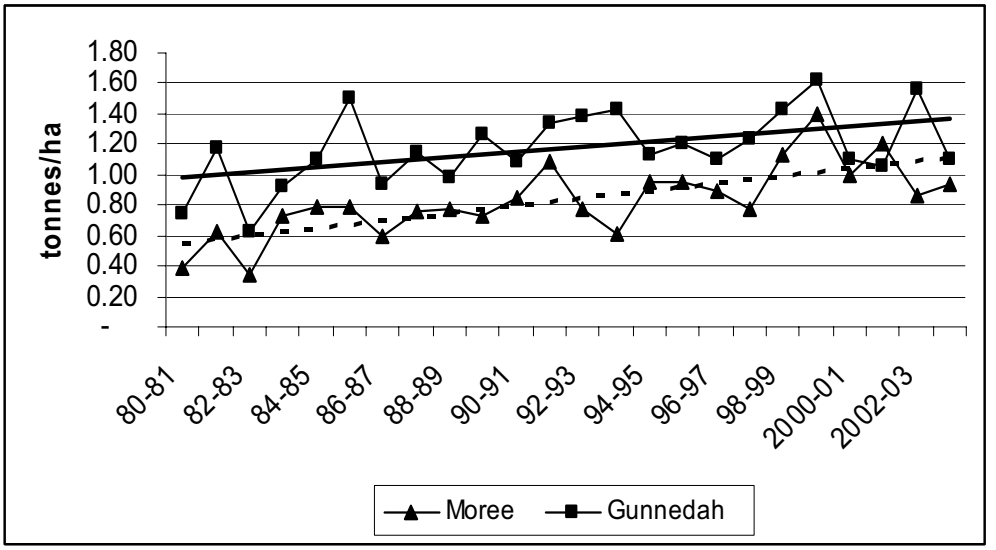

Figure 3. Sunflower yields in Moree & Gunnedah 1980 – 2003. Data source: Fitzsimmons, R.W. (2001).

Generally the rotation consisted of sorghum long fallowed to wheat or vice versa, followed by sunflower. The standard sowing width was 75 or 100 cm, which is comparable with sorghum. The main improvement in sunflower varieties came with the release of Hysun 33 during the mid 1980s. This heralded the shift from open-pollinated to higher-yielding hybrid varieties. The main sunflower varieties grown during the 1990s were Advantage, Hysun 45 and Hyoleic 31. Plant populations varied between 35,000 and 47,000 plants/ha. Fertiliser application was on average between 75 and 120 kg of nitrogen/ha.

In contrast, growers around Moree traditionally aimed for a plant population of 20-25,000 plants/ha. The recommendation at Moree was to plant up until mid-February (Doyle) but research and grower experience eventually refined that date to the end of January due to frost and Sclerotinia risks.

Current Agronomic Practice. The Australian Oilseeds Federation funded a project for 18 months covering the 2003-4 and 2004-5 season to benchmark the sunflower crops. During the 2003-4 season data was collected from 35 crops, including 20 early-sown crops and 15 late-sown crops.

The aim of this study was to collect data on current practices of growers, identify key management factors and trends for successfully growing sunflower crops, and the limitations to the expansion of the industry.

At the time of writing, preliminary data had been collected on 20 crops which were planted early (sown prior to the end of November). These crops were in the areas of

Gunnedah and Moree in northern NSW and the Darling Downs in South East Queensland. This paper discusses the 17 crops benchmarked in northern NSW.

The preliminary data collected included plant populations, row spacing, average plant height, average head diameter, weed distribution and species, fertiliser application, harvest losses, insect pests, yield, oil content, price and marketing. Figure 4 illustrates the average established plant populations for the 17 crops benchmarked in northern NSW while Figure 5 shows the interaction between average plant height and mean head diameter in the crops benchmarked across the Gunnedah and Moree regions.

The number and type of weed species found in the two square metres surrounding each sampling point was recorded. The weed species found in the Moree and Gunnedah districts varied, with the predominant weed species in the Moree district including caltrop (*Tribulus terrestris* L.), black bindweed (*Fallopia convolvulus*), field bindweed (*Convolvulus arvensis* L.), volunteer sorghum (*Sorghum bicolour)*, Paddy melon (*Cucumis myriocarpus*), phalaris (*Phalaris aquatica* L.), flax-leaf fleabane (*Conzya bonariensis*) and native sensitive plant (*Neptunia gracilis*). In the Gunnedah district the most commonly occurring species were downs nutgrass (*Cyperus bifax*), black bindweed (*Fallopia convolvulus*) and Boggabri weed (*Amaranthus mitchellii*). The number of each of these species was very low in most situations.

The majority of crops were sown on 1 metre row spacings with a precision planter with press wheels to improve seed soil contact. Current rotations include long fallow or double crop from wheat or chickpeas and short fallow from sunflower or sorghum. The main varieties in the study were Hyoleic 41, Sunbird 7 and Sunoleic 04.

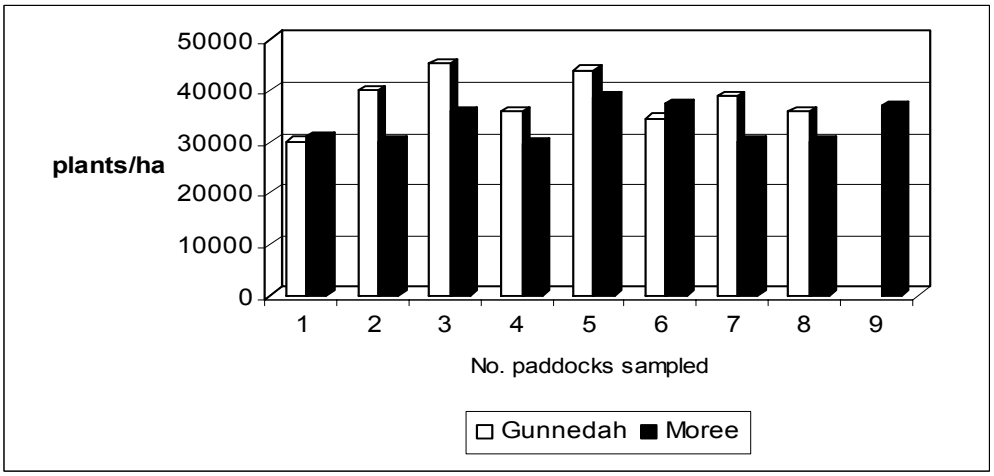

Figure 4. Average plant population of sunflower crops monitored across northern NSW.

Limitations to Industry Expansion. There are several buyers of sunflower seed currently operating in northern NSW, including companies involved in the crushing and the confectionery/birdseed market. In the crushing market there is one major player and several smaller players. Grower perception of oilseed crushers has been poor; a fact which is largely attributed to the perception of one major buyer which growers feel removes price competition.

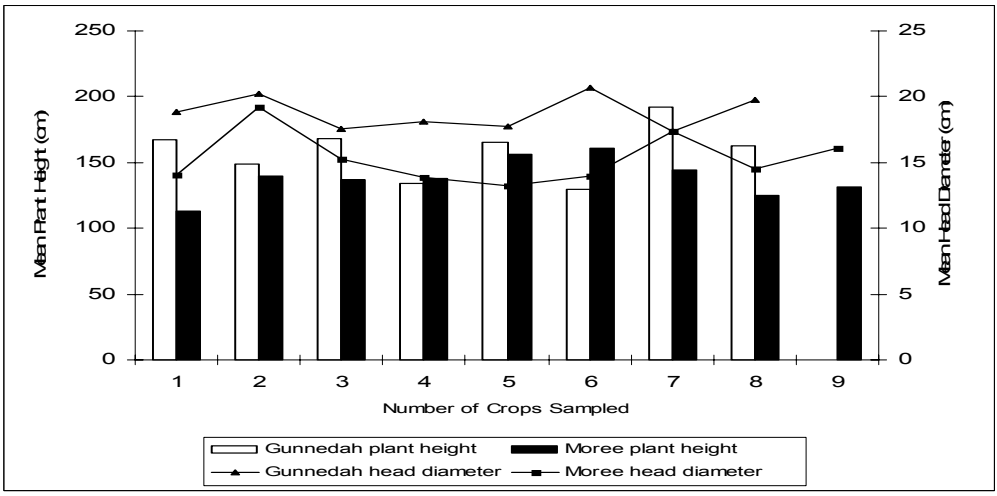

Figure 5. Mean plant height and head diameter for sunflower crops benchmarked across northern NSW.

Promotion of end use products is a major problem for the Australian sunflower industry, which has difficulty competing with other major oilseeds. Sunflower oil unfortunately has a poor profile in Australia. Inconsistent supply and production variability (caused by climate and price) has resulted in, end users focusing on alternative oils such as olive or canola. This is supported by Figure 6 which shows the decline in production and exports.

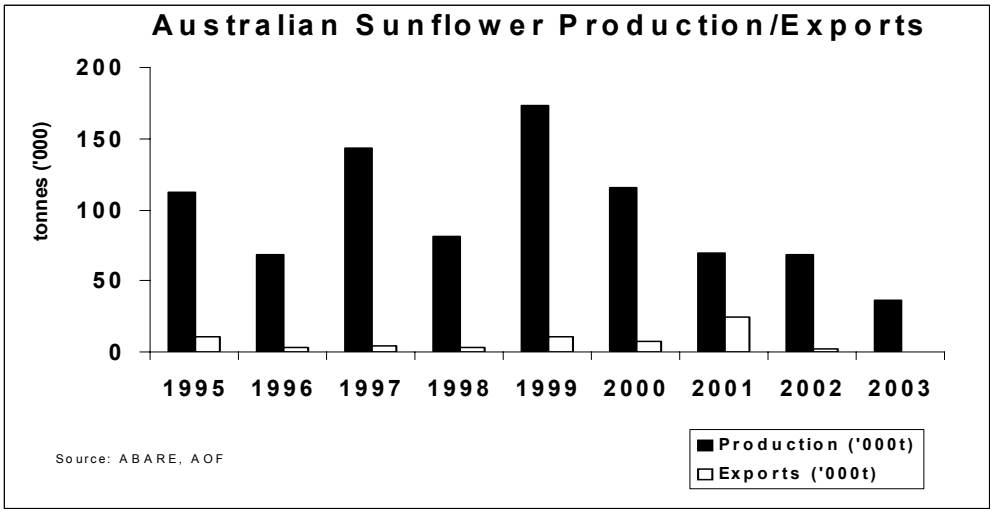

Figure 6. Australian Sunflower Production and Exports 1995-2003. Source: ABARE, AOF.

Financial returns from sunflower have not been as favourable as sorghum in recent years. The reliability of growing sorghum attracts more growers as there is less perceived risk.

In several areas of the northern region, major rivers and their tributaries flow bringing with them numerous birds that can devastate a crop. There are no reliable methods for controlling birds; therefore areas of suitable cropping country will not be planted to sunflower because of the risk of crop loss. Some growers will tolerate a 20% crop loss from birds.

Soils are highly erodible, and sunflower leaves the soil exposed to erosion during the winter months, as minimal stubble cover is left behind.

The lack of broadleaf weed control options which do not require incorporation is another issue. Most products are not suited to the predominantly minimum or no-tillage farming system due to the need for incorporation. Pendimethalin (Stomp®) is the most commonly used herbicide applied post plant/pre-emergent, and is relatively expensive, costing approximately $37.00/ha at 3.0 litres/ha. In addition the weed spectrum covered by these products is quite limited.

Growers and agronomists generally lack experience growing sunflower. Many growers have only tried sunflower once or twice, but have not continued. In addition most agronomists lack sunflower technical knowledge and as a result are reluctant to recommend the crop to growers.

The need to utilise crops with livestock in dry seasons is also perceived to be a disadvantage of growing sunflower. Sorghum, on the other hand, can be grazed or baled in dry seasons when a grain harvest is unlikely.

Growers also appear to lack confidence when it comes to harvesting sunflower. Most use sunflower trays but not all are utilising head snapping technology such as the Sullivan reel.

Agronomists have difficulty deciding on the appropriate time to desiccate sunflower due to lack of experience. Whilst some crops matured evenly, many crops in northern NSW in 2003/4 would have benefited from desiccation due to rain late in the season keeping the leaves green. These crops were either not desiccated or were sprayed too late. Hence dry down and admixture has been a concern.

Conclusion

Industry Future. There is huge potential for expansion of the sunflower industry in NSW. However, current investment in research is quite small. Encouragement of smaller buyers to enter the market and an improvement in consumer attitude towards sunflower would offer price incentives to make the crop more attractive to grow.

There are also opportunities in the Moree and Gunnedah districts for irrigated sunflower because of a reasonably low water requirement and suitability for integration into cotton farming systems. Niche markets including birdseed and confectionary offer unique opportunities to expand.

Improving the reliability of sunflower yields through better agronomic management packages will also assist in making sunflower competitive with sorghum.

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