THE ROLE OF SAFFLOWER (*Carthamis tinctorius* L.) IN SOUTHERN AUSTRALIA

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INTRODUCTION

The decline of Australia's wool industry has led to increased cropping intensity in the southern regions of Australia's traditional wheat/sheep belt. Cereals, canola and a few pulse crops, dominate rotations. Limited crop diversity increases disease risk and promotes the evolution of herbicide resistant weeds (HRW's). Further crop options for southern Australia are therefore required. Safflower (*Carthamus tinctorius* L.) has been a minor crop in Australia for many years, often being sown in spring as an opportunity crop where heavy winter rainfall prevents the sowing of cereals or canola. Recent interest in safflower has been inspired by economics and several proposed tactical roles that the crop may fulfill in southern farming systems. A survey of safflower growers (SG's) and non-growers (NG's) was undertaken in 2000 to investigate the current role of safflower in southern farming systems and limitations to further adoption.

METHODS

Two surveys (SG and NG) were prepared using preferred survey guidelines[1]. Although questions were largely open-ended to minimise influencing participants, example answers were provided in a few instances to maintain focus. A total of 150 SG surveys and 100 NG surveys were distributed largely by mail to participants identified through company grower lists, group facilitators/extension officers and personal contacts. Qualitative data was analysed as the frequency of responses[1] and quantitative data was subjected to basic statistical analysis using the software package SPSS 7.5.

RESULTS AND DISCUSSION

A total of 41 SG and 24 NG surveys were returned from Victoria (48), South Australia (13), southern New South Wales (3) and Tasmania (1). Average annual rainfall ranged from 270 to 750 mm (SG mean: 469 mm; NG: 422 mm). Soil types included clay loams, black clays, red soils and sandy loams (pH range: 4.5 - 9.0). Rotations typically included cereals, oilseeds and pulses +/- pasture or fallow. The main reasons for individual rotation strategies (SG's and NG's) were; disease break (34 %), weed control (28 %), make money (22 %), adaptation (12 %) and spread of risk (11 %). Major sustainability threats included; cost/price squeeze (54 %), HRW's (35 %), soil degradation (25 %), low rainfall in recent years (23 %) and waterlogging (15 %).

The 41 SG's provided a total of 380 years of safflower growing experience. The most frequent reasons for incorporating safflower into rotations were; control weeds (39 %), spread sowing and harvesting work load (22 %), break crop (20 %), use water (15 %), make money (15 %) and to open soil with roots (12 %). Major strengths included flexible time of sowing and an easy crop to grow. Major weaknesses included; poor/variable yields (41 %), price/market issues (29 %) and pests (7 %). About 39 % of respondents mainly sowed safflower in spring if winter conditions became untrafficable. Several SG's used safflower strategically in rotations to control weeds/HRW's or to dry soil profiles for subsequent crops. In some cases, safflower was used as the final rotation species as excess water use resulted in poor subsequent crops. Safflower was also used in some instances as cover crop for lucerne establishment. Only 19 % of SG's believed the economic viability of safflower to be currently good, with 48 % mentioning variable/marginal and 29 % stating that economics were good in previous years, but not now. Eighty percent of SG's believed that markets were inadequate. Research priorities identified by SG's include increasing or improving; yield (55 %), price/markets (56 %), varieties (29 %) seed/oil quality (15 %), seedling vigour/weed competition (10 %) and pest/disease tolerance or control (10 %). Other agronomic issues included sowing time, fertiliser and herbicides. Rutherglen bugs and Red Legged Earth Mites were frequently mentioned, but easily controlled pests. Harvest issues included rain staining of seed and dealing with stubble.

Fifty percent of NG's had either grown or considered growing safflower in the past but decided against it for a range of yield/market/price reasons or environmental factors. NG's cited similar strengths for safflower as SG's. Research priorities identified by NG's include; improved varieties (adaptation, grain/oil yield, oil type), marketing and rotation benefits. Most NG's indicated they would consider safflower if yield/market issues improved or environmental conditions were more suited to the crop.

Safflower is therefore utilised partly for economic reasons, but also as a tactical crop to dry soil, manage weeds, improve soil properties and spread workload. It is also used as a back up crop in the case of failed winter sowings. Many research issues could be partly addressed through new varieties adapted to particular environments, with increased yield and improved marketability.

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