

CASE STUDY
OCTOBER 2020

Soil Wealth
NURTURING CROPS



Integrated
Crop Protection
PROTECTING CROPS

INTER-ROW RYEGRASS COVER CROP

A WINNER IN SNOW PEA PRODUCTION

Grower Kim Ngov had a weed problem at his Sydney basin farm. Even though he grows his snow pea crops using plastic mulch, he has had to use herbicide to control weeds in the bare soil inter-row areas.

Cover crops have provided Kim with a solution. Growing a ryegrass cover crop in the inter-row areas has suppressed the weeds while improving the health of his soil at the same time.

Kim grows snow peas from autumn through spring in Wedderburn, a south-western suburb of Sydney. The

1.5-metre-wide inter-row areas between the trellises experienced prolific weed growth. So, Kim has had to apply herbicides on a monthly basis, leaving very little ground cover and exacerbating the wet, muddy conditions in the alleys during rainy periods.

This made it difficult for workers to install trellis lines and hand harvest the snow peas.

The Soil Wealth/ICP team assisted Kim with the planning and sowing of inter-row cover crops and then helped to assess the impact on weed control and working conditions during wet periods.

KEY FINDINGS

Cover crops grown on a snow pea farm can help set up an **integrated weed management (IWM) program** and **improve working conditions**.

Annual ryegrass was the standout cover crop for the 2020 snow pea crop with quick establishment, good weed suppression and success in holding up against foot traffic, pests (slugs) and wet weather.

Convinced by these first positive experiences, Kim and the Cambodian Growers' Group are happy to use cover crops on a broader scale to set up an IWM strategy, thereby **reducing their reliance on herbicides** and minimising the exposure of chemicals to personnel, crops and the environment.

TRIAL SET UP

This year Kim's second planting of snow peas was mid-April 2020 and a cover crop trial was hand sown in late April 2020 with five different combinations plus a control:

1. Ryegrass (20 kg/ha rate)
2. Buckwheat (50 kg/ha rate)
3. Combination ryegrass (20 kg/ha rate) + buckwheat (50 kg/ha rate)
4. Rye-corn (120 kg/ha rate)
5. Combination ryegrass (20 kg/ha rate) + rye-corn (60 kg/ha rate)
6. Control – fallow soil without the use of herbicides.

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ESTABLISHMENT OF THE COVER CROPS

On 30 April 2020, a gentle 20 mm rain fell resulting in almost 100% germination of all cover crops. Winter weeds also germinated from this rain event. One month after sowing (27 May 2020), the cover crop average plant populations were as follows:

- Ryegrass (2 – 3 leaf stage) = 595 plants/m² (Figure 1). Ryegrass seed hand sown onto the soil surface is subject to removal by birds and ants, and rainstorms can wash seed from higher ground to lower ground giving an uneven plant stand. Following this trial, Kim has increased his sowing rate to 100 kg/ha.

- Buckwheat (1 leaf stage) = 113 plants/m²
- Rye-corn (4 – 5 leaf stage) = 193 plants/m²

The dual species cover crops “buckwheat + ryegrass” and “rye-corn + ryegrass” were slower to establish and assessed five weeks later on 2 July 2020:

- Buckwheat + ryegrass = 156 plants/m² (29 buckwheat + 127 ryegrass plants/m²)
- Rye-corn + ryegrass = 327 plants/m² (144 rye-corn + 183 ryegrass plants/m²)

The buckwheat did not tolerate the cool winter weather, flowering prematurely and eventually dying from the cold weather and foot traffic.



Figure 1. Kim Ngov inspecting the inter-row ryegrass 30 days after sowing at a 20 kg/ha rate (27 May 2020)



INITIAL WEED SUPPRESSION

The ryegrass and the rye-corn were similar in their early weed suppression benefits reducing weeds by nearly 50% compared to the buckwheat which could be viewed as a second “control” due to its very weak establishment and early die-off in autumn (Figure 2).

In the mid-tillering stage, the ryegrass was providing strong competition against fleabane (*Conyza* spp.), common chickweed (*Stellaria media*), common sow thistle (*Sonchus oleraceus*), fumitory (*Fumaria* spp.) and pepperweed (*Lepidium* spp.). Fleabane was the most common weed identified in the trial area.

The dual species rows had to be aggressively hand weeded due to the slower cover crop establishment. Therefore, weed counts at the time of this assessment were irrelevant.

Unfortunately, the rye-corn had to be mown down in late June 2020 as it elongated through the jointing stages and shaded the snow peas. This late mowing removed the growing point and the following constant foot traffic from trellising terminated most of the rye-corn plants.

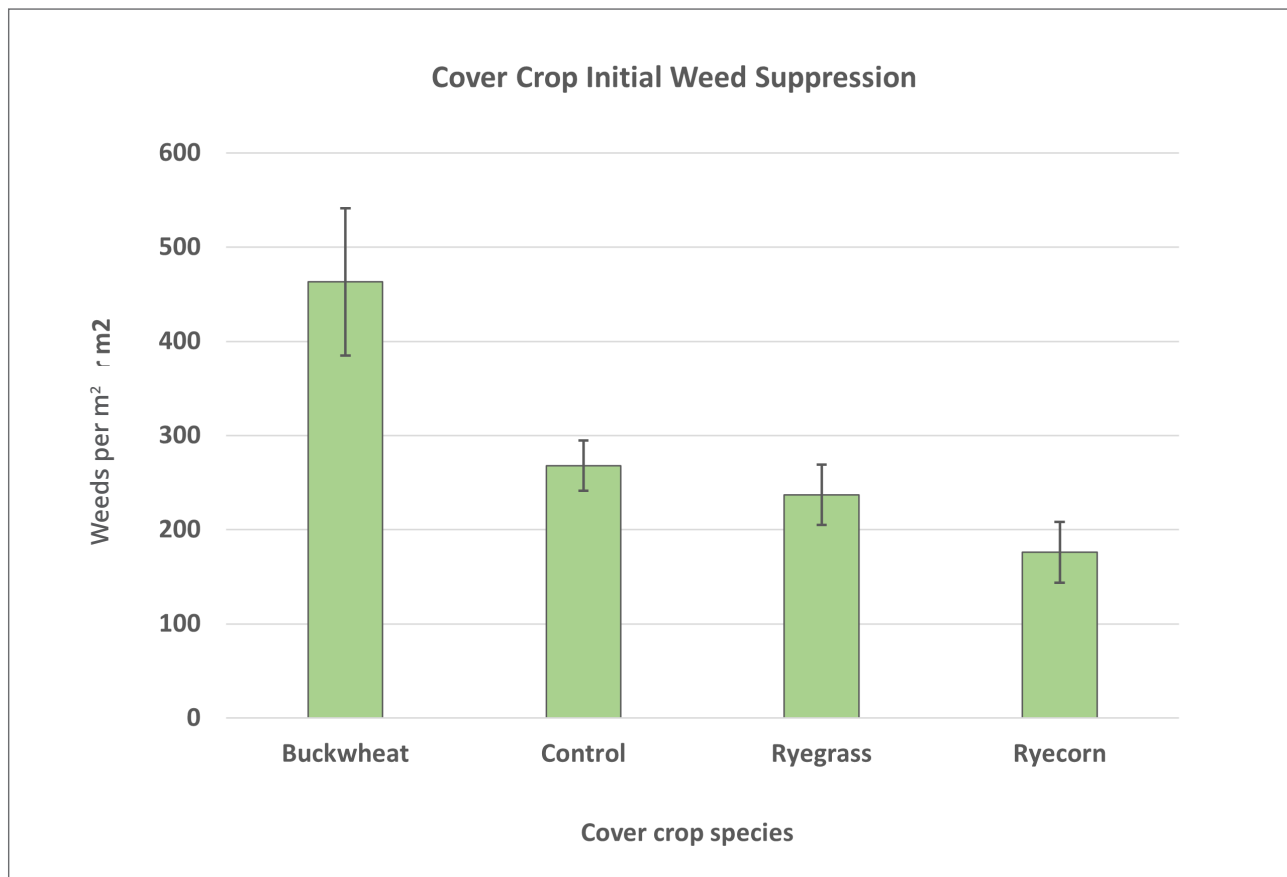


Figure 2. Weed counts per square metre for different cover crops assessed on 27 May 2020. Weeds counted: fleabane, fumitory, common sow thistle, common mallow, common chickweed, staggerweed, and pepperweed. The vertical bars indicate the standard error of the mean total counts (sample size n = 10).

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WEED SUPPRESSION NEAR HARVEST

The first harvest of snow peas in this planting started the last week of July 2020. By this time, the ryegrass was clearly the standout (Figure 3). The high plant density, heavily tillered and prostrate ryegrass gave good, thick ground cover holding up to over 15 abuses of foot traffic and rainstorms of 150 mm per week.

The only weed that outcompeted ryegrass and became troublesome was common mallow (*Malva parviflora*). Kim could easily mow the mallow down leaving most of the ryegrass uncut (Figure 4). Common mallow

germinates after late summer and autumn rains and can be controlled with pre-plant knockdown herbicides glyphosate + Group G tank mixes.

We have also suggested using glufosinate (with or without glyphosate) in pre-plant knockdowns to help control fleabane. Figure 5 shows the postharvest situation for ryegrass cover crop and control (fallow) – low weed pressure was found for the ryegrass cover crop, whereas high pressure was seen in the control area with up to 90% fleabane presence.



Figure 3. Intra-row ryegrass as per 29 July 2020 assessment



Figure 4. Common mallow in intra-row ryegrass before and after mowing (near harvest, 29 July 2020)



COMMENT FROM THE TEAM

It's been rewarding for the Soil Wealth/ICP team to follow Kim and his passion for trying new approaches and using IWM to achieve weed control as well as many other benefits including better environment for workers.

Inter-row seeding with a ryegrass cover crop has replaced 2 - 4 in crop herbicide spray applications, and created a drier, cleaner and greener work environment for his workers.



Figure 5. Postharvest situation as assessed on 22 September 2020 for ryegrass inter-row (top) and control area with up to 90% fleabane pressure (bottom)