

Weeds - The Killer of The Wheatbelt

What is Food Scarcity

Food security was defined by the World Food Conference as "availability at all times of adequate, nourishing, diverse, balanced and moderate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices." Food scarcity is caused by economic, environmental and social factors. Crop failure, large economic costs, overpopulation and poor government policies are the main causes of food scarcity in most countries. An example of crop failure is weeds like Annual Ryegrass in the Wheatbelt of Western Australia as weeds are corrupting harvests, reducing yield and reducing the availability of food, causing food scarcity. Weeds in the Wheatbelt also have large negative economic impacts on the local population.

The Wheatbelt



Ways People Intensify the Challenge

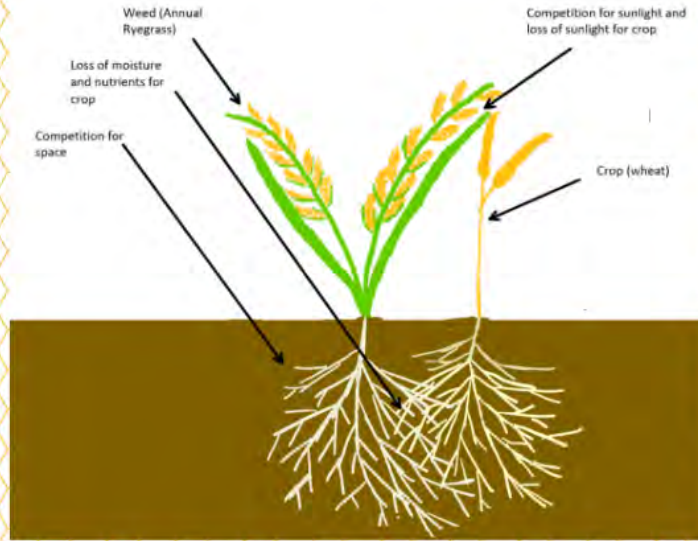
Weeds can be spread by natural causes or human interference. Natural causes include: travelling through the wind, river current, animal fur and wildlife. Humans can intensify the challenge of weeds by seeds attaching themselves on to shoes, clothing, vehicles and machinery. Seeds and plant parts can be hidden in soil, water, mulch, animal feed and herbivore faeces. Whenever people or animals move through weed-infested areas, there is a chance that weeds will be spread to new areas. To reduce humans impact on weeds, crop failure and food scarcity, measures need to be taken. As weeds can spread to new area's through seeds sticking to clothing and vehicles, you can limit the amount of time spent on your harvest. As machinery also can spread weeds, by minimising the amount of time machinery on the field, the spread of seeds will be reduced. These actions will immensely reduce chances that machinery or humans will transport seeds or intensify the challenge of weeds in the Wheatbelt.



What are Weeds

A weed is a type of flora that requires some form of action to reduce its effect on the economy, the environment and human health. They usually have no value for food, medicinal purposes. Weeds are a threat to food security due to it's corruption of crop harvest, reduction of yield and large economical damage. Weeds like Annual Ryegrass costs the Australian economy 1.482 billion dollars each year, with \$612 million dollars lost due to herbicides.

How Weeds Affect Crops



HARRINGTON SEED DESTROYER & CHAFF CART

The Challenge- Annual Ryegrass

- A contributing factor of food scarcity are weeds. Weeds like Annual Ryegrass have huge effects in places like the Wheatbelt of Western Australia. They corrupt crop harvest, having damaging economic impacts on farmers and cost the country 4 billion dollars a year in the fight of weeds.
- Annual Ryegrass (*Lolium Rigidum*) is one of the most costly and serious weeds present in the Wheatbelt of Western Australia, thriving in the summer when there is high moisture levels.
- Annual Ryegrass is one of the most serious problems of agriculture in the Wheatbelt due to an extremely high number of seeds per plant. Dense areas of Annual Ryegrass can have more than 100 plants per square metre and can produce up to 45 000 seeds.
- Annual Ryegrass is highly competitive and can completely destroy crops by out-competing the surrounding crops. Due to their large amount of seeds per plant, Annual Ryegrass has the ability to grow all around crops and take and compete for their sunlight, nutrients, space and moisture.



Strategies to Overcome The Challenge

Herbicides & Crop Plantation

A strategy for overcoming the challenge of Annual Ryegrass is increasing the seeding rate of the desired crop. Doing this reduces the effect of Annual Ryegrass and on crop yield and reduces it's seed output. Herbicides can also be used to kill Annual Ryegrass, by spraying a herbicide onto Annual Ryegrass at the early 'two leaf' stage of their cycle, the weed can be eradicated. This strategy is not perfect as herbicides are toxic and can be harmful to wildlife and humans. Using herbicides is also a very costly and time consuming process, although still effective on most weeds. Herbicides only have an effect on Annual Ryegrass in the initial stages of the plant, giving a short window of opportunity, showing the flaws in using herbicides on Annual Ryegrass. Increased seeding rates in combination with herbicides can result in very low levels of weed seed production, if done correctly.

Seed Destroyers

Seed destructors such as the Harrington Seed Destructor (HSD) are a very useful solution to the problem of weeds, and are the best strategy for weed treatment. They have many benefits including a 95% success rate of preventing the germination of seeds and chaff and weed nutrients remain in the paddock.

The HSD is a piece of machinery that connects to a chaff cart. A chaff cart is a machine that collects the chaff from a plant, which contains seeds. The chaff cart does this by using a spinning wheel to collect all the chaff and throw it into the chaff cart. This is then transported to the HSD, through a large pipe. In the HSD there is a cage mill, which is multiple steel discs spinning in opposite directions. When the seeds enter the cage mill, it pulverizes the seeds in the chaff and whatever else enters, preventing germination again. This is then ejected in the form of a dust like powder back onto the field, giving the nutrients back in the field. The Harrington Seed Destructor combined with a chaff cart is effective in reducing weed seeds, although is very expensive, costing \$80,000 each and may not be affordable for some. If weeds need to be treated on a small scale, the HSD is an unnecessary expense and herbicides would be a better option, while if weeds need to be treated on a large scale the HSD is undoubtedly a more successful treatment.