

Minimising pick up losses, stool damage and excess soil in cane supply

Crop presentation (erect VS lodged, row profile, row width) is the main factor determining the level of pick-up loss and stool damage. For example, when harvesting sprawled cane or heavily lodged crops, the gathering spirals struggle to pick up and guide cane stalks into the throat of the machine. In tangled crops side knives/saws reduce stools being torn out but increase pick-up losses.

Management of pick-up losses, stool damage and excess soil in the cane supply

To minimise pick-up losses, stool damage and excess soil levels entering the mill it is important that row profile is consistent and matches the basecutter height and angle. Hill height and shape will vary depending on cultural practices and agronomic considerations, hence the vital importance of grower and operator discussion. Whilst it is not possible to stipulate one specific height and/or size, some general rules apply:

1. Hill-up must be consistent across the block and, preferably, the entire farm.



Above: Appropriately hilled-up cane.

2. Ensure that plant cane is properly filled in. Start bringing in soil once there are eight to ten shoots per metre. If the filling in operation is left too long, soil will not flow properly into the centre of the hill, resulting in a volcano effect. The volcano effect later results in high quantities of soil in the cane supply and increased cane pick-up losses. Stools are more prone to damage as they are not properly supported by the soil.



Left: Volcano effect in plant cane created by poor hilling-up.



Left: Poorly hilled-up plant cane after harvest.

Note: The harvester operator cut high to avoid dirt, causing stool shattering and cane loss.

3. Flat or hollow profiles are unacceptable. Harvesters cannot pick up cane out of a hollow.
4. Avoid excessive clods in the row as this increases soil in cane.
5. Aim to produce a flat, smooth interspace free of tine marks to give the harvester a level base to work on.
6. Consistent row profile matching the basecutter angle is the key to minimising stool damage.



Above: Well filled-in and poorly filled-in cane.

Research indicates that there is no significant yield impact from filling in early versus filling in late (Figure 1). However, filling in early leads to reduced stool damage due to the improved row profile.

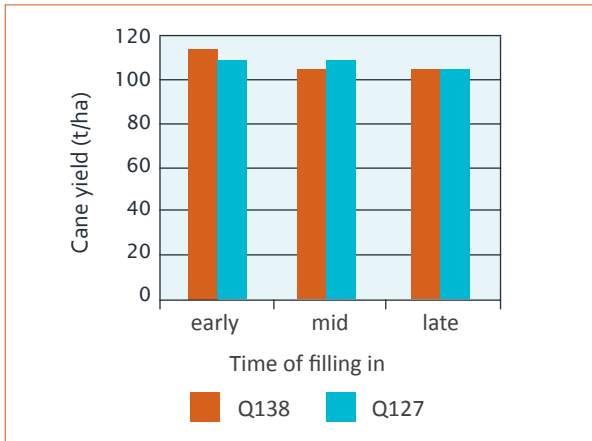


Figure 1: Time of filling in: effect on final yield.

Basecutters

To minimise damage to the crop stalk and stool, basecutter blades should have a sharp, square, cutting edge. Blades require regular adjustment and replacement due to wear. Keep them as long and thin as practically possible. Modelling shows that in good conditions—for example, an erect, single row crop in dry soil—forward speeds of up to 9 km/h will cause minimal stool damage provided that the basecutter blades are new (Figure 2). To maintain negligible stool damage, harvester forward speed should reduce to 6 km/h when 25 mm of blade has been lost from its corner. Many factors will greatly reduce maximum forward speed, including wet conditions, stool tipping and insect damage.

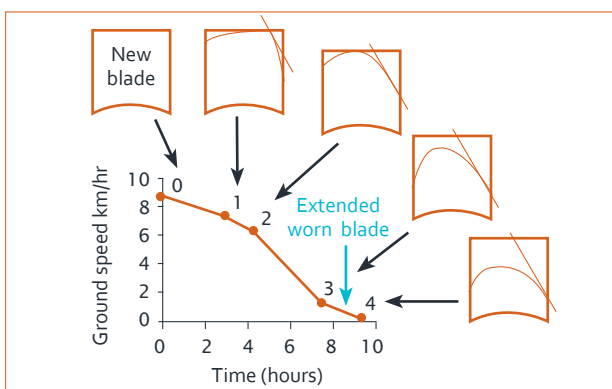


Figure 2: Basecutter blade wear and maximum forward speed.

Basecutter rpm and forward speed

The fixed rotational speed of the basecutters is between 580-650 rpm depending on year and model of the harvester. This basecutter speed is best matched to a harvester forward speed of 7 km/h. For a given speed, an overly high basecutter rpm will result in stools being cut by the blades multiple times. This will reduce the ratooning of the stool and increase blade wear.

Far worse than this is when basecutter rpm is too slow for the forward speed—it significantly reduces ratooning by tearing the stalk, and increases soil in cane supply. The disc tears off stalks before a blade reaches the stalk, causing severe damage to the stool. To minimise the effect of disc-to-stool contact, basecutters should ideally have six blades per disc. Having the extra blade per rotation leads to less disc-to-stool contact and improves the quality of the cut.

Basecutter angle

The basecutter angle should be adjusted to match hill height and shape and should increase as the hill height increases. A hydraulically adjustable basecutter angle is an advantage as it enables operators to quickly and easily match the basecutter angle to the stool profile at any time.

Basecutter height

Basecutter height is the distance between the tips of the blades and the bottom of the interspace. Ideally operators should aim to 'skim' the surface of the soil with the basecutter blades which gives a clean cut with minimal soil intake. Modern machines face a compromise between good cane pick-up and dirt intake. If basecutters are set above ground level, pick-up losses increase and stalk shattering and feeding problems may occur. If they are set too deep, excess soil is fed into the machine.