

Sediment

ROW PLANTINGS ON MOUND

Without mounds, erosion can occur when runoff from the bare land under trees is diverted by the strip of grass between the trees. This occurs because erosion of soil in the tree row makes it lower than the grassed, inter-row area. This process is referred to as a 'gutter effect'. It is less likely to occur if the rows are on the contour, but can be a significant problem if the rows are diagonal to the land slope. This problem can also occur between mounds if there is excessive grass growth or insufficient grass width between mounds.

Rows of permanent tree and vine crops such as bananas, papaws, macadamia nuts, avocados, citrus and grapes are often planted on top of mounds.

Mounds are constructed using topsoil excavated from the inter-row area. This provides a good depth of well-drained soil for the crop. The area between the mounds acts as a drain to provide good surface drainage and to manage run off for erosion control on sloping land. The drains flow to an outlet such as a natural drainage line, a subsurface waterway, or an in-field diversion bank. A disadvantage of mounds is that they expose a greater surface area of soil which results in a greater loss of soil moisture by evaporation. It is especially important not to expose dispersive subsoils in the drain.

Mounds can either be aligned to the contour with a small gradient to conduct runoff or they can have steeper gradients and be either at some diagonal to the slope or directly up and down the slope. Where mounds are not aligned to the contour, the inter-mound area needs to be grassed to prevent erosion. As the trees grow and the inter-row area becomes shaded, it can become difficult to maintain a good sward of grass in the inter-mound area.

The following table compares the relative advantages of mounds aligned to the contour compared to mounds diagonal to or directly up and down the slope. As a general guide, 5 to 8% is considered to be the maximum slope for mounds aligned to the contour and 15% for up-and-down slope mounds.

For crops that require maximum sunlight down the rows to encourage flowering and fruiting, it may be necessary to have straight rows in a north-south direction. This would usually necessitate the use of cross- slope mounds rather than mounds aligned to the contour.

Disclaimer: This information is provided as a reference tool only. Please seek professional advice.

A Growcom project conducted in collaboration with the Department of Natural Resources and Mines with funding provided by the Queensland Government's Rural Water Use Efficiency Initiative – Irrigation Futures.



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Relevant issues for comparing 'across-slope' and 'up-and-down hill' mounds

ISSUE	MOUNDS ALIGNED TO THE CONTOUR	MOUNDS DIAGONAL TO THE SLOPE OR DIRECTLY UP AND DOWN HILL
Topography and land slopes	Mounds on steep slopes can hold much less water than mounds of the same height on lower slopes. The steeper the slope, the more difficult it is to build high mounds with broad batters. Row width will be regulated by the slope rather than the best row spacing for the crop.	It is easier to build mounds on steeper slopes because less height is required to accommodate run-off.
Soil depth	Less suitable for shallow soils on steeper slopes as subsoils will be exposed in the drain	Can be constructed on reasonably shallow soils on steeper slopes
Traffic-ability	Wheeled equipment pulled on the contour across steep hillsides, tends to slip downhill and may cause damage to plants and hanging fruit (e.g. bananas) A flat bottomed channel between mounds becomes less feasible as land slope increases.	On steep slopes, traction may be an issue in wet weather and a greater amount of horsepower is required. A flat-bottomed channel is easy to achieve especially when mounds are directly up and down hill
Capacity to carry run-off	Effective capacity for a given mound height reduces as slope increases.	Provided any 'outside' run-off has been diverted, up-and-down hill mounds should carry all of the run-off they are required to, irrespective of mound height.
Use of rainfall	More rainfall soaks into the soil	Higher rates of run-off than when mounds are on the contour. Grass in the drain between mounds may compete with the crop for moisture
Erosion	Minimal erosion if low gradients are used or channels are grassed	Good cover levels are required in channels especially for gradients above 2%.
Channel roughness	Bare soil is acceptable on low gradients and provides minimal resistance to surface flow.	The grass between mounds should be slashed as high grass can resist flows and direct run-off onto the bare area under trees.
Drainage	Mounds provide good drainage but not as rapid as for drains up and down the slope.	Rapid drainage
Marking out	Layouts take longer to mark out because key rows need to be surveyed and gradients in parallel rows need to be checked periodically	Easier to mark out because gradients are less of an issue
Construction	Construction becomes very difficult and costly on steep slopes with batters become unacceptably steep and susceptible to erosion	Relatively straight forward Easier to construct double rows
Harvesting	On steeper slopes accessibility can become difficult on the down-slope batter of a mound	Accessibility is easier than for mounds aligned to the contour

Information in this fact sheet has been obtained from the following resource and is gratefully acknowledged.
Draft Chapter 14 Soil Conservation in Horticulture, Bruce Carey, retired Soil Conservation Officer DSITIA.

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