

BED & MULCH CONFIGURATIONS

HANDBOOK

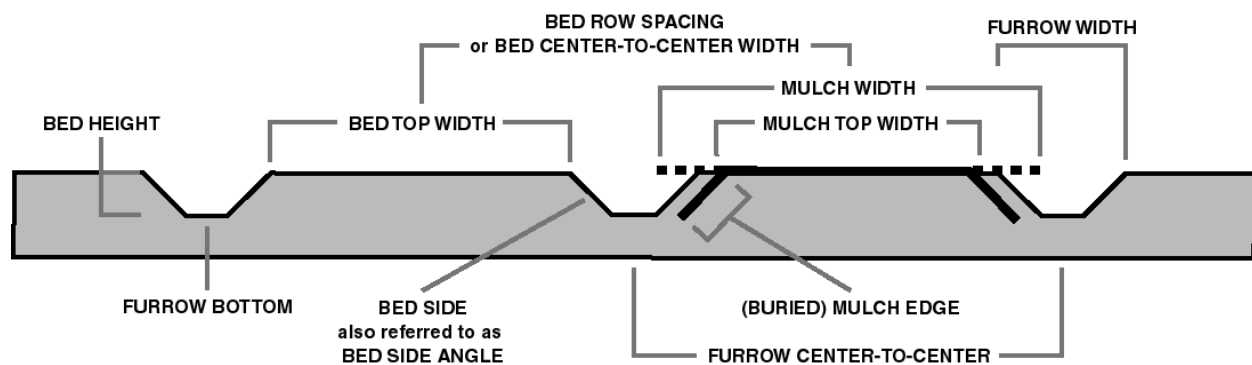


INTRODUCTION

Common mulch widths are 48" and 60" to typically cover the entire bed top. 36" mulch may be applied to the top of a wider bed, used with narrower beds and/or with narrower wheel spacings on smaller tractors. For wider or higher beds, 72" mulch provides extra width. This can also be used with narrow furrows to maximize coverage for weed control. The availability of 42" and 54" mulch or metric sizes can vary. Other mulch widths are useful for precise bed widths to maximize bed top with particular mulch edge placement relative to tractor wheel spacing. Sound methods also ensure plastic is secure with natural settling or erosion of covering soil on buried mulch edges.

Illustrations in this handbook present common methods for location and depth of mulch edges (placement), and demonstrate how mulch and raised-bed dimensions work together regarding mulch width, bed top width, bed height, furrow width and bed row width.

BED AND MULCH TERMINOLOGY



BASIC PRINCIPLES

1) Soil should be loose and tilled for proper operation of mulch layers, which are typically not designed for cutting in hard soil. Tillage depth should be sufficient for disks or soil-moving components to work freely without contacting hard soil below till depth, which can easily cause side-shifting. Soil may already be loose in raised bed, assuming mulch is applied shortly after bed shaping.

2) Mulch edges should at least reach the bottom of raised-bed furrows for soil stability. This counters effects from natural settling or erosion of covering soil. At most, mulch edges can be fully buried in the bottom of the furrow for the most soil stability. Avoid cutting deeper in the furrow bottom with mulch layer covering disks, which effectively cuts a deeper furrow.

3) Burying 6 to 8-in of mulch edge is practical. Principled and consistent mulch coverage holds plastic best. Attempting to bury more for mulch to "stay in the ground" may simply fold up in front of covering tools, can effectively reduce the bed top or be more difficult to remove from the field.

4) Looking at the profile of buried mulch, at least 2-in of the buried edge should be angled or flat enough for the weight of the soil to rest on the material. Mulch buried nearly straight down may pull out too easy, notably in windy conditions before rain re-wets soil after application.

5) Consider mulch removal in advance. Bed, furrow and mulch widths can be configured to avoid driving on buried mulch edges.

MULCH PLACEMENT METHODS

1) Place in the bed top or bed side, characteristics are:

- a) exceptional covering consistency
- b) very good soil stability over the season
- c) more practical in heavier soil since mulch layer disks do not need to cut deep
- d) better for use with narrower common furrows
- e) generally easier mulch removal

2) Place in the furrow bottom, characteristics are:

- a) exceptional covering consistency
- b) exceptional soil stability over the season
- c) easiest to do in lighter or sandy soil since mulch layer disks need to cut deeper in the furrow
- d) generally better with wider common furrows to avoid damage to plastic from wheels
- e) removal may be more difficult with deeper placement

3) Place on the bed side, characteristics are:

- a) cut covering soil from drive spaces or loose soil in "unfinished" furrows - furrows may first need to be wider
- b) very good soil stability over the season
- c) more practical in heavier soils since the mulch layer disks do not need to cut deep
- d) practical with drive-space beds and principal for many bedder-layer machines
- e) generally easier mulch removal

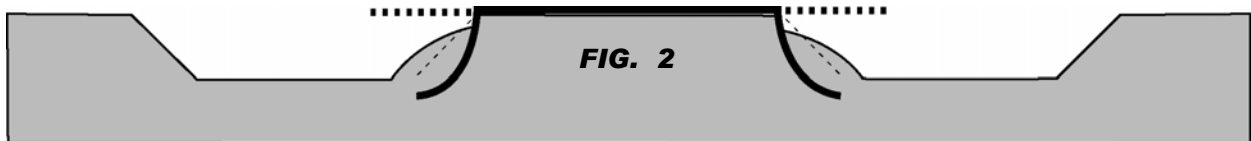


Start with basic mulch placement principles (Fig. 1). For beds up to about 6-in high, cut away up to 3 or 4-inches of bed top on each side. This provides consistent loose soil to cover mulch edges. Covering mulch edges also effectively restore the bed sides, which helps protect the mulch from field traffic, especially with narrow furrows. Mulch is secure since edges reach furrow bottoms, allowing for settling of covering soil.



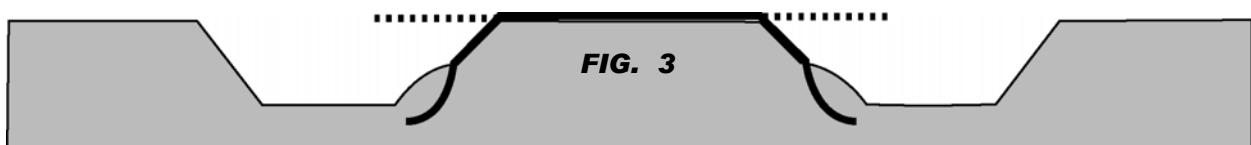
BED TOP WIDTHS - typical dimensions for the above method (Fig. 1)						
Mulch Width	4" bed ht	5" bed ht	6" bed ht	8" bed ht	10" bed ht	12" bed ht
36"	24"	22"	20"			
48"	36"	34"	32"			
60"	48"	46"	44"			

A common practice is to cut away bed sides without cutting into the bed top (Fig. 2). Since the mulch top width is the same as bed top width, also cut about 2-in into the furrow bottom to provide sufficient loose soil for coverage. Also, covering soil is principally more stable with edges placed below the bottom of the furrow. Soil returned to the bed side can still help protect mulch from field traffic. Figures 1 and 2 illustrate different possibilities. In practice mulch coverage may appear mulch the same.

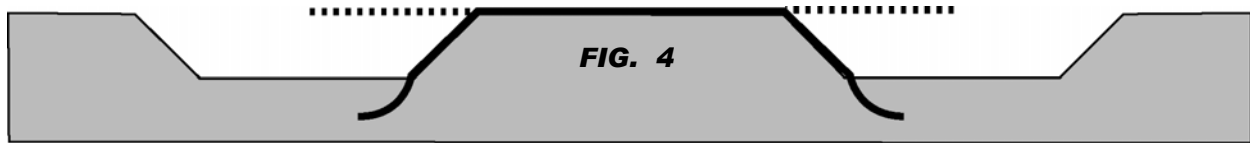


BED TOP WIDTHS - typical dimensions for the above method (Fig. 2)						
Mulch Width	4" bed ht	5" bed ht	6" bed ht	8" bed ht	10" bed ht	12" bed ht
36"	20"	18"				
48"	32"	30"	28"	24"		
60"	44"	42"	40"	36"	28"	22"
72"	56"	54"	52"	48"	40"	34"

With beds generally higher than 6-in, covering soil does not return to the top of the bed (Fig.3). Too much covering soil is possible if cutting into the bed top (like Fig. 1), resulting in poorly finished furrows, which can affect mulch layer on the next row. Cutting about 2-in into the furrow bottom without cutting into the bed top (like Fig. 2) may be preferred for consistency and overall appearance.



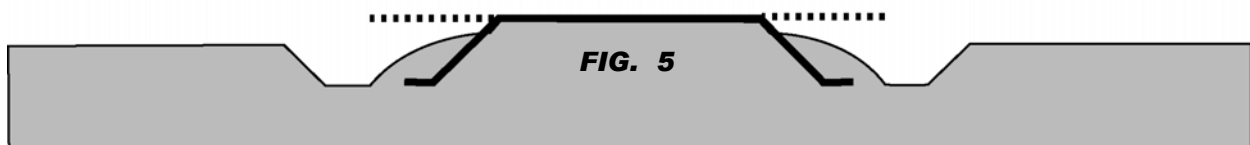
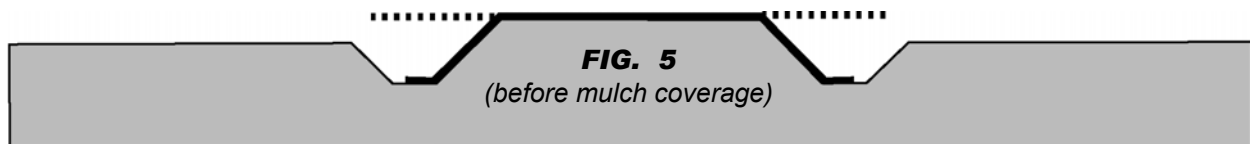
This is the second common mulch placement method (Fig. 4). Many published photos show plastic mulch fully “wrapped” over the bed sides. Mulch edges are buried in the bottom of furrows. This provides the most soil stability to secure mulch, which may be preferred in more-erodible light soils. This may also be preferred for higher beds. Cut 3 to 4-in into the furrow bottom. This method may not be preferred in heavier soils if furrow bottoms are too hard to cut into.



BED TOP WIDTHS - typical dimensions for the above method (Fig. 4)						
Mulch Width	4" bed ht	5" bed ht	6" bed ht	8" bed ht	10" bed ht	12" bed ht
48"	26-28"	22-24"	18-22"			
60"	36-38"	34-36"	30-34"	24-30"	18-24"	14-20"
72"	48-50"	46-48"	42-46"	36-42"	30-36"	26-32"
Use smaller number for 45-degree bed sides, larger number for 60-degree (straighter) bed sides						

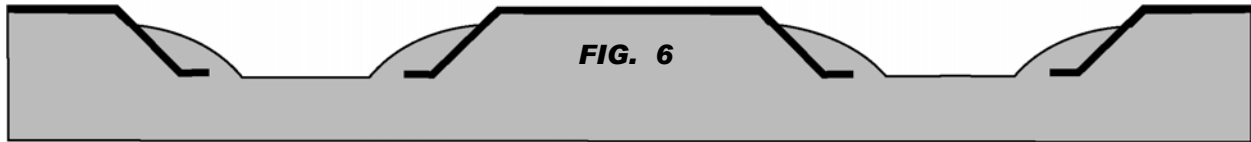
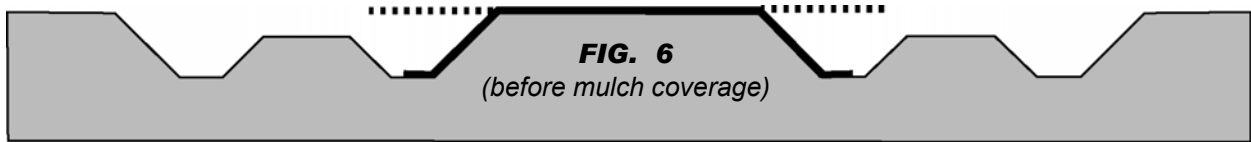
Equip mulch layers with tillage attachments to loosen furrow bottoms. This can relieve wheel compaction as well as previously untilled soil, within reason. Condition of soil cut out of the furrow bottom can depend on soil type and moisture. If deeper tillage is not practical, place mulch as shown in prior illustrations. Adjust bed width or mulch width, if needed.

A third, but less common, mulch placement method places mulch *on* the bed side for coverage. This avoids cutting into the bed side. With “drive-space” or “wide-space” beds, covering soil is simply cut from soil outside the furrows (Fig. 5). Start with wider drive spaces if cutting into wheel compaction is a problem.



BED TOP WIDTHS – same as shown under Fig. 6

With “common furrow” beds, shape with “unfinished” furrows. Place plastic mulch on bed sides and cover with the additional loose soil in the furrow (Figs. 6). Bedder-layer combination machines that do not feature opening disks principally work this way.

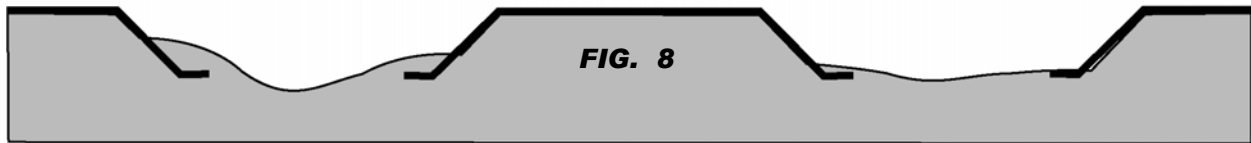


BED TOP WIDTHS - typical dimensions for the above methods (Figs. 5 & 6)

Mulch Width	4" bed ht	5" bed ht	6" bed ht	8" bed ht	10" bed ht	12" bed ht
36"	20-22"	18-20"	16-18"			
48"	32-34"	30-32"	28-30"	22-24"	16-20"	
60"	44-46"	42-44"	40-42"	34-36"	28-32"	22-28"
72"	56-58"	54-56"	52-54"	46-48"	40-44"	34-40"

Use smaller number for 45-degree bed sides, larger number for 60-degree (straighter) bed sides

Be sure loose soil in furrows is consistently available. A deeper cut with mulch layer covering disks for more covering soil should be avoided. This effectively cuts deeper furrows below the edge of the mulch (Fig. 7). Soil can more-easily settle or erode into the deeper furrows and expose mulch edges (Fig. 8).



EXAMPLES



BED AND MULCH WIDTH

When coordinating mulch and bed widths, either can have a higher consideration. Bed width may be given higher consideration to match established tractor wheel spacing and field equipment. Established mulch users may simply choose a bed size to fit the mulch. Otherwise, wider mulches cover more field area for more weed control. Narrower mulch, relative to bed row spacing, is generally easier to apply. Fully wrapping beds helps hold soil in place. Mulch width is not critical to function regarding plant growth environment.

Besides common mulch widths, generally available in 12-in increments, other widths like 54-in or 64-in (metric) can be used to fine-tune bed dimensions and spacing. For simplicity, the bed size charts in this handbook feature the common sizes. Simply adjust the dimensions for other mulch widths.

Smaller growers that raise many different crops can use mulch for some beds and not others. And different crops may be planted with one row or multiple rows per bed. For simplicity, use one bed size for these arrangements.

FURROW WIDTH

Tractor wheels can drive in very narrow furrows to maximize mulch coverage, likely driving on buried mulch edges. Be sure disks or other mulch layer components do not contact the previous mulch row. Furrows are typically a little wider to place mulch layer opening disks inside tractor wheels to avoid cutting into wheel compaction. Wider furrows provide more clearance to avoid damaging plastic with field traffic. Placing plastic edges with more soil on the bed side offers protection from field traffic.

Wider furrows may be preferred for more clearance to avoid driving on covered bed sides or on buried mulch or may be necessary for wheels and disk clearances on the mulch layer, especially multi-row machines.

Tractors can be equipped with narrow wheels for the narrowest possible furrows or to avoid driving on buried mulch edges, which makes removal easier, especially in heavier soils.

Straighter bed sides or vertical disk cuts may be ideal or look nice but are highly subject to soil moisture. Soil that does not “hold shape” in dry and loose conditions can fall down from bed corners into opening disk cuts. This effectively reduces the bed top and plastic placement may not be as deep. Consider this effect for appropriate mulch layer adjustments in different conditions.

When applying mulch on beds with narrow common furrows, covering tools on the mulch layer should sufficiently “restore” furrows to original depth for best results to apply the next mulch row. Uneven furrows can cause inconsistencies with mulch layer operation or confusion with adjustments.

Plan an exact bed top width for a mulch width and preferred placement method. Beyond these principles, furrow width and bed row spacing is not critical to function for plastic mulch and can be determined by other merits. See RAISED BED HANDBOOK for more.

MULCH LAYERS AND TILLAGE

Mulch layers are typically designed for operation in loose soil. Mulch layer performance can disappoint in many ways if working in hard ground. With raised beds, soil is usually already loose. But cutting deeper in the furrow bottom can put more demands on tillage preparation.



Tillage can be combined with mulch layers to loosen wheel compaction if opening disks are placed behind tractor wheels (Fig. 9). Do not add weight to mulch layers for cutting in hard soil if not recommended by the manufacturer.

WEED CONTROL

Other than herbicide, weed control with plastic mulch can be difficult to approach with weed growth through plant holes and in soil that covers mulch edges. Piercing by some grasses is possible. Mulch thickness and quality matters. Ironically, growers using plastic mulch *for* weed control may not consider herbicide. Cultivators cannot till mulch covering soil, but can work the wheel track area through the center of the furrow. Cultivators with disks can cover sprouting weed on the mulch edge, but timing is critical for effectiveness. Weed burners are becoming more accepted and available but be sure to not burn the plastic. Mowing is highly effective, though such equipment is highly specialized for the best job. The resulting “carpet” may be ideal for erosion control or appreciated by U-pick customers or CSA members. Then consider aggressive tillage in the furrows after harvest. Except for herbicides, one solution alone will likely prove insufficient.

Weed control is a secondary purpose for fumigation, which is predominant in the south for the primary purpose of pest control. Mulch is used with fumigation to “tarp”, or temporarily trap, it in the soil for effectiveness. Fumigation is highly expensive and may be economically prohibitive, depending on outlook.

MULCH REMOVAL

Bed and mulch configurations that place tractor wheels on covering soil compress mulch and soil. This is the most significant factor that complicates mulch removal.

Burying plastic fully in the furrow bottom requires deeper penetration with lifting shanks and likely more tractor power. This placement method may not be preferred in heavier soils. Soil type can make a difference in ease of mulch lifter operation, since this is essentially a tillage operation.

With mulch placed in bed sides, soil tends to be easier to fracture and less lifter shank depth is generally needed.