

Guidelines for Deep Zone Tillage in Vegetable Production


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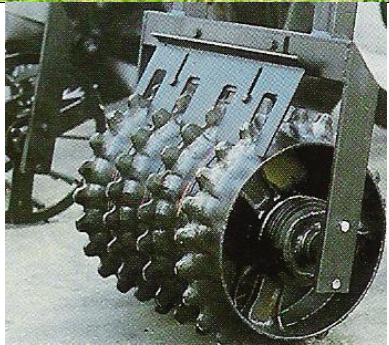
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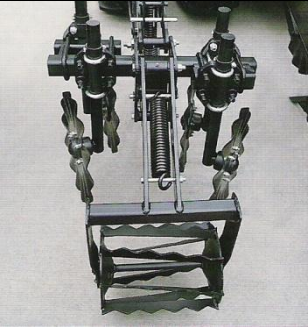



Deep zone tillage (DZT) is a reduced tillage strategy that limits surface soil disturbance to 6 to 10 inches at the planting row, leaving areas between crop rows undisturbed. The benefits of reducing tillage include labor savings, lower fuel costs, improved soil health, reduced soil erosion and greater planting flexibility early in the season. Zone builders are prevalent among Northeast growers using deep zone tillage for primary land preparation.





Deep zone tillage can be adapted for conventional and organic systems. Fertility in organic DZT systems is generally applied before tillage (e.g. compost spreading). In conventional DZT, fertility can be deep placed in the slot or banded at planting for many crops. In either system, cover crops can provide nitrogen to the cash crop, but residue management must be carefully planned. In organic, cover crop mowing must be timed to maturity to insure adequate killing. Row cleaners are needed to move any crop residue out of the zone before planting. Cultivation can be used for weed control in either system.





The following guidelines highlight key equipment, field preparation, fertility management and planter setup issues that should be considered for success at deep zone tillage for vegetables.



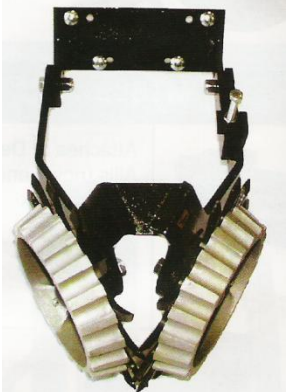
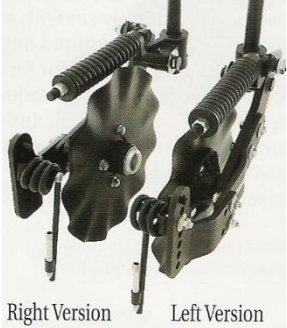
Activity	Comment	Photo
Deep Zone Building	Zone builders consists of a series of straight leg shanks optimized to disturb the soil in narrow zones where the crops will be planted, and can operate up to 20 inches deep. The depth is set to operate 2 inches below compacted soil layers.	

<p>Deep Zone Building</p>	<p>Narrow points and shanks are key to minimal soil disturbance and soil inversion.</p>	
<p>Deep Zone Building</p>	<p>Each shank must be preceded by a trash cutting coultter to prevent residue binding on the shank. Row cleaners help move cover crop or other crop residue to improve the planting bed. This especially important when using the finishing units.</p>	
<p>Deep Zone Building</p>	<p>3-point units must be leveled by the top link for proper performance. The square frame must be parallel with the ground.</p>	
<p>Deep Zone Building</p>	<p>Open slots can dry out quickly. Close the slots with cultipacker wheels or rolling baskets.</p>	

<p>Deep Zone Building</p>	<p>The zone builder should be equipped with closing coulters and rolling baskets, to break up clods and create a mini mound over the ripped slot. Mini-mounds are adjusted by angling the closing coulters.</p>	
<p>Deep Zone Building</p>	<p>Identify the depth of compacted soil layers using a penetrometer or sharpened rod. The depth is the point where the probe encounters a high resistance before pushing through the compacted soil layer. Set the depth of ripping to 2 inches below the compacted soil layer.</p>	
<p>Deep Zone Building</p>	<p>Aim for a 2-3 inch mini mound for best planting and weed control.</p>	
<p>Deep Zone Building</p>	<p>Maintain low travel speed. Travel speeds of 4-5 mph are optimal. Faster speeds can damage soil structure.</p>	

<p>Yeoman Plow http://www.yeomanplow.com.au/yeomans-plows.htm)</p>	<p>The Yeoman Plow requires less horsepower than most other deep zone till units. It is less expensive compared to other units.</p>	
<p>Yeoman Plow</p>	<p>The shanks have parts that can be replaced. The Shin Guard is contoured to protect the shank. The Wombat Point (black point in photo) can be replaced when worn. Shanks can be easily moved on the tool bar for different row spacing.</p>	
<p>Yeoman Plow</p>	<p>16" weed knives are available for mounting on the back of the shank. The depth and angle of the wings can be adjusted quickly. Wings placed near surface can undercut weeds and cover crops.</p>	
<p>Field Preparation</p>	<p>Lime requirements must be met before deep tilling. The tiller will work some lime into the soil. Increased lime infiltration will improve soil pH and nutrient availability deeper in the root zone.</p>	

<p>Field Preparation</p>	<p>Control perennial weeds prior to deep tilling. Perennial weeds may be better controlled in the fall. Plan on several alternatives to control weeds, even cultivation, if necessary.</p>	
<p>Field Preparation</p>	<p>Kill cover crops 2-3 weeks before zone building. Do not plant into live cover crops. Cover crop residue can interfere with planting and cultivation. It is essential to kill a sod cover crop in the fall before deep zone building.</p>	
<p>Fertility Management</p>	<p>Both liquid and dry fertilizer programs can be used in a zone tillage system. Avoid broadcasting fertilizers. Most if not all fertility needs may be banded at planting. Dry fertilizer openers can deliver most starter needs in a zone till system. Fertility may be supplemented with sidedress applications if necessary.</p>	
<p>Fertility Management</p>	<p>Complete nitrogen needs for sweet corn may be met using liquid fertilizer placed 8 to 10 inches deep in the ripped slot. For early planted corn, nitrification inhibitors are recommended. Use of deep placed nitrogen has not been thoroughly tested on other crops.</p>	

<p>Fertility Management</p>	<p>Liquid fertility needs can be most accurately delivered with a positive displacement pump. The rate is consistent and easily changed in the field as needed.</p>	
<p>Planter setup</p>	<p>An ideal planting unit for zone tilling has floating row cleaners, seed firmer, spiked closing wheels and a closing drag chain.</p>	
<p>Planter setup</p>	<p>The planter or transplanter units should be led by a row cleaner, preferably, floating with depth bands, for best seedbed preparation. They remove lumps, rocks, root balls and gently till in front of the planting unit.</p>	
<p>Planter setup</p>	<p>Planter units may be led by a pair of tillage/fertilizer coulters for similar results. It is best if these coulters are followed by the floating row cleaners.</p>	

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