

Role of Conservation Tillage in Vegetable Production

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The term “conservation tillage” (CT) technically denotes a variety of crop production alternatives that minimize primary tillage operations such as disking, plowing, ripping and chiseling and as a result, typically leave a minimum of 30% of the soil surface covered by residues from previous crops. While CT practices have traditionally been applied to the production of agronomic crops, there has been a dramatic increase over the last 5 years in interest and innovation related to reduced tillage alternatives in several of California’s very diverse cropping systems that include vegetable crops. Currently, however, less than 1% of row crop acreage in California is farmed using CT practices. Effective and efficient approaches for managing weeds are a critical and compelling requirement in CT vegetable rotations. Recent research in the Central San Joaquin Valley indicated that even heavy residue cover crop surface mulches typically permit over 25% of incoming photosynthetically active radiation to reach the soil surface and thus necessitate the use of specially-adapted high residue cultivators that allow residues to “flow” and avoid damage to crop plants, hand weeding, herbicides, or combinations of these interventions. A number of short-term studies have demonstrated the potential of CT processing tomato and melon production variants to match standard tillage systems in terms of yields and to reduce estimated diesel fuel use per acre. Longer term implications of these reduced till regimes in terms of soil compaction, water use, profitability, soil carbon sequestration, insects, diseases and weed seed banks are currently under evaluation.