

high in soluble salts, choose low-salt index fertilizer sources for example, potassium sulfate instead of potassium chloride and broadcast or split-apply the fertilizer.

Fertilizer application

Fertilizer placement (general). Fertilizer rate and placement must be considered together. Placing low amounts of fertilizer too close to plants can result in the same amount of damage as placing excessive amounts of fertilizer in the bed.

Because phosphorus movement in most soils is minimal, it should be placed in the root zone. Banding is generally considered to provide more efficient utilization of phosphorus by plants than broadcasting. This is especially true on the high phosphorus-fixing calcareous soils. Where only small amounts of fertilizer phosphorus are to be used, it is best to band. However, in most other situations, broadcasting and thorough incorporation in the bed area prior to planting is satisfactory. If broadcasting phosphorus, a small additional amount of starter



Figure 7. Sidedress fertilizer applicators.

phosphorus near the seed or transplant may improve early growth, especially in cool soils. For wide-row crops such as watermelons, the modified broadcast method provides more efficient use of fertilizer than complete broadcasting.

Micronutrients can be broadcast with the phosphorus and incorporated in the bed area. On the calcareous soils, micronutrients, such as iron, manganese, and boron, should be banded or applied foliarly.

Since nitrogen, and to a lesser extent, potassium, are mobile in our sandy soils, these nutrients must be managed properly to maximize crop uptake. Plastic mulch helps retain these nutrients in the soil. Under non-mulched systems, split applications of these nutrients must be used to reduce losses to leaching (Fig. 7). Here, up to one-half of the nitrogen and potassium may be applied to the soil at planting or shortly after that time. The remaining fertilizer is applied in one or two applications during the early part of the growing season. Splitting the fertilizer applications also will help reduce the potential for soluble salt damage to the plants.

Another technique to reduce leaching losses is to use the strip mulch method. In this case, incorporate all phosphorus and micronutrients pre-plant along

Table 6. Relative salt effects of fertilizer materials on the soil solution.

Material	Salt index ¹
Anhydrous ammonia	47
Ammonium nitrate	105
Ammonium nitrate-lime	61
Ammonium sulfate	69
Calcium carbonate	5
Calcium nitrate	53
Calcium sulfate	8
Diammonium phosphate	30
Dolomite	1
Monoammonium phosphate	34
Monocalcium phosphate	15
Nitrogen solution, 37%	78
Potassium chloride	116
Potassium nitrate	74
Potassium sulfate	46
Sodium chloride	154
Sodium nitrate	100
Potassium-magnesium sulfate	43
Normal superphosphate	8
Triple superphosphate	10
Urea	75

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¹The term "salt index" is the salt effect of the material in relation to sodium nitrate, which is given an index of 100. Materials with high salt indexes must be used with great care to avoid plant injury.