

# PROCEEDINGS

## ECO-FALLOW CONFERENCE

WRAY, COLORADO

FEBRUARY 12-13, 1980

LAMAR, COLORADO

FEBRUARY 14, 1980

## EUROPEAN CORN BORER CONFERENCE

WRAY, COLORADO

FEBRUARY 13, 1980

Cultural Management of Wheat and Chemical Fallow <sup>1/</sup>

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I will limit the discussion in this section to management of residue, fertility, seeding, and equipment needs. In this semiarid Central Great Plains, residue plays a major two-fold role. First it provides the much needed buffer between the soil and atmosphere to increase soil water storage. The standing stubble cools the soil during the hot dry summer periods to reduce the evaporation potential at the soil surface. The standing stubble also eliminates wind movement at the soil surface when stubble is 18 inches high and wind is 15 mph or less - which also contributes to decreasing evaporation potential at the soil surface. Standing stubble as well as that portion of the total straw production which is flat on the soil surface breaks-up raindrops as they fall to the soil surface, thereby increasing water infiltration into the soil by decreasing puddling of the soil surface. By permitting soil nearer the surface to remain wet longer there can be a higher percent of the small rainstorm events stored since less of the water is required to rewet the soil before storage can occur. Lastly standing stubble is excellent for trapping and holding snow for soil water storage.

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The second benefit from residue is to provide protection from the ever present threat of soil erosion by wind. The residue on the soil surface itself provides protection but as the residue decomposes it releases fats, waxes, and oils which serve as bonding agents between soil particles to form particles that are too large to be moved by the normal wind storms in our area.

Fertility problems associated with the use of herbicides for weed control during fallow will vary with past management practices, soil type, and intensity of operator input into the system, (how much and what quality of product does the operator want to produce). When going to the minimum tillage fallow system from a system where disk-type implements were used to bury most of the residue during fallow, most of the nitrogen needed by the crop will have to be applied as fertilizer during the first two crops to capitalize on the water that has been stored. If a good stubble mulch fallow system had been used prior to going to the minimum tillage system then less fertilizer N will be required, and probably for only the first crop. A soil test should be made to determine if nutrients other than nitrogen are needed. Yield response to the fertilizer is greatest when the fertilizer is applied before planting. Spring topdressing applications are more beneficial for improving protein content. With silt loam soils the nitrogen can be applied up to 13 months before, but no later than 4 months before seeding of the wheat crop for the greatest benefit on yield. However, with sandy or coarse textured soils the application should not be more than  $4\frac{1}{2}$  months or less than  $1\frac{1}{2}$  months before seeding of the crop. As previously stated, the amount of nitrogen to be applied will vary with previous management, soil type, and yield level desired but wheat

requires 2 lbs of N/ac for every bushel of grain produced. Using soil test information, sufficient fertilizer should be applied for the yield level desired.

Seeding requires a drill that has sufficient clearance to permit the 1,500 to 2,000 lbs/ac of residue to pass through the drill without plugging. At the present time there is no drill on the market that does not cause a problem when the residue level is high. The most successful modification is the attachment of a rolling coulter in front of each drill shank to cut the residue to eliminate plugging. A second very important need on the drill is that the seed dispensing device be such that the seed is placed at the bottom of the slot opened for the seed, and not dropped more than 0.5 inch from the bottom. Once the seed has been placed on the moist soil, a firming wheel should be used to ensure good seed-soil contact.

Equipment used during fallow should have a minimal destruction effect on the residue. Also, we have found that most soils do not require any tillage for seedbed preparation. The optimum seedbed is a firm soil and tillage loosens the soil thereby defeating the purpose of the tillage for creating a seedbed.