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Post-CRP land-use options for Oklahoma's HEL.

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A deficiency of integrated research and education information on conservation management of highly erodible lands (HEL) retired under the Conservation Reserve Program (CRP) exists in the southern Great Plains. Serious obstacles to the sound use of fragile, environmentally sensitive lands must be addressed as the expiration date of contracts for the first sign-ups is rapidly approaching. Oklahoma has 1.2 million acres of HEL enrolled in CRP. Most of this land is located in western Oklahoma and has been cropped annually to winter wheat prior to the CRP. Dryland cotton production is also important in south west Oklahoma. Soil erosion and the associated particulate and nutrient discharges are significant problems in the production of both of these crops. Old World bluestem (OWB) and native grasses are extensively used for permanent soil cover during the CRP. A collaborative study is being conducted with the financial support of the Southern Region SARE/ACE program. Our objectives are (i) to develop management guidelines for environmentally sound cropping-livestock systems of production that preserve and sustain the accumulated benefits to the soil resource base, and (ii) to determine the relative persistence of improvements to the soil that have accumulated during the program's tenure under alternate land management practices. Replicated farm-scale plots have been established on lands currently in the CRP at two locations in western Oklahoma. A study of the effects of haying of the grass cover and those of a transition back to annual wheat cropping practices is being carried out near Forgan, Oklahoma.

Treatments are as follows:

- a. Old World bluestem: (i) unimproved and hayed, and (ii) fertilized and hayed
- b. Conversion to winter wheat 1: production of (i) wheat forage, or (ii) winter forage-grain, using conservation-tillage practices
- c. Conversion to winter wheat 2: production of (i) wheat forage, or (ii) winter forage-grain, using no-till practices

Near the town of Duke in south west Oklahoma, we are evaluating the following land-use options.

- a. Conversion to cotton 1, under conventional tillage, and
- b. Conversion to cotton 2: under row-till (strip) practices, in addition to the OWB and winter wheat treatments mentioned previously.

During 1994, we found that the time of suppression/kill of the grass cover is essential for conserving soil water, thus is vital to the success of producing a winter wheat crop in the year a CRP contract expires. Changes in program rules must be made to allow pre-treatment of the CRP vegetative cover much earlier than the current 90-day period prior to a contract's expiration date. In addition, the amount of vegetative dry matter removed and regrowth is critical to how well we can perform reduced tillage, how well we can suppress or kill the growing cover, and to establishing a good stand of wheat. In any case, the remaining residue coverage is more than adequate to meet conservation compliance plans for the first winter wheat crop.

Measurements of whole system performance and alterations in indices of soil quality will be continued over the next three growing seasons. Paired comparisons are being made between these field plots

and adjacent fields that have been continuously cropped during this time. The relative costs of crop production on highly erodible lands will be compared with the returns from maintaining the grass cover for grazing livestock production. Economics and market conditions of 1996, or the year in which a contract expires, will be of prime consideration in how a producer decides to use CRP acreage. Educational activities are organized by the cooperating action agencies and producer cooperators to disseminate these research findings, promote technology adoption, and address similar situations facing contract holders across Oklahoma and the southern region.

Summary

The Oklahoma post-CRP land management and sustainable production alternatives research and extension project.

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The Conservation Reserve Program (CRP) was formed within the Conservation Title of the 1985 Food Security Act. The program gave farmers incentives to take Highly Erodible Lands (HEL) out of crop production and put those lands into permanent vegetation, thus reducing soil erosion. The permanent vegetation options included 1) trees, 2) native grasses, 3) introduced grasses, and 4) wildlife habitats. Approximately 80% of the CRP land was planted to perennial grasses. Several benefits expected from CRP were reduced crop surpluses and certain environmental benefits including water and air quality benefits, reduced soil erosion, etc. Over 36 million acres are now in the CRP of which 1.2 million acres are in Oklahoma. Of this 1.2 million acres, 40% is located in the Oklahoma panhandle and 48% is located in the counties bordering the Texas panhandle. The CRP is a ten year program with first contracts expiring in 1996. Since almost 2/3 of the total CRP land has a crop base history with the USDA/ASCS, wheat being almost half, it is believed over 60% of this land will return to crop production. This project was designed to examine options for returning CRP land to wheat.

Test sites were established in southwest Oklahoma and the Oklahoma panhandle, with USDA cooperation, on private CRP land seeded to Old World bluestem (Bothriochloa ischaemum L.). An experiment was established at each location to determine the best tillage/herbicide combination to return CRP grassland to wheat production. CRP contracts permit tillage for such purposes 90 days before contracts expire on September 30. A split-block design with four replicates was used at each site. The main factor was primary tillage treatments, ie. no-till, offset disk, or moldboard plow. The subplots were seven herbicide treatments including glyphosate at 0.25, 0.5, 0.75, 1 and 1.5 lb ai/acre, glyphosate + 2,4-D premix at 40 and 54 fl oz/acre and a check. Ammonium sulfate and surfactant were included with all herbicide treatments at 2 % w/w + 0.5 % v/v. The herbicide treatments were applied in early May and early July, at one site and in early June and early July at the other site. Tillage was conducted 24 hrs after the second set of herbicide treatments was applied. The tilled plots were disked once again during the summer and disked and harrowed prior to planting. Old World bluestem control was less than expected, indicating that current CRP contract provisions restricting killing the sod until July 1 may hinder control with glyphosate. Biomass harvested before tillage operations began ranged from 2 to 9 tons/ac, with less than 7% crude protein thus it would be poor hay if removed for that use. Prior to planting, soil cores were taken at six inch intervals to a depth of four feet from plots treated with the high and low rates of glyphosate at each application timing and the checks. Soil moisture and nutrient content were determined at each depth to determine whether time of herbicide application, rate of herbicide and/or tillage treatment affected nutrient release and moisture storage. Within two weeks after planting, wheat stands were counted to determine tillage and/or herbicide treatment effects on stand establishment.

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Reverting to Crop Production on CRP Lands: Changes in Selected Soil Properties. DAO*, T.H., USDA-ARS, J. STIEGLER, T. PEEPER, J.C. BANKS, and M. HODGES, OK State Univ.

As the expiration date of the bulk of Conservation Reserve Program (CRP) contracts is rapidly approaching, a general lack of integrated management information exists on how these HEL would be used for grazing livestock production or to revert back to row-cropping while meeting conservation compliance. During 1994, we found that CRP lands cannot be used immediately in hay or grazing livestock production. The greatest limitations is inadequate N, P, and stand density. To re-crop these lands, we found that the time of suppression of a warm-season grass cover is essential for conserving soil water that is vital to the success of producing a winter wheat crop in the year a CRP contract expires. Changes in program rules must be made to allow pre-treatment of the CRP vegetative cover much earlier than the current 90-day period prior to a contract's expiration date. The amount of dry matter removed and regrowth is critical to how well we perform reduced tillage, kill the growing cover, and establish a good plant stand. Paired comparisons of the treatments in the CRP field and an adjacent field under continuous wheat production showed that after 7 years under grass increases in OC accumulation in soil was primarily observed in the 0 to 0.025 m depth of La Casa-Weymouth SiL and in the 0 to 0.10m of Dalhart fsl under the CRP. Differences in mineralizable N of these soils under the two land uses will be discussed.

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Post-CRP Land Use Options for Oklahoma's HEL.

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