OKRA: Its Role in Soil and Water Conservation

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Definition: Okra (*Abelmoschus Esculentus*) belongs to the mallow (*Malvaceae)* family and is considered a native of tropical Africa. This warm season, soft-stemmed, self-pollinated annual or perennial herbaceous plant, also called lady's finger; was introduced to the United States in the 1700s from Africa. It grows up to 4 - 6-feet in height according to the variety and region. Okra is cultivated as a vegetable for its green fruit pods and is one of the basically popular and consumed vegetables in the world.

PURPOSES

- To conserve soil and water through the use of vegetation.
- To maintain and/or improve soil availability, quality, and soil nutrients.
- To suppress weeds, reduce insect pests and diseases, and increase crop yield.
- To improve soil tilth, soil organic matter, and soil structure

General Criteria Applicable to all Purposes

Planting: Well-drained sandy loam or slightly alkaline soils with a high level of organic matter are good for raising okra. It prefers a pH range of 5.8 to 6.5. Okra needs full sun at least 8 to 10 hours a day. The optimum temperature range is 70 degrees F to 86 degrees F, with minimum temperature of 64 and maximum of 95 degrees F. Although a drought resistant crop, okra needs at least 1 inch of water per week for good quality growth and yield. If planted in May, this crop will last in the field until the first freeze in November. For planting 1 acre, 6 to 7 lbs of seeds are needed. Sow seeds 1 inch deep and space rows 36-42 inches apart with 18 to 24 inches between plants. For earlier production, transplant okra at 3 to 4 leaf stage in double rows. Soaking seeds overnight in water leads to faster

germination. When seedlings reach 3 inches tall, thin okra plants (18 to 24 inches apart) for better growth and yield. Shortly after pollination, the pods change fibrous and so must be harvested early and regularly, when they are about 3 to 4 inches long. Following hand harvest, remove the bottom leaves in order to speed up production.

Disking is a global practice used in farming that breaks up large clods of heavier soils, dissolves previous crop residues, improves soil quality and prepares a uniform seedbed for planting. Early deep disking is recommended to help minimize weed rots, fungal diseases and destroy root knot nematodes in okra crop, prior to planting. Disadvantages of disking include soil erosion on sloppy land, reduced water infiltration, a general decline in productivity, dust, and expenses.

Crop Rotation: Crop rotation is an effective cultural plan of raising crops in a sequence, on the same piece of land. This method produces an environment resistant to soil-borne diseases, pests and insects. The key purposes of rotation include increasing profit from the land, maintaining and improving the soil fertility, productivity and soil structure. Crop rotation efficiently controls the fungus disease verticillium wilt that affects okra and also prevents rootknot nematodes. It is practical not to plant okra, egg plant and tomatoes in the same field. Also, okra crops should not be grown following the production of other crops such as squash and sweet potatoes. Okra being a deep rooted crop, sweet corn, cabbage, wheat, and winter legumes like hairy vetch will make excellent succeeding crops whereas onions, mustard, and lettuce are generally beneficial preceding crops.

Cover crops: They are very important for maintaining soil structure, nitrogen production and nutrient enhancement, weed suppression, rooting action, and soil and water conservation. Cover crops act as ‘catch crops’ and add organic matter to soil. They are beneficial during the time of non-crop and prevent water runoff, soil crusting, and drought. Living mulches are cover crops that are inter-planted with vegetables in a minimum or no-tillage system. As a cover crop, alfalfa helps draw assassin bugs that hunt caterpillars, aphids, stinkbugs etc. It is a useful nitrogen fixer also. Another well-suited cover crop for okra is cow pea that significantly advances soil fertility and prolific yields.

Mulching: This is a commonly established horticultural practice. Mulches are substances placed over the top of the soil as a layer. They notably benefits crop production through soil and water conservation and temperature control. Apply organic mulches like grass clippings, straw, bark or wood chips, sawdust etc around the okra plants for protection and also yield enhancement. They revoke the necessity to cultivate by maintaining the soil loose, workable and additionally, shelter earthworms. Living mulches like canola, white clover and red clover reduce water and wind erosion, generate amounts of organic matter, improve soil structure, help adjust extreme temperature, and discourage weed growth.

Weed Control: Many weed species can infest okra such as broadleaf weeds, sicklepod, annual morning glory, common cocklebur, nutsedge, and annual grasses like crabgrass, goosegrass, perennial grass and Bermuda grass. Layers of mulching around the okra will aid radically in destroying weeds. During the initial stage of growth, tilling with a rolling cultivator, hoeing or pulling will eliminate majority of the small weeds. Besides, large leaves of the okra shade the soil and relatively prevent weed expansion.

Pest Management: Cultural practices along with crop rotation suppress pests very well. Ensure to remove, destroy and bury crop residues in the winter to prevent the pink bollworms. Get rid of stinkbugs, cabbageworms, corn earworms, and pests by handpicking. Cutworms, crickets and earwigs damage okra during stand establishment. Silverleaf whitefly and aphid attacks are regular during the growing season. Quality seeds and strict sanitation usually prevent fungal diseases. Animal manure and eco-friendly substances like Neem and bio-control agents are economical and useful in pest management. Consulting with a licensed pest control advisor for specific insect problems is sensible.

Residue Management: The management of crop residue is a priceless technology for reducing erosion and improving run-off water from agriculture lands. Surface residue management is the most practical erosion control practice in use today. Okra crop residue incorporated into the soil decays faster than residue left on soil surface. The rate of crop residue decomposition is vital from both agriculture and environmental angles. Crop residue, if retained on the soil surface, can extensively reduce soil erosion. It is possible to minimize the soil borne fungus disease “damping –off,” by decomposing all preceding crops, prior to planting.

The total fresh residue mass of okra (root and shoot) ranges from 50,000 lbs to 60,000 lbs/acre (11750-14,000 lbs/acre of dry residue.) Okra residue contains 37% carbon and 0.90% nitrogen. At this rate, the crop returns 4350 to 5200 lbs of carbon, and 106 to 127 lbs of nitrogen per acre. Leaf area index (LAI) is the unit area of leaves per unit area of soil surface. LAI goes up to a maximum of 2 between 60 and 80 days after planting and it goes down below 1 after the fourth month, due to the shedding of lower leaves. If planted in April, the canopy cover percentage of okra in May (after 40 days) will be 20 to 26%. Okra offers thick vegetation with more than 50% canopy cover after 45 days of planting. This soil conserving crop provides outstanding protection to soil with 80-95% canopy cover until the end of the fourth month. Okra lengthens its fruit production even after shedding the entire leaves. The canopy and yield lessen after four months and it is advisable to clip the crop down at this phase, as it turns into a soil depleting crop. Okra needs multiple harvests every week and the yield ranges from 20,000 to 25,000 lbs per acre.

Published by Cooperative Extension, School of Agriculture, Research, Extension, and Applied Sciences, Alcorn State University, Mississippi, in collaboration with the USDA/NRCS. Alcorn State University is deeply grateful to the USDA/NRCS for providing funds for this publication. * Corresponding author