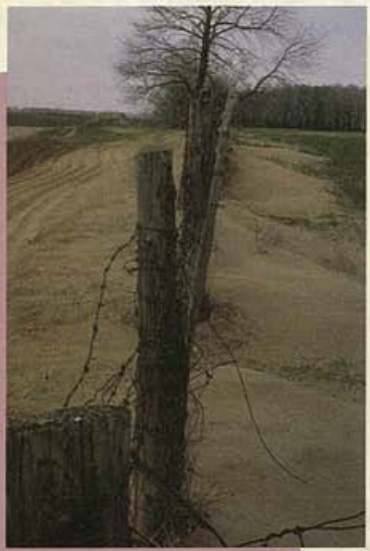
TOBACCO



Tobacco soils are prone to wind and water erosion requiring good management to be productive.

Tobacco farmers have been concerned about soil and water quality since the 1930's. In fact, developing farming practices that take environmental issues into account is vital when farming on the sandy soils used by tobacco farmers. As new technology and scientific research become available, farmers must continue to re-examine and evaluate their cropping practices.

SOIL MANAGEMENT

Organic matter is vital when growing tobacco in sandy soils, particularly for nutrient storage capacity. It improves the soil's ability to hold moisture and helps to develop soil structure. The level in tobacco soils varies from less than one to about three per cent with most soils falling within the range of one to two per cent.

Rotation with rye is the traditional way of maintaining and increasing soil organic matter levels in the soil. Research shows that a rye-tobacco rotation is an effective way to maintain and increase soil humus. As markets change and new varieties are introduced, further research will be needed to understand nutrient uptake in tobacco plants and the interaction with cover and rotation crops. In particular, studies of the following areas are needed:

- ►Spring application of nitrogen to a rye crop including use of various forms of ammonium-based fertilizers.
- ►The timing and method of working straw into soils and the effectiveness of cover crops that were harvested vs. not harvested.
- ►The changes in organic matter as a result of late-summer application of nitrogen.
- ►The best time to work green manure into soil.

Along with using rye in rotation with tobacco, farmers may consider applying manure to sandy soils and knolls. Manure should be worked into soil as soon as possible to avoid loss through evaporation and surface run-off.

Soil texture also affects fertilization. Sandy soils do not store as much water and nutrients as do loam soils so good management is crucial. Soil structure must be carefully protected by:

- ►Working soil that is dry.
- ►Avoiding excessive tillage.
- ►Reducing traffic from heavy equipment.
- ►Where possible, minimize axle weight to no more than five tons per axle.
- ►Applying lime in the fall when soils are dry.

If these practices are not used, soil may become compacted. This destroys the large pores containing air in the soil. When there is not enough air, specifically oxygen, in the soil, plants cannot use nutrients as effectively. If your soil has a compacted layer, consider subsoiling at that level. See the section on Understanding the Basics for more information.

Farming systems that reduce the amount of tillage should improve and protect exposed soils. Some growers, as a result of reducing primary tillage, use excessive cultivation to create a good seedbed. More evaluation of the technique is required. To date, research into no-till systems shows reduced yields. At this time, no-till is not recommended for tobacco.

Row crop cultivation performed on a timely basis avoids crusting and increases soil roughness. Production is enhanced through:

- More water soaking into soil.
- Erosion by water is reduced.
- Wind erosion to early transplants is reduced.
- Soil temperatures are higher.
- Soils contain more air.
- Weed control is cost-effective.

Continued planting of windbreaks, use of strip cropping, rotation with rye and ridge tilling reduce wind and water erosion. These practices also increase the level of organic matter in soils and improve soil structure. At this time, moldboard plowing remains the best way to improve topsoil when combined with these methods. Any change will require further research.

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NUTRIENT MANAGEMENT

Before applying nutrients, it is important to determine the levels already in soils. Therefore, the following steps should be completed:

Test soil for nutrients and pH levels. Highly acidic soils, for example, do not make nutrients as available to plants and so fertilizer applications will be inefficient.

Test plant tissue to understand how plants are using nutrients. Although misleading at times, tests can show needs for micronutrients. OMAF Publication 298 says, "Very high levels of iron, manganese and zinc are occasionally found in the cured leaf and these are associated with a certain type of 'grey' tobacco."

Examine plants for nutrient stress by walking your fields.

Rates of nitrogen application vary with soil type and cropping practices. Follow the recommendations in OMAF Publication 298. Split applications of nitrogen address plant needs throughout the growing season. This will also reduce leaching and inefficiency in fertilizer use. Slow release forms of nitrogen may help but more research is needed. Banding fertilizer is both cost-effective and environmentally-friendly.

WATER MANAGEMENT

Factors such as tillage that affect organic matter and soil structure also affect water quality. Surface run-off and leaching are concerns. Any practice that keeps topsoil in place and increases the rate at which water soaks into soils will improve the soil's ability to hold water. This, in turn, controls the movement of water through soil. Many of the practices already discussed such as rye-tobacco rotation and the management of nutrients and pesticides help maintain water quality.

When rainfall is not adequate, irrigation may be needed. The rate that water is applied, the frequency of watering and knowledge of approaching rainfall will control movement of water in soils.

Good nutrient management techniques such as soil and plant tissue testing and field observation will pay off at harvest.

PEST MANAGEMENT

Present day pesticides have several advantages:

►They are less persistent in the soil.

►Lower toxicity.

►Employee safety is increased.

►They are not applied as frequently.

Research has shown that low rates of pesticides can be effective. For example, there are several alternatives for cutworm control that permit lower rates as compared to the soil treatment.

►Apply to the cover crop.

►Band the pesticide at planting.

►Apply a systemic pesticide in the planting water.

When crops are heavily infested with black root rot, a multi-purpose fumigation treatment is normally used. Other possibilities to reduce the problem include:

►Rotating the crop with corn.

►Using crop varieties that are more tolerant to Black root rot.

Disposal of pesticide containers is a concern. The best answer to date is to increase use of refillable containers so that disposal is not necessary. This also is more economical.

Summary

The nature of tobacco soils forces use of best management practices. Many of these practices are long-standing traditions. However, new problems and challenges are continually being resolved. The benefits of research have helped farmers over the past 60 years and will continue to help into the future.