PHOTOGRAPHIC PLATES

ACKNOWLEDGEMENT

The following pages of photographs depict a progression of harvest technology, as well as examples of various factors affecting harvest efficiency. The editors of this Monograph gratefully acknowledge the generosity of Col. Harris Barnes, USMCR (Ret), for supplying many of the photographs. Also contributing photographs (in order of appearance): Delta Research and Extension Center, James Supak, Jerry Duff on behalf of Uniroyal Chemical, Charles Snipes, and T.B. Freeland, Jr.
Prior to the development of aqueous sprays, agrichemicals, including harvest aids, were applied with mule-drawn “dusters” that relied on wet foliage to “stick” the active ingredient to the plant.

Aerial application contributed to the acceptance of harvest aids, with products such as calcium cyanamide, which also was called cyanamid powder, or “Black Annie.”
Mechanical harvesting gained acceptance in the 1940s, beginning with one-row models initially introduced by International Harvester™.

Experimentation with different machinery was commonplace in the 1950s and 1960s.
In the 1950s, several manufacturers, such as Allis-Chalmers®, built affordable two-row pickers and strippers.

Tractor-mounted pickers and strippers provided farmers with affordable mechanical harvesting capability.
Two-row pickers and strippers dominated the harvest scene for more than 20 years, until manufacturing technology and production economics drove the market to wider, multi-row models.

A cost-effective defoliation/desiccation operation in the fall begins in the preceding spring with a uniform stand of healthy seedlings.
Weed management during the growing season is vital to a cost-efficient harvest. Morningglory (*Ipomoea* sp.) is one of the most troublesome weeds that plagues harvest.
Understanding boll maturity is critical to obtaining high-quality lint. Look for back seed coats and well-defined cotyledons to delineate a mature boll from one that is immature.

Location of the uppermost cracked boll can be used to determine crop readiness for harvest-aid application with the "nodes above cracked boll" method. Research has shown that four first-position bolls above the uppermost cracked boll are safe to defoliate.

(Inset) A mature boll is considered cracked if lint can be seen through the sutures.
Basal regrowth is the first to form and hardest to control, but generally is less troublesome to a harvest operation.

The new leaves subsequent to defoliation can appear as terminal regrowth and often are a source of green staining, fine leaf trash, and excessive moisture in seed cotton.
Leaves desiccated by a harsh harvest-aid treatment are essential for stripper harvesting, but can increase hard-to-remove trash in spindle- and stripper-harvested seed cotton.

A crop stressed by drought, hot weather, disease, or other factors generally is more difficult to defoliate.
Ground units are widely used for harvest-aid application, especially in smaller fields and near populated areas. Harvest aids are most effective on crops that are physiologically mature, or “cut out,” and free of undue stresses.

Choosing the right combination of harvest-aid products for crop and weather conditions can improve the overall defoliation/desiccation operation.
A significant percentage of the U.S. cotton acreage is defoliated with ground-application equipment.

Aerial application of harvest aids allows cotton producers to cover large acreages in a timely manner.
Turbine-powered aircraft largely have replaced rotary engines. Turboprops carry a larger payload than conventional spray planes and can cover a greater number of acres per day.

Good defoliation and desiccation allow for timely stripper harvesting.
Modern cotton pickers have far greater capacity than could be imagined even as recently as 1980. Advances in the use of harvest aids have facilitated development of larger, faster harvesting and ginning equipment.

Effective defoliation allows a high-capacity harvest, keeping pickers operating efficiently by using "boll buggies" to transport cotton to module builders.
Manufacturing technology meets demand, as growers rush for greater harvest efficiency.

Module building made harvester capacity independent of ginning capacity, enabling growers to get crops "off the stalk" and minimize field weathering losses.
Good defoliation and desiccation, coupled with timely harvest, are important in allowing for safe field storage of seed cotton in a densely packed module.

The images on the following page were processed by T.B. Freeland, Jr., and C.E. Snipes from data provided by Mississippi State University's Remote Sensing Technologies Center and NASA.
In the future, precision application of harvest-aid materials will be possible by using remotely sensed data. Classified net vegetative indexing (shown above) indicates areas of full foliage (green) and areas completely defoliated (tan/cream). Decreasing levels of foliage are indicated by blue, followed by purple, then red, then pink.

Multi-spectral infrared imaging may be used to identify defoliated (grayish-blue) and non-defoliated (red) areas in a single field.
Harvest-aid programs allow for timely harvest and fit into overall crop management systems, by eliminating food and overwintering sources for insects and by facilitating fall tillage operations.

Cotton harvest in the new millennium has advanced greatly with the wise use of harvest aids and advances in manufacturing technology.