

100 Years of Aerial Crop Dusting

By: FAA Historian Terry Kraus



First known crop dusting effort, 1921
Courtesy: National Agricultural Association of America
(NAAA)

In August, the agricultural and aviation communities quietly celebrated the 100th anniversary of the first use of the airplane for crop dusting. On August 3, 1921, Army Air Corps pilot Lieutenant John A. Macready, piloting a specially modified Curtiss JN4 Jenny, spread lead arsenate over a six acre grove of 6,000 catalpa trees at Postmaster Harry Carver's farm Troy, Ohio. Catalpa trees were harvested for their hardwood used for railroad ties and fence posts.

The plane, fitted with a small makeshift hopper (a metal container) and a release mechanism attached to the side of the plane, flew 20 to 35 feet over the orchard, spreading the powdered insecticide in an attempt to kill caterpillars eating the leaves of the trees. Macready relied on the wind and currents from the propeller to carry the poisonous power to the rear of the plane and then down to the grove. The plane landed five times to refill the hopper. The dusting proved successful, demonstrating a plane could do in minutes what it would take ground-based workers days to complete.

The idea of using an airplane for crop dusting came at the suggestion of Charles R. Nellie, an Ohio Department of Agriculture forester in Cleveland, who shared his thoughts with entomologist John S. Houser at the Ohio Agricultural Experiment Station in Wooster, Ohio. Wooster officials contacted the Army at McCook Field to see if they could create a device for spreading insecticide from a plane. Etienne Dormoy, an engineer at the field, constructed the hopper, which could hold 100 pounds of the powdered insecticide.

Although early trials using planes as crop dusters showed the feasibility of such a venture, the use of planes for aerial crop dusting was not quickly adopted. Many farmers could not afford to purchase planes, and the current plane models could not be easily adapted for farm use. Furthermore, as the U.S. began preparing for possible entry into the European war in the 1930s, plane manufacturers geared production toward military use.

After World War II, surplus planes became readily available and agricultural use of aircraft saw a rapid expansion. By the early 1950s, the Civil Aeronautics Administration (CAA) listed over 5,000 aircraft in agricultural use. Farmers found that aircraft could spray 60 to 70 acres an hour compared with 100 acres a day for a tractor-drawn ground sprayer. The airplanes used by farmers ranged from heavy World War II bombers to light, personal aircraft. Most of these airplanes had to be adapted for agricultural use by the individual operator.



Aircraft adapted for aerial spraying had a high accident rate. Hoping to develop a safe crop dusting plane, in 1949 the CAA contracted with the Aircraft Research Center at the Texas Agricultural and Mechanic College (Texas A&M) to build an airplane specifically designed for agricultural use. Under the \$50,000 contract, the college would build an aircraft designed to spread insecticides, broadcast seeds, and fertilize fields. Noted aviation pioneer and engineer Fred Weick, then working at the college, developed the plane. AG-1 made its first flight on December 1, 1950. The CAA demonstrated the AG-1 on June 27, 1951.

The AG-1 prototype was a single-seat low-wing agricultural plane with open-cockpit and 225 horse-powered Continental E-225 engine. The CAA held demonstration flights across the country and allowed scores of aerial applicator pilots to fly the plane for evaluation purposes over the next three years. In southwestern part of the country, for example, the airplane flew 4,180 miles and 147 pilots tested the aircraft. After service testing, during which 650 pilots flew the aircraft, Texas A&M made final modifications to the plane.

Weick built the AG-1 with safety in mind. He worked with Cornell University's Crash Injury Research Unit to design many of the safety features. Structural safety features included an adjustable pilot seat that could withstand a 40G shock and a shoulder harness. The plane's design also included slow-flight control. *Aviation Week* described the plane as a "flying padded cell." In August 1953, the safety features proved their worth. CAA pilot, John P. Jones crashed the plane near Lubbock, Texas, destroying the plane. Jones, however, survived the crash – his only injury was a bruised thumb.



AG-2
Courtesy: NAAA

By design, neither the college nor the CAA held the patents for the design features of the plane. The CAA hoped manufactures would use the engineering plans to create their own agriculture aircraft. Transland, in conjunction with the Texas A&M, went to work on AG-2 in 1954. The new plane included application equipment for handling solids and liquids, pump, tanks, hopper, spray booms and spreaders. The 53 cubic foot hopper almost double the size of the hopper on AG-1. The plane increased the capacity for liquids from 150

gallons to 250 gallons. The single-seat agricultural aircraft made its first flight on October 11, 1956, and the CAA awarded the aircraft its approved type certificate on June 24, 1958. The company hoped to put aircraft into production for all types of aerial spraying and as a tanker for

fire-fighting and control. The plane, however, proved too expensive at over \$15,000 and, hence, Transland only built three of the aircraft.



While still at Texas A&M, Fred Weick designed the third plane in the AG series, a 135 horse powered, fabric covered, low-wing taildragger with an 800 pound payload which resembled the AG-1, but smaller and lighter. In 1957, Weick joined Piper as the company's director and chief engineer. He brought his plans for the AG-3 with him. Hundreds of farmers tested the AG-3 before it went into production as the Piper PA-25 Pawnee agricultural plane.

Today, a variety of planes, helicopters, and drones are in agricultural use. Thanks to innovations in agricultural aircraft pioneered by Fred Weick and others, there are approximately 1,560 aerial application businesses in the United States. In addition, the country boasts almost 3,400 total agricultural pilots, who work in all fifty states. Each year, these pilots treat 127 million acres, or approximately 28 percent of America's cropland.

For more information on the 100th anniversary, visit the National Agricultural Association of America at <https://www.agaviation.org/100pressroom>.