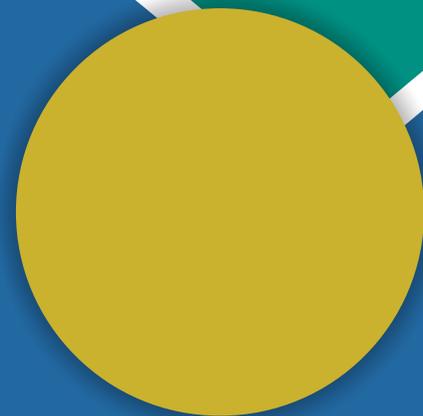


An Improved Boom Sprayer for Crops



Muhammad Iqbal

Department of Farm Machinery and Power,
University Agriculture, Faisalabad



It has been observed that about 50 percent of insecticides/pesticides are wasted which not only add to the cost of production but also cause environmental pollution hazards and imbalance in the natural ecosystem. In Pakistan, different types of sprayers are being used. Presently available tractor mounted boom sprayers spray from the top of the plants on the upper side of leaves but most of the insects resting on the lower side of the leaves have been reported. Mostly the chemicals do not hit the actual target and cause wastage of the spray material to the environment.

Benefits of using improved over the conventional boom sprayer

- Number of sprays reduced from 12 to 8
- Insect mortality found 100%
- Savings in spray was up to 10%
- Increase in crop yield was up to 10%

Machine development

To solve the big problems of crop spraying, a drop-pipe tractor mounted University Boom Sprayer has been designed, developed, and tested for mortality rate of attacking insects which cause severe damage to cotton crop and reduce the yield greatly. The newly designed boom sprayer is 11.43 m long, 0.73 wide, and 2.44 m high. It is operated with a tractor of 50-hp or above. This sprayer has upper and lower two booms to spray the cotton crop both from above and below the leaves. The lower boom has drop-pipes on the lower end of each two nozzles are mounted. Each nozzle can be rotated and adjusted in 360° both in horizontal and vertical planes to directly hit the insects. Drop-pipes have also the facility to be adjusted backward at any angle from 0°-90° with respect to vertical position to avoid crop damage during more vegetative growth. The upper auxiliary boom has been designed to spray from top to bottom at later stages of crop as in the conventional boom sprayer.

The performance of improved boom sprayer was found best at 4-km/h-field speed and 400- kPa fluid pressure. Insect mortality has been found 100% at 60% leaf surface coverage with spray both on upper and lower leaf surfaces. This newly designed sprayer saved insecticides amounting about \$30/ha, increased 10% cotton yield per hectare. Since mostly crop was sprayed by nozzles mounted on the lower ends of drop pipes moving within the crop canopy, therefore, negligible environmental pollution and spray drift were observed. This machine is really a great invention of national importance. About 1000 acres has been successfully sprayed in Multan area during 2004.



Improved Boom Sprayer spraying cotton crop for demonstration to stakeholders

Registered and patent issued by the Registration and Patent, Department Karachi Government of Pakistan.

(Patent No. 139290, Dated: June 30, 2008).

Website: www.ipa.gov.pk/patent/gazette/11-8-2007.pdf