

Drudgery Remover: Boom Sprayer

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SUMMARY

Farming is India's cornerstone. Pest controlling measure play crucial role in production of crop. The spraying uses a low-pressure fluid stream that is mixed with compressed air at the air cap to atomies' fluid in a controlled manner. The utilization of air spray technology achieved the benefits of highest finish quality of crop. Different types of sprayers have been developed, according to situation the different sprayer are employed.

INTRODUCTION

Pests are the most common issue that farmers encounter while cultivating crops. As a result, in order to achieve high yields, farmers need to find strategies to deal with the presence of plant pests. That is undoubtedly expensive. A sprayer is a device that is used in agriculture to spray liquids like as water, insecticides, and pesticides. Chemical application is the most vital process in agriculture for increasing production. There currently are four types of sprayers and booms available: hand-operated, animal-drawn, tractor-borne, and self-propelled (Ambaliya *et al.* 2022). In developed countries, sprayers have been developed to help farmers for elimination plant pests. In a sprayer, a boom was employed for applying pesticides. They are typically known for applying herbicides to crops, pastures, golf courses and lawns, but are used in many other applications such as dust control and frost protection.

Types of Boom Sprayer

Self-propelled boom sprayer

It uses a battery as power source to spray the liquid or herbicide contained in the tank. The liquid will flow through the distribution pipe and will spray at each nozzle. The nozzle has mechanism which allows the nozzle height, to be easily adjustable. It has an electric tank which enables to use either manually or automatically. The automatic electric tank comes with a battery as a power source. When the battery is fully charged, it can last for 6 hours.

Tractor mounted boom sprayer

It is a device, controlled by a four-wheel tractor while the operator only drives and controls the spraying results. Gasoline motor or PTO (power takeoff) used as a power-generating unit in a semi-automatic boom sprayer with tank capacity of about 200–1000 liters of water. It resembles with a knapsack sprayer, but nozzle positioned appears behind the operator, thereby does not require hand assistance to pump and move it.



Self Propelled Boom Sprayer



Tractor Mounted Boom Sprayer

Parts of a Boom Sprayer

There are several other components that comprise a boom sprayer:

Pump

Different types of pumps can be used on a boom sprayer. However, the most common types are 12-volt diaphragm, roller, and centrifugal pumps.

12-Volt Pumps

They are used on smaller boom sprayers, that don't require high flow such as ATV sprayers and pull-behind lawn sprayers. They can be powered by the existing battery on mowers, ATVs, pickups, etc.

Roller Pumps

When the required more flow and pressure than a 12-volt pump can provide, a roller pump can be used. It is generally driven by PTO shaft; if it is not available then roller pumps can be driven by a gas engine. They are primarily used on three-point linkage on tractors.

Centrifugal Pumps

Centrifugal pumps are variable capacity but they generally produce higher flow rates than the other two types of pump mentioned above. It drives using through the different sources as PTO, hydraulic motor, a gas engine, or an electric motor.



12-Volt Pumps



Roller Pumps



Centrifugal Pumps

Tank

Tanks used on sprayers come in a wide range of sizes and designs. Polypropylene tanks are the most common form of sprayer tank used today. This tank has resilient chemical resistance, robustness, and is lightweight. Tank design may appear arbitrary, yet it determines how a tank drains and where its center of gravity might be balanced.

Hoses

A hose is a flexible hollow tube used to transport fluids from one location system to another. It is also known as a pipe.

Controls

There are various methods for controlling the output of a boom sprayer. Smaller lawn sprayers will feature a pressure regulating valve, however bigger agricultural or de-icing sprayers may have more intricate electronic controls to manage sprayer output. Sprayer control can be divided into two types: pressure control and flow meter control. Pressure-based controls allow the operator to regulate the sprayer's output dependent on the operating pressure.

Flow meter-based sprayer control gives the operator a precise reading of the sprayer's output in gallons per minute or liters per minute. The flow meter interfaces with a computer-based rate controller and shows the results on a tab. This enables the user to make changes depending on the reading of the flow meter.



Pressure based controller



Flow meter based controller

Boom

Types of Boom

Conventional Boom

A conventional boom is the type that is most commonly associated with a standard boom sprayer. This is made up of several nozzles evenly spaced along a piece of pipe or bar. There are two types of conventional boom: wet and dry.

The difference between a Wet and Dry spray boom is how the liquid is supplied to each nozzle body. On a wet sprayer boom, the liquid travels through a rigid pipe and each nozzle body is attached directly to the boom. So the boom is “wet”. A dry spray boom uses hoses to supply liquid to each nozzle body and the nozzle bodies clamp onto a boom pipe or tube that does not have liquid flowing through it, so it is “dry”.

Boomless Sprayers

A “boomless” sprayer is closely related to the boom sprayer. This type of sprayer, like a boom sprayer, covers a wide swath but instead of multiple nozzles uniformly distributed on the boom, it employs just one single nozzle or two nozzles mounted back to back.



Conventional Boom



Boomless Sprayers

Nozzles

The nozzles are the most important part of sprayer. Many boom sprayers designed for lawn mowers, ATVs, UTVs, etc., will come with a “standard” set of spray nozzles. Selecting a nozzle is important to ensuring you are applying the correct rate, and doing it in an effective, and efficient manner.

Benefits of boom sprayer:

- Boom sprayer is less affected by wind.
- It provides more accurate spraying.
- It is more efficient sprayers and compatible with large farms.
- The farm machine need less effort (remove labour) and extra expenses.
- More work in less time
- Different variations in spraying to protect crops
- Safe to use

CONCLUSION

While spraying pesticide, herbicide and fertilizer by hand sprayer, spray of chemical droplets may fall on human body. Which result into, itching or skin damage. But, boom sprayer not only reduces drudgery but also the effect of chemical on body. Hence, increase the efficiency and quality of life.

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