

MACHINERY SELECTION - CROP SPRAYERS FOR ORCHARDS AND VINEYARDS



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Before deciding to purchase new equipment, consider the following:

Existing and future farm policy and equipment-Existing and future farm policy will dictate the area, variety and rotation of the crops to be sprayed; different crops will have different spraying requirements, such as types of chemical, application rates and the timing of applications.

Timeliness-Timeliness of spraying is very important to the grower. Pesticides must be applied at the correct time to ensure their success. The following points will affect timeliness of application-

- a) area to spray per season,
- b) frequency of spraying,
- c) land characteristics,
- d) weather
- e) workload of the farm.

Alternative spraying techniques - Growers need to consider novel sprayer designs such as directed deposition sprayers. Each new design needs to be carefully assessed; do the benefits outweigh the extra costs? With increasing legislation concerning the environmental aspects of pesticide application, techniques that improve deposition, reduce drift and reduce tank rinsate must be considered.

Modify an existing sprayer - Many modern components for updating sprayers can be bought via catalogues or via the Internet and can be supplied by nozzle manufacturers and specialist component manufacturers. These very comprehensive catalogues or web pages are illustrated with excellent diagrams to aid on-farm sprayer modification. A number of manufacturers offer electronic aids that help monitor the sprayer, self-fill hoses, chemical probes, etc.

Home construction - If the farmer is mechanically minded or has a competent mechanic and a lot of spare time, one may consider making one's own sprayer. Sprayer component catalogues are a most useful source of information to aid the construction of farm sprayers. The alternative to making a sprayer oneself is to commission a sprayer from a manufacturer; a number of manufacturers will construct a sprayer to the client's specification

Custom application - Growers based upon small acreages should consider the role of the custom applicator before purchasing a sprayer. Alternatively, a grower, after purchasing a specialist sprayer, may have time to establish a business as a custom applicator and thus help spread the high costs involved.

Aerial spraying is normally a specialized contracting service and can be financially attractive to some farmers, particularly when early applications are required.

PURCHASING A SPRAYER

Before purchasing a new sprayer, consider the following criteria in regard to sprayer selection:

1. Construction

Durability is required.

2. Tank

The tank should be made of non-corrosive materials such as plastic, glass-fiber or stainless steel

and be adequately supported by the framework. Stainless steel is stronger but heavier. Tank agitation is very important to ensure that the chemicals are well mixed, so check that the pump is large enough. Access for tank filling is most important, check the height and ease of filling. Many modern sprayers are fitted with a self-fill hose for water and an induction bowl for chemical filling. Use of tank rinsing aids (small spinning discs or nozzle heads) fitted in the top of the tank is recommended. They reduce the amount of washing water, reduce the time required to wash out sprayer tanks and eliminate operator contamination.

3. Pump

The choice exists between a centrifugal, diaphragm, diaphragm/piston or a piston pump. The use of a diaphragm or piston pump, whilst more expensive, has less moving parts in contact with the solution; the farmer may consider a positive displacement pump as being the most favorable, particularly where a variable forward speed is required. The pump should have a high capacity to ensure a good flow to the nozzles as well as providing good agitation for the tank contents.

4. Nozzles

Farmers should consider nozzles made from modern materials, which are, long lasting, color coded for easy selection and are easily replaced. Modern anti-drip devices use rubber diaphragms that ensure longer life and require less maintenance.

5. Filters

Adequate filtration is so important to ensure that the sprayer output is maintained and remains accurate, inadequate filtration results in excessive nozzle wear and nozzle blockages. If the farmer is intending to use wettable powders and fine sprays the extra in-line filters can be fitted. Filter accessibility for maintenance should be considered.

6. Pipes and Hoses

Check hoses for size, large bores ensure a good flow and helps reduce foaming. Check the strength of the materials used e.g. check that the pipes don't kink thus reducing or preventing flow.

7. Framework

The frame needs to be light but strong, it needs to be strong enough for the treatment it may receive on your farm. The overall strength of the sprayer should be considered. The sprayer should be well made using strong, durable materials but not too heavy. A heavy sprayer with a large tank will cause soil compaction on most soils. The choice of tires will affect the degree of compaction and one should check that alternative tire sizes are available. Low ground pressure tires are most useful if one sprays in early spring.

8. Controls

Access to the controls from the tractor cab is important, particularly if one is applying toxic sprays. The use of electric or cable controls may need to be considered, they add to the cost but help to provide a better and safer environment for the operator, allowing him/her to concentrate on driving at the correct speed and direction.

9. Monitors

Are any monitors fitted as standard, are they adequate or too sophisticated? Monitors are an important aid to greater accuracy. Monitoring systems can be part of a fully automatic constant spray control; do you require such a system? To obtain the best from any monitoring system you need to understand fully how the system works.

10. Ease of Attachment

Trailed sprayers are often easier to attach than mounted sprayers, a lot of time can be wasted with some sprayers if they are difficult to attach. A number of manufacturers use a lower linkage hitch for their mounted sprayers. Other manufacturers mount the pump on the sprayer frame, this saves a lot of time trying to fit a pump and torque chain onto the tractor.

11. Cost

The capital cost of a sprayer is very important; as is its resale value, check that the sprayer holds its value. Alternative methods of finance such as leasing may be considered. Maintenance costs should also be considered, as these costs can be quite high.

12. Machinery Dealer

Close proximity to a reliable dealer is so important to ensure a speedy service when the sprayer breaks down; machines tend to break down at the busiest time of the year! The availability and cost of spare parts from the supplier should also be considered. Surveys show that people buy from people.

13. Ease of Maintenance

Good maintenance will aid accuracy and the sprayer should be designed to allow for easy maintenance, e.g. the sprayer should be able to be drained of all liquids to avoid frost damage; filters should be easily dismantled or self flushing to ensure a good liquid flow.

14. Power requirement

Ensure your existing or future tractors will be able to pull and drive the sprayer over varying terrain.

15. Operator

The person who is to operate the sprayer should be considered. The operator should be responsible, well trained and highly motivated. The degree of sophistication of the sprayer may be too great for some people; there is a definite need for operator training. A comprehensive instruction manual should be provided which explains in detail the finer points of the sprayer. All operators should attain a level of competency to ensure the safe and correct application of agricultural chemicals. A skilled operator is so important to ensure accuracy of application. Operator comfort and safety is very important especially if one is spending many hours spraying during the season.

16. Personal preference

The final consideration is that of personal preference, this may be based upon:

- a) One's own experience, gained from many years of crop spraying
- b) Advice obtained from a specialist adviser, or neighboring farmers who have experience of a similar land-type and climate.
- c) Advice may also come from machinery dealers who, like neighboring farmers, have experience of local conditions.

After considering all the previous points, one should then draw up a short list of suitable sprayers and see them demonstrated on your farm, comparing each sprayer under your field conditions and your standard of operation and management.

Use this checklist to compare sprayers

	Machine A	Machine B	Machine C	Machine D	Machine E	Machine F
1. Construction						
2. Tank						
3. Pump						
4. Nozzles						
5. Filters						
6. Pipes and Hoses						
7. Framework						
8. Controls						

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