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Overview of the organic spreaders stock in France: state of the art and performance assessment

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Abstract

The French stock of organic spreader evolves and presents differences by their users. Cuma and agricultural work companies are the main operators which buy machines and provide spreading services for farmers. Individual sales are currently at a low level. The market decreases in units sold but prices increase. In this context, operators renew spreaders after 7-8 years and over 10 years for tankers, replacing small machines with bigger ones. Cuma use mostly vertical rotors spreaders for solid organic fertilisers and big slurry tankers for liquid organic fertilisers. Application rate equipment is at a level of confidential use. Agricultural work companies, when they are specialized in spreading, use mostly spreading table spreader, the biggest slurry tankers on the market and also all type of self-propelled machines. They adopt more easily application rate equipment as they have to respect more constraints for spreading than farmers and the possibility to get easier cost amortization due to a high intensive activity.

Introduction

The stock of organic spreaders is currently barely known in France. Public institutions have very little information on this equipment and are in demand of such data to improve either legislation or provide subsidies for farmers. Since 20 years, spreaders with vertical rotors are very used for manure spreading. Slurry tankers have increased their capacity following the farm areas evolution. In the largest farms with cultivated land, some self-propelled spreaders are used. A study was conducted in order to answer several questions [1]. What kinds of equipment are in use for solid and liquid spreading? What are there capacities? What is the different application rate equipment used?

Material and Methods

The different type of spreader in use

Organic spreaders can be divided in two types, for solid organic fertilisers such as manure or residual waste and for liquid ones such as slurries [2-3]. Regarding the solid product spread, the main type used in France is spreaders with two vertical rotors (Photo 1). These spreaders are mainly used for cattle manure which is the most common matter encountered in spreading practices. These spreaders are robust and especially destined for raw products. The common application rate for these spreaders is between 20 and 30 t/ha. For other solid product, such as compost, broiler manure and other by-products, the spreaders with spreading table (Photo 2) are also used. These spreaders with large capacities allow small application rate (between 3 t/ha and 15 t/ha).

Liquids are commonly spread with slurry tankers. The most common spreading equipment is a simple splash plat. But recent models, with largest capacities receive better spreading equipment as trailing hoses (Photo 3) and injectors (Photo 4).



Photo 1. Spreaders with two vertical rotors



Photo 2. Spreader with spreading table



Photo 3. Trailing hoses



Photo 4. High capacity tanker with injectors

Survey of the main operators

Different operators represented at the national level were surveyed. Three types of groups were identified: the cooperatives for the use of agricultural equipment (CUMA) i.e. groups of farmers buying together agricultural equipment for a common use. In the CUMA Network, organic spreading is a main activity with approximately 9.000 spreaders in use in 2009. By contacting Cuma in most of the departments (67), we collected data on a large sample of machines. Finally, almost 6.400 spreaders and 3.400 tankers are taken in account. The localisation in the country is presented Table 1.

Table 1. Number of machines by region

Localisation	Manure spreader	Slurry tanker
West	1824	1201
North east	1536	836
Centre	925	274
South east	771	451
South west	1357	666

Agricultural work companies represented by their national federation (FNEDT) can provide different agricultural services including organic spreading. The national federation has selected a sample about a hundred of companies specialized in organic spreading. All companies of this sample were localised in north east, west and centre French regions. Finally, the sample takes into account 150 manure spreaders, 100 slurry tankers and 80 self-propelled spreaders.

The French syndicate (Axema) representing the industry of agricultural equipment in France collaborates also to this study. The French market of manure spreader decreases since 15 years: the number of machines was over 4 000 in 2000 and near 2 000 right now. Their capacities are nevertheless largest and the value of the market is stable. For slurry tankers, a collapse of the market divided sells by 3 in 15 years. The large capacities (over 14 m³) are in expansion.

Technical characteristics

Three technical characteristics were studied to have a look of the stock:

- (i) The kind of spreading equipment use (vertical rotors or spreading tables for solid products, splash plates, multi nozzle spreader bars, trailing hoses or injectors for liquid products),
- (ii) The spreader capacities divided in different classes announced in m^3 ,
- (iii) The type of application rate equipment used like proportional flow rate speed, flow rate meter (for liquid spreaders only) and weighing systems, following shutter, edge shutter (for solid spreaders only).

Complementary information as the year of purchase and localisation in the country were also studied.

Results

Spreaders of Cuma

For solid organic fertilisers, most of the spreader (sample of approximately 6000 units) have been bought since 6 years ago. Spreaders are intensively used, generally more than 500 loads per year and the wear is important. Models with vertical rotors are the reference for Cuma (Figure 1). Spreader capacity is between 10 and 15 m^3 in 60 % of cases. Since 2006, increase in sales of bigger capacities spreaders (more than 15 m^3) was observed. Application rate equipment just appears recently in the Cuma. This equipment is used in little number. The flow rate proportional to the speed (DPAE) system is the most disseminated (Figure 2).

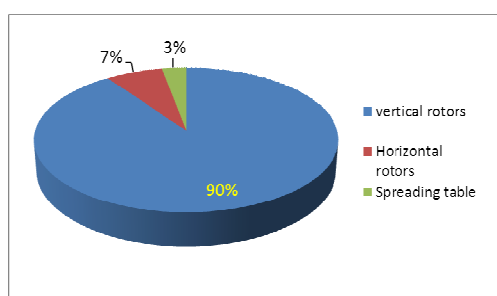


Figure 1. Proportion of spreader models

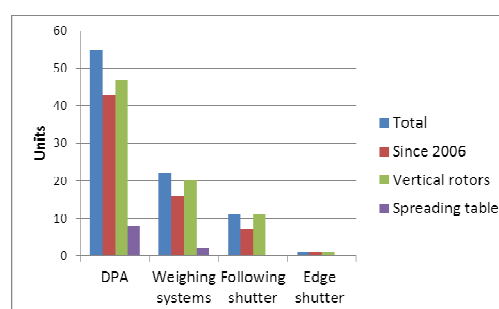


Figure 2. Application rate equipment for solid spreaders

For liquid organic fertilisers (sample of approximately 3 000 units), slurry tankers are also recent (20 % of the sample more than 10 years). The half of tankers bought since 20 years have a capacity of 10 to 15 m^3 . Smaller models represent the third. Since 2006, sales of tankers having a 15 to 20 m^3 capacity also increase. The simple splash plate is used in an overwhelming majority of the spreading equipment. If the use of others solutions increases, notably the multi nozzle spreader bars, this represents a little part yet (Figure 3). Application rate equipment is very few used with a little number of units (Figure 4). Since 2006, flowmeters are often mounted on big capacity models.

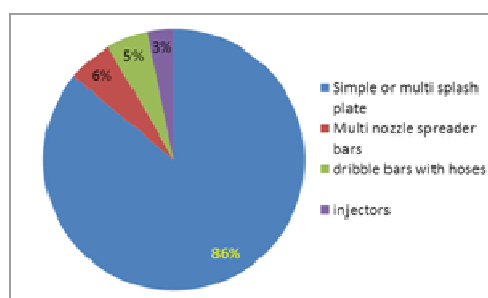


Figure 3. Proportion of spreading system for liquid spreaders

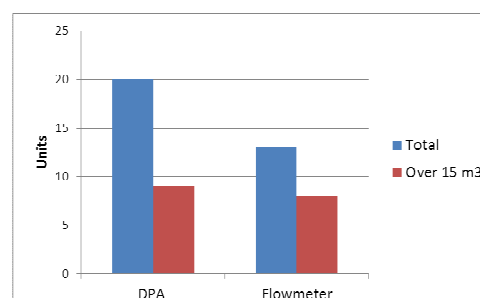


Figure 4. Application rate equipment for liquid spreaders

Spreaders of agricultural work companies

For the solid organic spreading (sample of 152 spreaders), companies use mostly spreading table (Figure 5), with a capacity over 15 m³ in half of cases. Application rate equipment is more used, especially DPAE and edge shutter. For the liquid organic fertilisers (sample of 101 tankers), different spreading systems are used in same proportion (Figure 6). The splash plate is only used for 28 % of cases. Application rate equipment is well disseminated in the studied sample. In our sample, 40 % of de tankers have DPAE. Generally, application rate equipment is recent and get up on big tankers (over 15m³)

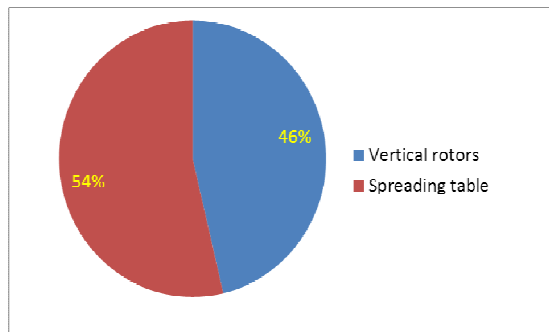


Figure 5. Spreading system for solid spreaders

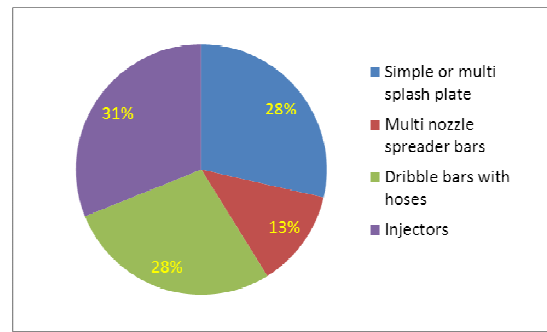


Figure 6. Spreading system for liquid spreaders

Self-propelled spreaders are also used by companies. In our sample, we have found 81 machines. These spreaders use only spreading table for solid organic fertilisers spreading. The capacity of self-propelled machines is less high than towed ones but there level of application rate equipment is higher (GPS, DPAE, weighing system in any case). These machines have the particularity to be loaded in the field; no transport is done with such machines. . In our sample, most of liquid machines use multi nozzle spreader bar and there is a common use of DPAE as application rate equipment and a beginning for flowmeter.

Conclusion and perspectives

Since twenty years, spreaders have become huge machines, with a high productivity and also a more intensive using. Cuma mainly spread cattle manure and so use vertical rotors spreaders. Models with spreading tables are more in use in agricultural work companies which spread a larger variety of organic fertilisers. Slurry tankers are bigger and the renewal is less than manure spreaders. Spreading in France is evolving with more professional actors. Units sold decrease each year but medium prices increase. Application rate equipment's have for the moment a confidential using. A progress in their use is possible because the stock is insufficiently equipped. The study identified different levels of application rate equipment. All these equipment need to be qualified in a test bench to assess their performances. With these results, it will be possible to communicate for users and manufacturers to develop a more high-performance stock.

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