

Inspection of the spraying equipment mounted on trains – the Polish approach

A. Godyn, G. Doruchowski, R. Holownicki, W. Swiechowski

*Research Institute of Horticulture, ul. Konstytucji 3 Maja 1/3, 96-100 Skierniewice,
Poland, E-mail: artur.godyn@inhort.pl*

Summary

The inspection of agricultural sprayers is conducted in Poland since 1999. At the present the mandatory inspection of the self-propelled and tractor mounted, field and orchard sprayers is carried out. Directive 2009/128/EC on the sustainable use of pesticides requires EU member states to start with the inspection of the other spraying equipment. Such equipment includes, among others, spraying equipment mounted on the trains (simply: railway sprayers). Since the European standard is not developed yet, it is necessary to develop an inspection methodology and the criteria for testing that kind of the spraying equipment, taking into account the specificity of the railway. Railway sprayers perform their duties, and in most cases are also stored in the areas of railway, with the limited access and available only to authorized persons. This situation enforces the necessity to take that into account in the training process of sprayers inspectors.

In order to conduct the inspection of railway sprayers it is necessary to identify the types of spraying equipment used on the railways and to develop the appropriate methodology for them. Inspection procedure should be developed in sufficient time for examination railway sprayers at least once before 2016.

The national railway network is managed by the Polish company PKP Polskie Linie Kolejowe S.A. (Polish Railway Lines). In 2011 the total length of railway lines in Poland was about 19,300 km, which gives 37,400 km of track (Anonim, 2011). The track width of the line depends on the railway category, the number of tracks and their mutual axial distance, and varies from 4.5 m to 10.9 m for double track lines. Taking into account the total length of railway track in Poland it can be estimated that about 19,000 ha should be sprayed, which is about 1 ‰ of the farmland in Poland.

In view of the need to comply with the provisions of Directive 2009/128/EC, the European Commission asked the European Committee for Standardization (CEN), giving to it a mandate (order) on the development of standards that include requirements for sprayers in use, including train sprayers. For the moment European standards for the inspection of railway sprayers do not exist yet, so it is necessary to take own decision on the procedures and criteria for testing railway sprayers. The framework for these activities is limited by the Directive and national legislation (Plant Protection Product Act and few Regulations on general rules of the inspection of sprayers in use) and previous experience in the implementation of sprayers inspection in Poland.

The most important rules governing weed killing on the Polish Railway Lines contains the internal instruction Id-1 "Technical conditions of railway road maintenance", which requires: "the destruction of vegetation on the entire width of the prism and railway benches on the tracks of all classes" and "the destruction of vegetation should be done with chemicals registered to use them on the railroad tracks". There is no detailed information about the internal procedures for the chemical weed killing on the track.

The Polish Ministry of Agriculture and Rural Development which is responsible for the implementation of the Directive 2009/128/EC in Poland ordered the expertise on the spraying equipment used on the railways in Poland. The additional activities, supplementary to the covered by the expertise, was to look for the specificity and the survey of different kinds of the railway spraying equipment at the owner place.

The equipment used to control the vegetation on the tracks of intensive passenger traffic or cargo must be mounted on a vehicle moving at a speed that allows the implementation of the timetable. Therefore, such vehicles have to work at a speed not less than 30-40 km/h (Wisniewska and Polinski 2012). The proper performance of the railway sprayer depends on the appropriate spray volume and good distribution (even and hitting the target). For that purpose the few special railway sets for Chemical Weed Control On the Tracks (abbreviation from the polish name is CHOT) are used. They use injection systems and special nozzles (with the higher flow rate).

On the tracks of the slower and less frequent movement, the sprayers similar to the field crop sprayers are used. These are brand sprayers and self-made sprayers, made with the sprayers spare parts and/or with the other suitable elements (pumps, valves) used for non-spraying purposes. Therefore the elaborated methodology contains some parts with inspection procedures for two kinds of the railway sprayers: CHOT's and the others.

After the survey, the assumptions of the inspection procedure were elaborated. That proposal will be consulted with the stakeholders before the suitable Regulation will be elaborated.

The main difference between the sprayer inspection methodology for agricultural sprayers and railway sprayers comes from the driving speeds used (up to 30-40 km/h) and sprayed swath width (about 5.0 m). The accuracy of the injection system mostly used in CHOT's has to be checked too. It has been proposed to inspect the nozzles by the output measurement. Because of the one nozzle flow reaching several liters per minute and (sometimes) special shape of the nozzles, the equipment used so far for that purpose may be not suitable. Therefore the 20 liters containers of the user-friendly shape and the weight measurement of the spray volume (acc. to ISO 5682-2) was proposed. The symmetry of the flow for the nozzles placed on the left and right hand side of the rail track should be kept (15% deviation allowed). For the comparison with the nominal flow (if such data is available) may be done passing over the thermal expansion of water, which is smaller than the measurement accuracy. The accuracy of the injection of the

herbicide should be checked too. The clean water test at the same time as the nozzle flow measurement is proposed (to save water). The maximum values settings used during spraying railways are checked. The 10% deviation of accuracy is allowed.

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