

Protocol for the preparation and application of the pesticide treatment

How much pesticide per plot?

We use a Karate Zeon suspension which contains 100g/l of the active ingredient Lambda-Cyhalothrin, a Score suspension which contains 250 g/l Difenoconazol, and an Ortiva suspension which contains 250 g/l Azoxystrobin. It might be that in your country these numbers are different, and that the products you can buy are more or less diluted. In this case you might adjust our calculations a bit, so please check this before! If you don't know how to do that, don't hesitate to ask!

As none of the compounds are usually used in grasslands, we will use recommended concentration of the pesticides for crops that are most closely related to a grassland (cereals). We use the following recommended concentrations (based on the suspensions of our products, described above):

Fungicide: Ortiva 1L/ha = 0.1 mL / m²
Score 0.4 L / ha = 0.04 mL / m²

Insecticide: Karate Zeon 75 mL / ha = 0.0075 mL / m²

Based on these numbers we can then calculate how much of each product needs to be sprayed per 25m² plot (simply x 25), and we can also work out the amount of water to dilute it and to make the application feasible.

Treatment	Amount per 25m ² plot
Insecticide only	0.1875 mL Karate Zeon + 1 L water
Fungicide only	1 mL Score + 2.5 mL Ortiva + 1 L water
Insecticide + Fungicide	0.1875 mL Karate Zeon + 1 mL Score + 2.5 mL Ortiva + 1 L water
no Insecticide + no Fungicide	+ 1 L water

It is important that we only apply a thin layer/film of liquid on the plant (Syngenta recommends to dilute the pesticides in only 1L per 25m² plot). It is therefore recommendable to use a very fine sprayer. If we apply too much liquid, the active compound drops to the ground and does not stay on the leaves. However, depending on your sprayer, 1L for a whole 25m² plot might be too little, and you might need more liquid. In this case you can dilute it in 2l water, to make the application easier. We recommend that you figure out the amount of liquid that is necessary for your sprayer to spray an area of 25m² beforehand. Very handy are the sprayers that you can wear on your back, and you can pump to keep the pressure constant while spraying (see pictures A), but also the cheaper hand-sprayers will work well (e.g. picture B).



Fig. 1. A) Example of a sprayer that you can wear on your back, and B) a hand sprayer.

How to prepare the pesticides?

Two plots per block (the -I+M+F and -I-M+F treatment combinations) receive insecticide only and no fungicide, two plots per block receive fungicide only (+I+M-F and +I-M-F), 2 plots per block receive insecticide and fungicide together (-I+M-F and -I-M-F), and two plots receive water only (+I+M+F and +I-M+F). That means, that we have 6 plots for each pesticide application. You can either mix the pesticide-water mixture for each plot (pesticide + 1L water), each block (2 x pesticide + 2L water) or for all six plots together (6 x pesticide + 6L water). The way you do it depends on the size of your sprayer and whether you are able to see how much you have sprayed on one plot already. If your sprayer has a constant spraying pressure, you can for example measure the time of spraying until 1L of liquid (or the amount of liquid that works well for your sprayer) has been sprayed, and then spend exactly this time spraying on each plot.

Prepare a concentrated solution in the lab

Since the used quantities of the pesticides are very small and are difficult to measure in the field without a proper pipette, we recommend that you prepare a concentrated solution (the amount of pesticide needed plus a bit of water) in the lab. You can use small vials, e.g. 50 mL falcon tubes which you will then bring to the field and which you will add to your sprayer and dilute in more water (Fig 2). The amount of vials you need to prepare depends on whether you fill your sprayer with the pesticide-water mixture for each plot, block or for all plots together:

	Treatment	Concentrated solution	Fill up to... in field
Per plot (6 vials per treatment)	Insecticide only	0.1875 mL Karate Zeon + 50mL water	+ 1 L water
	Fungicide only	1 mL Score + 2.5 mL Ortiva + 50 mL water	+ 1 L water
	Insecticide + Fungicide	0.1875 mL Karate Zeon + 1 mL Score + 2.5 mL Ortiva + 50 mL water	+ 1 L water
Per block (3 vials per treatment)	Insecticide only	0.375 mL Karate Zeon + 50mL water	+ 2 L water
	Fungicide only	2 mL Score + 5 mL Ortiva + 50 mL water	+ 2 L water
	Insecticide + Fungicide	0.375 mL Karate Zeon + 2 mL Score + 5 mL Ortiva + 50 mL water	+ 2 L water
For all 6 plots (1 vial only per treatment)	Insecticide only	1.125 mL Karate Zeon + 50mL water	+ 6 L water
	Fungicide only	6 mL Score + 15 mL Ortiva + 50 mL water	+ 6 L water
	Insecticide + Fungicide	1.125 mL Karate Zeon + 6 mL Score + 15 mL Ortiva + 50 mL water	+ 6 L water

For example, if you decide to always prepare the pesticides for each plot, you also need to prepare a concentrated solution for each plot (see table above, e.g. for the insecticide only treatment a tube would contain 0.1875mL of Karate Zeon and 50 mL of water). In this case you need six of those vials for each pesticide treatment (18 in total), which you bring to the field. In the field, you can then simply add the content of one vial to your sprayer, and fill up with water until you reach 1L, and you repeat this for each plot.

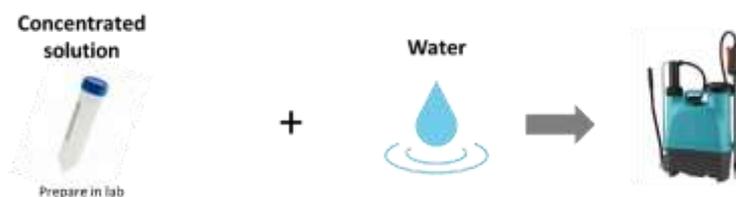


Fig. 2: Prepare the concentrated solution in the lab and bring to the field. In the field you simply add the concentrated solution to your sprayer and fill up with the required amount of water (see table).

How to spray?

Wear protective, waterproof clothes to cover your arms and legs and wear a filtering face mask (FFP2). If you have only one spraying bottle, start to spray water on those plots which will not receive any fungicide and/or insecticide (as a control). Then use one pesticide after the other. Cover the whole plot with a thin layer of pesticide (or water for the control), until all the leaves are moistened. Spray the pesticide low to the vegetation to avoid spill-over, in particular if it's a bit windy. After spraying you should not work on the plots for at least 48 hours!



Always use protective equipment when spraying ...



... or you will end up looking like this!

When to spray?

You should spray fungicide and insecticide 4 times per growing season (for very short growing seasons, 3 times is enough). Record the dates of the spraying. Choose the day and hours when you can spray the pesticides based on the weather forecast that day. It should be dry, sunny and not windy. Even a weak wind can result in spill-over to neighbouring plots! In several countries there are special online tools for farmers to know when to spray (in Switzerland for example Syngenta offers a tool called **Phytometeo**), maybe there is something similar in your region?

Try to only prepare as much pesticide-water solution than you also need to spray and avoid leftovers. If you have pesticide leftovers, never add them to rivers or water bodies, as they can harm the environment.

You will need:

- the pesticides (Karate Zeon, Ortiva and Score or other products with the same active substance)
- gloves and protective clothes, masks
- little tubes of ca. 50 ml (number depends on the way you spray, see table) in which you mix a concentrated pesticide solution in the lab before going to the field
- water for mixing the pesticide solution and for the control treatments
- one or two spraying bottles (one for the pesticide application, one for the controls)

DON`T FORGET TO SPRAY THE SAME AMOUNT OF WATER TO THE PLOTS THAT WILL NOT RECEIVE ANY INSECTICIDE OR FUNGICIDE!