# **Advice report**

Linge Agroconsultancy

Advice Subject Document number Applicant Contact person Address Additional data requirements for V10 20160057 ZTG
V10 in tomato
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We emphasize the fact that the national authorities alone are authorized to make decisions on applications for authorisation of plant protection products. In its advices, Linge Agroconsultancy will to the best of its knowledge conform to the demands and guidelines as set by the EU.

# 10.2.e

In a letter dated September 14<sup>th</sup> 2017 with reference number 201709120266, the zRMS in charge with the evaluation of V10, the Ctgb, listed several questions with regard to the Efficacy section dRR Part B7 for V10.

In this advice report all questions raised by the Ctgb will be addressed.

#### IIIM 6.1.1 Preliminary range-finding tests – Benefit of the co-formulation

The following comment is made by the zRMS:

Especially the mild CH2 strain (VC1) on its own provided lower efficacy after a dual infection with two aggressive strains. V10 also provided better protection against leaf and stem necrosis, and stunting of plants when compared to VX1. However VX1 alone resulted in less damage to fruits. It should be noted that compared to the other efficacy trials (please refer to IIIM 6.1.3) the amount of fruit damage in the efficacy trial for the co-formulation was exceptionally high.

Due to genetic instability there may be risks associated with co-formulations due to recombination. This is further discussed under 6.2.1 (phytotoxicity)

As stated above, in this trial, off all efficacy trials conducted, the most severe effects on fruits were observed. In the untreated objects infected with aggressive isolates EU and CH all fruits were affected, whereas in the rest of the trials fruit damage in the untreated objects infected with aggressive isolates EU and CH, ranged from 0.2-11.2%.

Furthermore, it should be noted that in this trial some mistakes were made in the artificial infection of the objects. Whereas objects treated with V10 and VC1 were inoculated with both aggressive isolates, objects treated with VX1 were only inoculated with aggressive isolate EU. Nevertheless it was found that cross-contamination had occurred, and the aggressive isolate CH was also detected in these objects. Despite the fact that because of the highly infective properties of the PepMV isolates it is likely that all plants were sufficiently infected with aggressive isolate CH, it cannot be said with certainty that the level of infection with aggressive isolate CH was comparable over all objects. The lesser extent of fruit damage in the VX1 objects may have been the result of that.

Nevertheless, the trial did substantiate the benefit of the co-formulation by demonstrating that several virus symptoms such as damage to leaves and stunting were much reduced when the co-formulation was used.

The benefit of the co-formulation lies in a greater range of protection against PepMV. Protection is offered against both the EU isolate and the CH2 isolate. Both these isolates occur throughout Europe, though the spread of isolate CH2 is more recent. Referred is to EPPO PM7/113(1) Pepino mosaic virus:

[...EU is the PepMV genotype that is genetically most similar (95%) to, but biologically distinct from, the Peruvian strain group and that predominated initially in European tomato crops. Since 2004, however, isolates of strain group EU seem to be replaced by, and/or to occur increasingly in mixed infections with, strain Ch2 in Europe. This latter genotype, first identified from tomato seeds originating from Chile, is genetically very distinct (79% identity) from the EU strain.]

Though there may be a risk with co-formulations due to recombination, as noted in IIIM 6.2.1, suboptimal protection against the "wrong" strain may facilitate recombination. Given that both strains occur frequently in Europe, the latter is considered the greater risk.

## IIIM 6.2.1 Phytotoxicity to host crop – Use on nursery plants

The following comment is made by the zRMS:

It is concluded that the product should only be used in situations where aggressive strains are a risk. In situations where such a risk is not present, inoculation will lead to unnecessary crop damage (the mild strains can cause minor phytotoxicity, while this may not result in a reduction of yield in tonnage, quality of yield is infected which may render fruit unmarketable).

In addition unnecessary use of the product will result in the circulation of extra virus material which will increase the risk for creation of new mutants. There is no system in place to restrict transport of treated plant material to areas where the use of the product would lead to these risks, nor is it clear if growers will have access to virus free material.

The product has had several authorisations in the Netherlands under article 38, in these cases the product was authorised with a restriction that stated that the product can't be used in the nursery phase of tomatoes and should be used on production crops only.

It is concluded that the same restriction should apply to the authorised product.

It is stated that given that mild symptoms may occur from treatment with V10, the product should only be used where aggressive strains are a risk. Experience from practise learns that infection with aggressive strains is almost always a risk, especially in extensive production areas.

Tomato growers and nurseries are very aware of the infectivity of the PepMV and take the necessary precautions as a part of Good Plant Protection Practise. EPPO has a GPP guideline for Solanaceous crops under protected cultivation. Next to PepMV there are various other infectious diseases that may cause great economic damage. Many of these occur in tomato. It is therefore key that the grower always takes the necessary precautions for good sanitation. Thus, regardless if plants are treated with V10, growers and nurseries should always take precautions to prevent spreading of disease.

V10 should be applied preventatively before infection occurs. The use of V10 during the nursery phase is therefore especially important. After application with V10 it will take several weeks (incubation) before the plant is fully protected against PepMV. If the plant is treated at a later stage (at the grower) the chances of infection with PepMV during the incubation time of V10 is higher.

Tomato seedlings may be produced by the grower himself, but are also often bought from another source (nurseries). The propagation of tomato seedlings is by demand of the grower. The nursery will grow the plants to special order of the grower. If this includes several (preventative) treatments (including V10) or not is the choice of the grower who will procure these plants. Given that such treatment is a costly affair, nurseries will not be tempted to apply these treatments if this is not by order of the customer.

In short, it is highly unlikely that growers would buy plants from a nursery that were unknowingly treated with V10, because the treatment programme would be determined by the order of the grower. Furthermore, precautions for spreading disease should always be in place, because the risk is always there. The precautions that should prevent the spreading of the aggressive PepMV should also be able to prevent the spreading of attenuated PepMV (following application with V10). The restriction of not allowing the product in the nursery phase of tomatoes is therefore considered unwarranted.

#### IIIM 6.2.6 Impact on succeeding crops

The following comment is made by the zRMS:

The mild virus strains in the plant can multiply in the plant and can infect new plants in ways similar to the aggressive strains. For the aggressive strains there are known issues in keeping greenhouses disease free between successive crops. A more extensive justification for succeeding crops is needed that addresses this issue.

Considering the narrow host range of PepMV (tomato, Pepino and wild tomato species) other crops than tomato will generally not be susceptible.

The cultivation of tomato is a specialized trade and is therefore almost exclusively performed by growers specialized in tomato. As a result the succeeding crop for tomato in production areas will most often be tomato.

In the case of nurseries, several crops will be grown for propagation. However to prevent spreading of disease, tomato seedlings are raised in isolated locations away from Solanaceous crops. Precautions are taken to prevent diseases such as PepMV and damping-off.

As described above under IIIM 6.2.1, experience from practise learns that for the cultivation of tomato infection with aggressive strains is almost always a risk, especially in extensive production areas. Therefore the grower and nursery will know to take precautions when planting a new crop. The precautions that should prevent the spreading of the aggressive PepMV and a variety of other infectious diseases, should also be able to prevent the spreading of attenuated PepMV (following application with V10).

## IIIM 6.2.7 Impact on other plants including adjacent crops

The following comment is made by the zRMS

The mild virus strains in the plant can multiply in the plant and can infect new plants in ways similar to the aggressive strains. In addition, the host range of Pepino Mosaic Virus includes plants other than tomato. A more extensive justification for adjacent crops is needed that addresses these issues.

EPPO PM7/113(1) Pepino mosaic virus states the following concerning the host range of PepMV:

[Like most other potexviruses, PepMV has a fairly narrow natural host range that appears to be largely restricted to Solanaceous species. In addition to tomato and the original host, pepino (S. muricatum), natural infections by PepMV have been reported not only from the wild tomato species S. chilense, S. chmielewskii, S. parviflorum S. peruvianum and potato germplasm, but also from several weeds belonging to various plant families and growing in the vicinity of tomato glasshouses. Since the experimental host range of PepMV includes Solanaceous crop plants such as potato, tobacco, Capsicum peppers and eggplant, these crops may also be at risk.]

Though it is stated that other Solanaceous crops than tomato, Pepino and wild tomato may be at risk, the occurrence of PepMV in these crops is rare. On the contrary, sweet pepper plants are used as a buffer in PepMV experiments between rows of tomato crops.

Furthermore, as stated above, the cultivation of tomato is a specialized trade and is therefore almost exclusively performed by growers specialized in tomato. Therefore in production areas, adjacent crops will most often be tomato.

In the case of nurseries, several crops will be grown for propagation. However to prevent spreading of disease, tomato seedlings are raised in isolated locations away from

Solanaceous crops. Precautions are taken to prevent diseases such as PepMV and damping-off.

As described above under IIIM 6.2.1, experience from practise learns that for the cultivation of tomato infection with aggressive strains is almost always a risk, especially in extensive production areas. Therefore the grower and nursery will know to take precautions for preventing the spread of diseases between crops. The precautions that should prevent the spreading of the aggressive PepMV and a variety of other infectious diseases, should also be able to prevent the spreading of attenuated PepMV (following application with V10).