Propagation and distribution system of healthy seedcane as control measures against sugarcane white leaf disease

Production | Implementation | Item: Sugarcane

Chemical pesticide reduction

Outline

We developed a system and manual on field management techniques for propagation of healthy seedcane to control sugarcane white leaf disease (SCWLD) (Fig. 1), distribution methods for the production, procedures to detect pathogens using the loop-mediated isothermal amplification (LAMP) method, and procedures to produce disease-free seedlings using the growth point culture method.

Background/effect/note

SCWLD is one of the most devastating insect-borne diseases affecting sugarcane production in Asia. We considered that the use of healthy seedcane is highly effective in controlling SCWLD. Hence, a manual for the propagation and distribution of healthy seedcane was developed for sugar mills and institutions that produce and distribute seedcane to farmers (Fig. 2). Verification test demonstrated sufficiently low rate of healthy seedcane even though the number of diseased plants increased up to 10-fold in the third generation (Fig. 3). The insecticides that can be used to control the vector are based on information available in Thailand. Users are advised to check and confirm current pesticide treatment regulations in their respective countries.

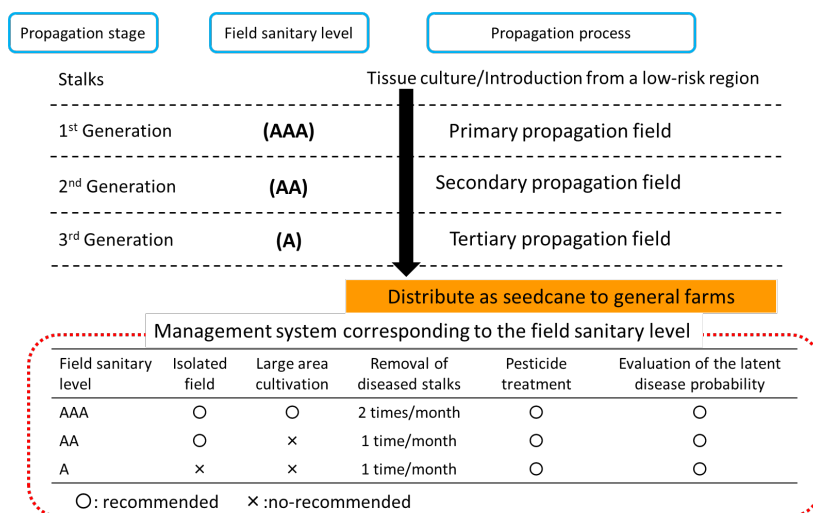Fig. 1. A field abandoned due to widespread sugarcane white leaf disease (SCWLD)

Propagation stage	Field sanitary level	Propagation process
Stalks		Tissue culture/Introduction from a low-risk region
1st Generation	(AAA)	Primary propagation field
2nd Generation	(AA)	Secondary propagation field
3rd Generation	(A)	Tertiary propagation field

Distribute as seedcane to general farms

Management system corresponding to the field sanitary level

Field sanitary level	Isolated field	Large area cultivation	Removal of diseased stalks	Pesticide treatment	Evaluation of the latent disease probability
AAA	○	○	2 times/month	○	○
AA	○	×	1 time/month	○	○
A	×	×	1 time/month	○	○

○: recommended   × :no-recommended

Fig. 2. Overview of the healthy seedcane propagation system

1st generation

Approximately 13ha
(2017-2018)
Diseased stalk ratio : 0.0011%

Approximately 5.3ha
(2018-2019)
Diseased stalk ratio : 0.0029%

2nd generation

Approximately 5.3ha
(2018-2019)
Diseased stalk ratio : 0.0057%

Approximately 40.5ha
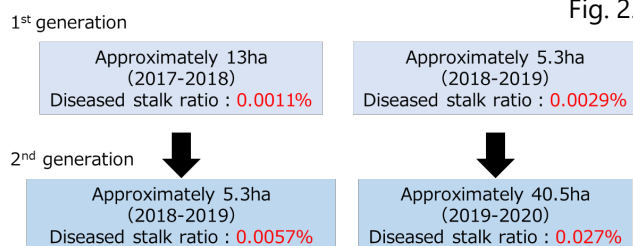(2019-2020)
Diseased stalk ratio : 0.027%

Fig. 3. Results of the healthy seedcane propagation verification test
Observations for two generations showed lower disease prevalence (0-20%, mean 5.8%, median 5%) as compared to newly planted fields.

Technical details:
https://www.jircas.go.jp/en/publication/research_results/2020_b10

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