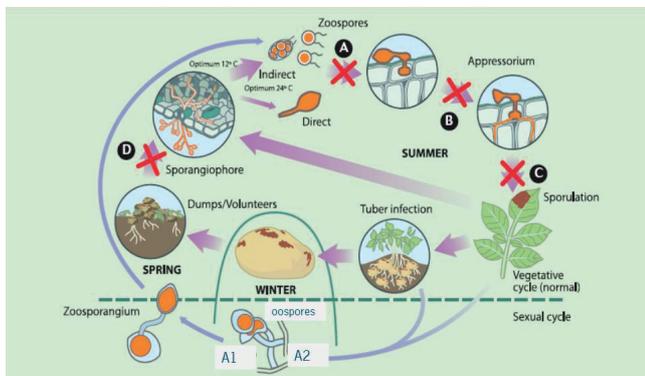




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Lifecycle of late blight

Late blight (caused by *Phytophthora infestans*) is the most important fungal disease in potato production in West Java. The pathogen needs moisture to infect the plants and spread to new plants. In wet conditions, the disease cycle can be completed in as few as three to four days. Tomato can also be infected by *Phytophthora*, and infected tomato plants can be a serious infection source for potato plants. The impact of the disease can be very severe during the rainy season (October-March), as the foliage of the crop may be killed at a too early stage. The most frequently used potato cultivars, Granola and Atlantic, are both susceptible to the disease, with Atlantic at particular risk.



Lifecycle of *Phytophthora infestans*

Use of fungicides

The protection of crops against late blight is very important in potato cultivation and makes up a substantial share of the total production cost, particularly during the rainy season. In an average season, the crops are sprayed with fungicide 12-16 times, with a spraying interval of three to five days depending on the weather conditions. In most cases a sticker or spreader is added to increase the rainfastness of the fungicides on the potato leaves. Fungicides can be categorised into preventive and curative ones. Preventive products contain active ingredients such as chlorothalonil or mancozeb and need to be sprayed on the foliage before spores reach the surface of the leaf. The fungicide layer on top of the leaf inhibits germination of the spore and thus prevents infection. Curative products (cymoxanil, dimethomorph) can be sprayed after a spore has germinated and penetrated the leaf and act by killing the fungal structure in this phase.

Highlights or key messages

- Late blight, caused by *Phytophthora infestans*, is the most important disease in potato in the rainy season.
- In the dry season, early blight caused by *Alternaria solani* is more important.
- Both Granola and Atlantic potatoes are susceptible to late blight.
- Potato plants must be regularly sprayed with fungicides to protect them against late blight.
- Fungicides can act against late blight in a preventive and/or curative manner.
- In situations of high disease pressure, it is recommended to combine preventive and curative products.

For proper control of the late blight, however, curative products need to be applied before any symptoms become visible. While some curative products have preventive characteristics as well, in most cases this is less effective than the preventive action of mancozeb or chlorothalonil. It is therefore recommended to apply both a preventive and a curative active ingredient each time the plants are sprayed, either through an existing product that combines the two or by creating an own mix.

Some of the products used to control late blight also have an effect on early blight (caused by *Alternaria solani*). Since early blight prefers warmer and drier conditions, this disease is mostly a problem during the dry season.

Product	active ingredients	LB P	LB C	EB	Rainfastness
Antracol	propineb	++	0	++	+(+)
Dithane	mancozeb, maneb	++	0	++	+(+)
Daconil	chlorothalonil	++	0	+(+)	++(+)
Curzate	mancozeb + cymoxanil	++(+)	++	++	++
Revus	mandipropamid	+++	+	0	+++
Revus opti	mandipropamid + chlorothalonil	+++	+	+(+)	+++
Amistar Top	azoxystrobin + difenoconazole	0	0	+++	+++
Siodan	cymoxanil	+	++	0	
Acrobat/Sirkus	dimethomorph	+	+	0	
Infito	propamocarb + fluopicolide	+++	++	0	++(+)
Previcur	propamocarb	+	++	0	
Equation Pro	famoxadone + cymoxanil	+(+)	++	++	++(+)
Ridomil Gold	mancozeb + mefenoxam	+++	++(+)	++	+++
Trivia	propineb + fluopicolide	++	+	++	++

Table of fungicides used in Indonesia and their rating in the preventive (LB p) and curative (LB c) control of late blight and the control of early blight (EB).

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