

PROFESSIONAL POTATO GROWING

Pre-sprouting



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WHY PRE-SPROUTING?

Rapid emergence, fast initial growth and a homogeneous development of the crop are important conditions for obtaining optimum yields. Pre-sprouting can help to ensure that these conditions are met. Pre-sprouting also favours the growth of a larger number of sprouts/stems per seed potato, which leads to a more efficient use of the seed. A rapid development of the crop is, moreover, advantageous from the viewpoints of disease prevention and weed control.

To ensure that the advantages of pre-sprouting are exploited to the full, the treatment of the seed potatoes must be adjusted to the local cultivation conditions. Using pre-sprouted seed is particularly advantageous in circumstances demanding short cultivation periods. This will be the case for example in the cultivation of seed potatoes or early ware potatoes or under certain climatological conditions.

In the Netherlands, the seed potatoes are stored in a dark area and then prepared for shipment. Thanks to an excellent infrastructure and efficient logistics, the Dutch seed potato sector is able to supply high-quality seed potatoes to potato growers all over the world from October until June.



The suppliers and buyers must cooperate closely with one another to ensure that the seed potatoes are received in the right physiological stage and at the right moment. The finishing touch is seeing that the seed potatoes are treated as required – and this is the potato grower's task. Pre-sprouting is one of the ways in which the grower can favourably influence the growth of his crop.



PHYSIOLOGICAL DEVELOPMENT

Immediately after harvest, the tubers are dormant for a while. The length of this dormant period varies from one variety to another and depends on the growing conditions, the tuber's maturity and the presence of tuber injuries. Other important factors are the storage conditions, such as temperature, relative humidity and light. After the natural dormancy, a single sprout, the apical sprout, will develop.



The sprouting stage is an indication of the tuber's physiological stage. The apical-sprout stage is the transitional stage from dormancy to normal sprouting. In this stage the sprouting of other eyes is suppressed. After a certain length of time, more sprouts will form. They will ultimately branch, while the tuber remains firm. Long, thin hair sprouts and a soft tuber characterise the final physiological stage, senescence. When a tuber is senile it is no longer suitable for use as seed.



STORAGE CONDITIONS

CONDITION OF SEED	PLANTING TIME	DE- AND RESPROUTING	STORAGE CONDITIONS	
			TEMP C°	LIGHT
NO SPROUTS	SOON	-	15 - 20	DARK
	LATER	-	5 - 10	LIGHT
TOP SPROUTS	SOON	yes	15 - 20	DARK
	LATER	yes	5 - 10	LIGHT
SEVERAL SHORT SPROUTS	SOON	no	10 - 20	LIGHT
	LATER	no	5 - 10	LIGHT
LONG, WHITE SPROUTS FIRM TUBER	SOON	yes	15 - 20	DARK
	LATER	yes	10 - 15	LIGHT
LONG, WHITE SPROUTS SOFT TUBER	SOON	no !	cool	LIGHT
	LATER	no !	cool	LIGHT

Pre-sprouting involves many decisions and operations. The diagram presents recommendations regarding de-sprouting, temperature and light conditions for storing sprouting seed potatoes. Seed potatoes will reach the multi-sprout stage earlier if you remove or damage the apical sprouts. If, owing to circumstances, the sprouts have grown too much, the tubers may have to be de-sprouted at a later stage.

Dutch seed potato growers pay close attention to their seed potatoes during the storage period. They control the climatic conditions to ensure that the potatoes remain dormant for as long as necessary or possible. A high relative humidity shortens the dormant period. The effect of light on the tuber's dormancy depends on the seed's maturity. Light lengthens the dormant period of mature seed potatoes, but may on the contrary shorten that of seed potatoes that have been harvested while still immature.





The temperature is of great influence on the length of the dormant period and the tuber's physiological development. Fluctuations in temperature, but also a storage temperature above 5°C, shorten the dormant period and favour the growth of sprouts. Temperatures of 2°C or less are dangerous as they may lead to internal sprouting, the formation of secondary tubers or other defects. The optimum storage temperature for seed potatoes is 3-4°C.

DE-SPROUTING



If seed potatoes have formed an apical sprout during the storage period, this sprout will in most cases have to be removed to enable the tuber to grow more sprouts. Often, carefully shaking the seed potatoes or tipping them on to another container will already suffice to damage or remove the apical sprouts. If seed potatoes are stored for a long time at a low temperature they will skip the apical-sprout stage and there will hence be no need to desprout them.

The pre-sprouting procedure starts with the filling of the pre-sprouting trays. The filling machine is set so that the seed potatoes are spaced wide apart in the trays. There must not be too many tubers in each tray.



The trays are loosely stacked. This ensures sufficient ventilation and sufficient light at a later stage, when the potatoes are hardened off. Dutch seed potato growers allow their seed to sprout in the dark and then harden it off in the light. Besides pre-sprouting trays, suspended bags are also used.



HEAT SHOCK

If necessary, the tuber's dormancy can be broken by means of heat shock. The time at which the temperature will have to be raised depends on the seed's maturity, the planting time, the variety, the storage conditions and the desired number of stems.



SPROUTING

The seed's temperature is raised to 18 to 20°C in steps of about 1 to 2 degrees a day. After that, the grower maintains a constant temperature and ensures good ventilation throughout the sprouting period.



The potatoes are kept in the dark until they have formed sprouts of a few millimetres to half a centimetre. At this stage the sprouts are vulnerable to damage.



Physiologically very young seed potatoes may benefit more from a sudden drop in temperature than from a heat shock. Keeping the seed potatoes at a low temperature for a short time after the wound healing period (for example 3°C for two weeks) may shorten the dormant period of certain varieties.

As a result of the pre-sprouting the tubers have a large number of sprouts. During the planting, great care must be taken to ensure that the tubers are not damaged, to prevent the loss of sprouts. It is for this reason that the tubers must be hardened off. This is done by placing the tubers in a light, cool, well ventilated area for at least a few weeks.



A drop in temperature and exposure to daylight will slow down the growth of sprouts while the tuber's development continues. This will initiate the development of leaves, stolons and roots and the formation of chlorophyll. The sprout will consequently remain relatively short and firm.



A low light intensity will already slow down the growth of sprouts. The greater the light intensity while the tubers are being hardened off, the firmer the sprouts will be.



Besides trays, suspended bags can also be used. This system saves labour in the pre-sprouting and hardening off of the tubers and the filling of the planting machine. Many growers of ware potatoes use an intermediate form, which involves placing open bags outdoors in windows.



DAYLIGHT GLASSHOUSE

In the Netherlands, daylight glasshouses are also used for hardening off seed potatoes. As far as the result is concerned, it does not matter whether wooden or plastic trays are used.



ARTIFICIAL LIGHT

Tubers can also be hardened off with the aid of artificial light. 40-65 Watt lamps are then placed between the rows in the sprouting shed. One fluorescent lamp stand is required every 4 to 5 m². Fluorescent tubes of factor 33 or 57 are the most suitable.



HARDENING OF THE TUBERS OUTDOORS



Usually firmer sprouts will be formed outdoors. Especially if planting has to be postponed for a long time, it will be easier to control sprout development outdoors. In the event of unfavourable weather conditions it will usually suffice to protect the tubers by covering them with transparent film. If the trays are stacked on pallets, the grower will be able to bring the seed potatoes indoors quickly when there is a risk of night frost.

SUMMARY



The desirability of pre-sprouting and the methods to be used will depend on the location and the purpose for which the crop is intended. In the Netherlands, growers pre-sprout their tubers for 2 to 3 weeks and then harden them off for at least 5 to 6 weeks. That way they ensure that their seed potatoes are pre-sprouted and ready for the cultivation of seed potatoes at the required time. Hence they start the pre-sprouting 7 to 9 weeks before the time of planting.



Well pre-sprouted and hardened off seed potatoes will remain in good condition for a greater length of time. This will allow the grower greater flexibility in waiting for the best time to plant the seed potatoes. Well pre-sprouted seed potatoes will show rapid initial growth after planting and will produce a closed canopy at an early stage. This is an important precondition for an optimum yield.

In general, pre-sprouting is advisable if:

- the growing season is fairly short;
- the soil is rather heavy;
- the planting conditions are not very favourable;
- the seed potatoes are fairly weak/old;
- the varieties mature fairly late, but nevertheless have to be harvested early.

CREDITS

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**Carefully pre-sprouted seed potatoes
soon develop into plants
with a closed canopy...**

**...and produce high yields
after a short growing period.**

