

# Cool, Cloudy Weather Conditions With Tobacco Transplant Development

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**A**dequate temperature and light are critical for tobacco transplant germination and development, and light is just as critical as temperature. Although we can usually do a good job of maintaining suitable temperatures in greenhouse float beds, getting adequate sunlight is more dependent on the weather. We always seem to have at least 1 or 2 dreary periods during the transplant production season where daytime temperatures remain in the 40's with almost complete cloud cover for several days. Low light levels like this can have direct and indirect effects on transplants.

During extended periods of low light for several days, the obvious effect is the slowing of growth rate by at least half, even when all other factors such as temperature and fertility in the float bed are ideal. It has also been proven that these periods of low light are the most common cause of early and premature flowering after plants go to the field. All plants are preprogrammed to respond to low light not just as a short-term response of delayed growth due to low photosynthetic activity, but also implement longer-term responses as somewhat of a survival mechanism. Extended periods of low light mimic the same conditions that occur in the fall, when plants sense that the end of their growing season is approaching. Plants are programmed to perpetuate themselves by making seed, and in order to make seed they must first make a flower. Tobacco plants that are at least 6 weeks old and are exposed to extended periods of low light may be triggered to produce a flower much earlier than normal.

We generally separate this condition into two types of responses, early flowering and premature flowering. In the case of early flowering, plants may make normal looking leaves but simply flower a few days or weeks earlier than normal. In the case of premature flowering, the plants are directing most of their energy toward flower and seed production and will have very distinctive short, narrow, unusable leaves, flower extremely early (possibly knee-high) and have excessive sucker growth. Luckily, only a small percentage of tobacco plants exposed to extended low light in the float bed will have the premature flowering response. In most cases, premature flowering does not exceed more than 3 percent of the plants exposed to these conditions. Dark tobacco is more prone to this than burley, but will still not usually reach levels of more than 3 to 4 percent in a given field. However, when a grower sees a few plants showing these symptoms he is concerned that the whole

field is going to bloom. Keep in mind that once the plant has been triggered to bloom there is nothing that can be done to reverse that process; fortunately the problem will usually be fairly minor. A proven way to combat this problem is to supply 3 to 4 hours of supplemental light in the middle of the night during these prolonged low light periods. Even relatively low intensity light from incandescent light bulbs can be enough to prevent triggering of the hormonal response that causes early and premature flowering. The light should be provided only for the 3 to 4 hour period and should not be left on continuously. Excessive early suckering and ground suckering may also be caused by other factors such as bud damage from tight clipping, severe cold injury in the float bed, or setting plants too shallow in the field.

Another concern during periods of extended cool weather and low light is the use of unvented heaters without adequate air exchange. Many greenhouses are equipped with vented heaters that have a stack or stovepipe to release exhaust from the heater, while other greenhouses have unvented heaters suspended in the middle of the greenhouse and/or jet-type space heaters set up to heat or supplement the main heat source. During normal spring conditions of warmer days when the heater is only running at night, the exhaust fan coming on and side curtains being lowered and raised are enough to release any harmful exhausts from unvented heaters. But during cool, cloudy periods of several days when the entire greenhouse is closed and the heater is running almost continuously, harmful exhaust, particularly sulfur dioxide, can build up to levels that can be toxic to plants and also not good for people working inside the greenhouse. Damage from sulfur dioxide on tobacco plants will appear as etched, white to light beige areas between the secondary veins on the most exposed leaves. Although vented heaters are always best, unvented heaters can be used during these cool, cloudy periods if air inside the greenhouse is flushed out regularly to release these harmful exhausts. Even during these cool periods, manually turn on the exhaust fans and lower the curtains at least half way for at least 15 minutes once or twice a day. Twice a day is preferable, once in the morning and once in late afternoon. Even though it is cold outside, this short flushing of air will not be enough to damage the plants and will release these harmful exhausts.

This flushing of air is also a good practice even with vented heaters during these periods, as we would like to have fresh dry air frequently mixing and replacing the moist air inside the greenhouse. △

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