

Instructions for Use

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SeptoriaTimer

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1 Use

Dashes of rain transport the spores of the causative organism for Leaf drought in wheat (*Septoria tritici*) during rainfall to higher leaf levels, where they require some time to germinate, grow towards the stomata and penetrate the leaf. Those weather conditions favourable for spreading of the causative organism are captured by the **SeptoriaTimer**. Thereafter, the causative organism requires approximately 3-4 weeks (depending on temperature) to develop the typical symptoms. At that time it is no longer possible to control the disease and it is therefore crucial for the user to capture the weather criteria essential for an infection. The **SeptoriaTimer** provides essential support for this. The device therefore only captures weather parameters. Influencing data such as initial infestation and susceptibility of the variety (see latest Bundessortenliste¹) must be identified by the user himself and incorporated in decision-making to prevent failures in controlling the disease.

2 Design and Mode of Operation

The **SeptoriaTimer** is a device used in the prognosis of *Septoria tritici* and is composed of a leaf wetness sensor according to WEIHOFEN and a datalogger. The leaf wetness sensor registers start and duration of wetness of the wheat population. From those values measured the datalogger calculates the end of the epidemiologically favourable infection period and the externally visible sensor displays the number of days since the end of that favourable condition for infection, including the hours of duration of the period. The data indicated must be interpreted taking into account the susceptibility of the variety, of the preceding crop, the time of sowing and the initial infestation of the population. In the case of susceptible varieties and/or high initial infestation, controlling the causative organism population is necessary after less hour values than in the case of resistant varieties, late seeds and populations with lower susceptibility to infestation.

According to today's level of pest control techniques and depending on the fungicide application rate, the farmer has a maximum of 5 days time to spread the fungicide in order to protect the population against further infection for approximately 3 weeks (in the case of application of the full authorized application rate).

Leaf wetness is simulated by a multi-layered cotton stripe, the conductivity of which relates to the percentage of wet plant in the wheat population. The leaf wetness sensor must be hung on a pillar at a representative location from growth period 31 and its upper edge must be in line with the third leaf from the top. The height of the leaf wetness sensor must be adjusted in accordance with growing population (shoot stage).

Caution:

Only accurate installation of the SeptoriaTimer ensures reliable prognosis of an infection incident causative for Septoria tritici!

¹ Bundessortenliste: German National List of Crop Varieties

3 Visual Check / Maintenance / Functional Test

A weekly check must be performed to ensure that the cotton stripe remains intact. Electricity is supplied by a 4.5 Volt battery ensuring power supply for a minimum of two years. Every second year the device should be sent to the manufacturing company or any other authorised institution for inspection in order to guarantee that the device is in working order for the next two years. The cost of such maintenance is approximately € 110.00. Experience has shown that the extremely high reliability of the **SeptoriaTimer** can only be maintained by regular inspection.

The **SeptoriaTimer** should undergo a functional check before utilization in the population:

After switching the **SeptoriaTimer** on, it initially displays the digits **-19:99** for 15 seconds. This combination of numbers always marks the **Start of indication**. It is followed by the number combination **- :00 (End of indication)**.

Before initial utilization of the device, the farmer can easily check if it is fully operational by submerging the leaf wetness sensor in a bucket full of water and reading the sensor the next day. From the beginning of a wetness period, the expired hours of duration of the wetness period are indicated by the number combination appearing after the colon. For example, the **indication - :09** means that the wetness period is already lasting since nine hours. After this, the **SeptoriaTimer** must be turned off temporarily to reset it to "Zero".

Determination of important development stages of wheat:

Assembly date of **SeptoriaTimer**

Source: Bayer grain-diagnosis-system according to VERREET/HOFFMANN, 1992

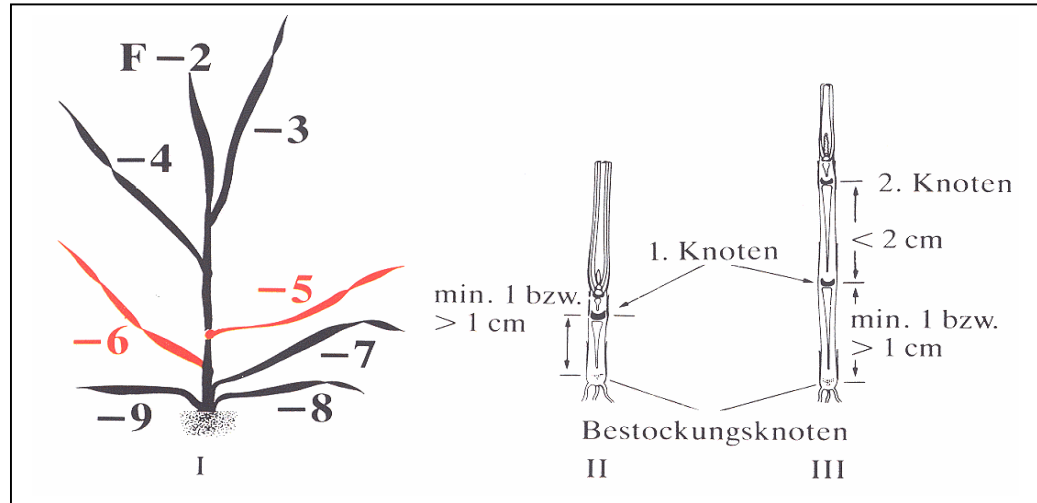


Illustration 1: (1-node-stage) growth period 31

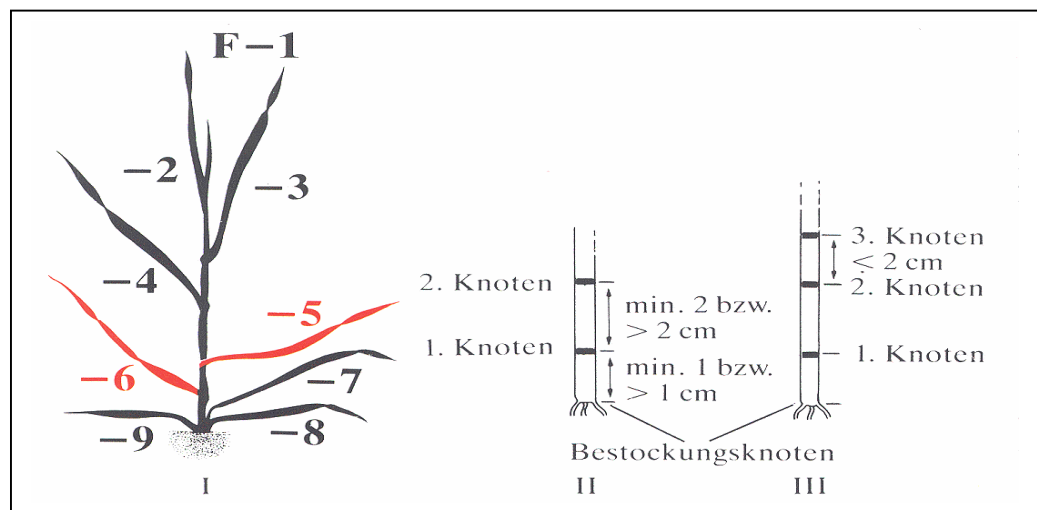


Illustration 2: (2-node-stage) growth period 32

Bestockungsknoten = stem node

Knoten = node

4 Description of Functions

If after rainfall (> 3 mm/day) the **SeptoriaTimer** indicates further digits between the digits **-19:99 (Start of indication)** and **- :00 (End of indication)**, these digits indicate the days after which an infection was excluded and the corresponding duration of leaf wetness.

Operation:

Example 1:	-19:99 (Start of indication)
	 -:00 (End of indication)

Utilization in population:

Example 2:	-19:99 (Start of indication)
	4:48 4 days ago an infection period favourable for <i>Septoria tritici</i> ended after a duration of 48 hours
	 -:00 (End of indication)

In case of a number of infection incidents within one period, several digits are indicated between **-19:99 (Start of indication)** and **- :00 (End of indication)**.

Example 3:	-19:99 (Start of indication)
	-19:48 19 days ago an infection period favourable for <i>Septoria tritici</i> ended after a duration of von 48 hours
	5:37 5 days ago an infection period favourable for <i>Septoria tritici</i> ended after a duration of 37 hours
	0:42 During the course of today an infection period favourable for <i>Septoria tritici</i> ended after 42 hours
	 -:00 (End of indication)

*It should be noted that previous periods of wetness stored in the **SeptoriaTimer** are deleted after 19 days as the highest possible digit on the left side of the sensor is the number 19.*

During the vegetation period the user is able to delete all previously stored infection conditions for *Septoria tritici* (causative organism for Leaf drought in wheat) in the **SeptoriaTimer** by means of the ON/OFF-switch of the device.

5 Interpretation and Procedure in case of SeptoriaTime Warning Message in Growth Period 31/32 (50% of F-2 visible)

The **SeptoriaTimer** indicates favourable infection conditions for the causative organism of Leaf drought (*Septoria tritici*).

After a warning message from the **SeptoriaTimer** the user must initiate the following steps:

1. Determination of the initial infestation of *Septoria tritici* (causative organism for Leaf drought).
Only if the initial infestation is > 50% infestation frequency (greater than one in every two plants) on the leaf level F-6 = seventh leave from the top (respectively higher leaf levels) treatment against this causative organism is appropriate after receiving a warning message from the **SeptoriaTimer**.

2. Advice for interpretation:

Duration of leaf wetness	Interpretation	Reaction
< 36 hours	no respectively low risk of infection	treatment not really necessary
> 36 hours	medium risk of infection	treatment <u>may be necessary</u> in the case of: early seeds, susceptible varieties, high initial infestation
> 48 hours	severe risk of infection	treatment <u>is necessary</u> for: all varieties

3. If the condition of the initial infestation and the risk potential of the prevailing conditions are also fulfilled (see also point 2), check if the *Septoria tritici* infection was securely covered by a previous septoria-specific application. **If this is not the case, treatment should be carried out using a septoria-specific substance.**
Regarding selection of the application rate, ensure that **the curative (healing) efficiency** of the preparation employed securely covers the infection incident (if necessary, the advisor should be consulted). Applications carried out too late or using the incorrect dosage only lead to partial success in controlling the disease.
4. Depending on the application rate chosen and the efficiency of the active substance used, infection periods during the protective capacity may be ignored after application has been carried out (if necessary, consult advisor).
If new infection periods occur after this stage, the population must be examined for *Septoria tritici* and, if necessary, be treated again. Regarding selection of the application rate, ensure that **the curative (healing) efficiency** of the preparation employed securely covers the infection incident (please consult advisor if necessary). No applications are necessary after the blooming stage.

We accept no liability for damages in the population caused by misinterpretation of the measuring results.

7 Assembly Instructions

Only correct assembly of the SeptoriaTimer guarantees a reliable prognosis of an infection incident causative for *Septoria tritici*!

ASSEMBLY SHOULD BE COMPLETED BY GROWTH PERIOD 31!

1. **The measuring station may only be installed when there is absolutely no precipitation!** If moisture enters the datalogger, errors may occur temporarily, leading to improper operation of the device. If any moisture does enter the datalogger, it is recommended that it be dried in a sheltered room.
2. The following assembling aids and tools are required:
pillar or supporting pipe approx. 1.5 m in length,
sledge-hammer and hit block,
screwdriver 8 mm,
insulating tape,
spanner (10),
(bamboo-) stick, approx. one meter in length,
protocol form and pen.
3. The leaf wetness sensor must be hung up on a stick at a representative location behind the headland, while its upper edge must be in line with the third leaf from the top. The cotton stripe must be **absolutely free** and point in the main direction of rainfall (western)! The height of the leaf wetness sensor must be adjusted according to the growing population (shoot stage).
4. The **cable of the leaf wetness sensor must be completely uncoiled** as coiled cables may cause malfunctions during thunderstorms.
5. **Pillars with the supporting pipe** for the **SeptoriaTimer** must be driven into the ground approx. 1 m deep until the point at which the pillar has the **best possible contact with the soil moisture**, achieving optimal protection against lightning. When driving the pillar into the ground it is to be protected by a hit block.
6. Assembly nooks must be fastened to the pillar respectively to the supporting pipe in accordance with assembly instruction 506614. The **SeptoriaTimer** must be screwed tightly on the assembly nooks with the enclosed screws.
7. Unscrew the cover of **SeptoriaTimer** and put the switch in the "ON" position. After a short while (up to 30 sec.) the values -19:99 and - :00 change every 15 sec. on the sensor (display).
8. Enter location, date and time on the protocol form.
9. Screw the cover of **SeptoriaTimer** on tightly. Ensure that no cables are clamped and that the sealing of the **SeptoriaTimer** is within its notch.
10. Regarding tightness, the case of the **SeptoriaTimer** corresponds to DIN-norm IP65, i.e., it is splashproof. Sometimes, weather conditions prevail in open countryside (thunderstorms, severe storms with rainfall) where the norm is exceeded. Additional sealing of the **SeptoriaTimer's** opening notch with insulating tape is therefore recommended.

11. **The SeptoriaTimer must be visited at least once every week**, data must be entered in the protocol form and if necessary, the wetness sensor must be adjusted in height (see also 3.). Without a carefully completed protocol form, reliable analysis of the measured data is not possible.
12. The **SeptoriaTimer** must be dismantled before harvesting. If the **SeptoriaTimer** is not sent for inspection, the switch must be put in "OUT"-position to prevent battery discharge. In this case, the battery voltage ensures sufficient electricity supply for two vegetation periods (March – July).
13. Only an **alkali-manganese-battery** must be used as other batteries do not supply sufficient electricity for use in low temperatures, discharge too soon and above all leak out too soon.
14. **Every second year, the SeptoriaTimer should be sent to the manufacturing company in power-on operation for inspection.**

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