

Trials with German Growers 2015

Vegetables

Mildew at Pot Basilicum—Climate conditions with the plants

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### **The results - summary**

Since 2013, the relationship between small-climatic conditions in pot basil stocks and the risk of infestation with mildew (*Peronospora belbahrii*) are studied at the Institute of Horticulture of the University Weihenstephan-Triesdorf. For this at the HSWT and in commercial farms were temperature and humidity measurements performed, and evaluated in terms of dew point:

An optimization of the operational measuring point for the Setpoint legislation must be examined. The measurement must necessarily take place among the plants. Recurring, long-lasting periods of the dew point must be reduced by an adapted air guide, controlled irrigation and regular monitoring of irrigation facilities. Targeted nocturnal exposure, but also the use of units for the regulation of RH devices can contribute to defusing of critical dew point situation.

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### **Trial- Question and Background**

The infestation of basil with downy mildew (*Peronospora belbahrii*) forced growers worldwide with major problems. Also in Germany the fungal pathogens caused since 2003 high economic losses. Currently, there are no suitable, sweeping control strategies against downy mildew of basil. There are now the first resistant varieties on the market, but this probably offer no long-term guarantee of success, as taught by the example of race formation of downy mildew in lettuce and spinach. Chemical seed treatment is not an option for organic farms, offering also due to rapid development of resistance no lasting security.

To find solutions, was first initiated a requirement of HSWT with Ökoplant, with the participation of the nationwide 29 companies (including 16 from Bavaria) involved, a basil-Greenhouse total area of

18 ha covered up in 2013, which corresponds to a production volume of about 36 million pots corresponds. In all participating companies downy mildew occurred on basil.

Regarding the controllable, damp climate and culture-relevant parameters such as temperature, humidity, light, irrigation and the use of energy shield and shading resulted in a very wide range of operating individually selected combinations. Within this range, no air strategy was evident, with the infection with downy mildew was totally prevented.

Generally, the leaf wetness plays a vital role in the biology of downy mildews. Therefore, the regulation of the humidity is of vital importance in inventory. Basic prerequisite for an infection and infestation spread is always the presence of excessive moisture. Particularly critical are more than 8 hours lasting air humidity-content over 95% at night.

## **Results: Details**

### **Positioning of climate sensors**

All measurements and tests on the HSWT since 2013 had therefore humidity and temperature directly in plant stock in focus. The measurement results 2013 of 3 commercial farms showed that the relative humidity under the leafs was 20 to 30% higher than 20 cm above the plants or in the area of the control sensor. The climate sensors for setpoint control thus depend on a risk assessment with regard to leaf wetness danger often much too high (Fig. 1).

### **< dew point**

Based on the dew point temperature and air humidity per hour averaged-measurements were calculated phases of cumulative related dew point. Furthermore, temperature and humidity conditions were determined and compared with the infestation dew point hours situation in the greenhouses. Both in 2013 and 2014 occurred in the three commercial farms by phases with related dew point in the stock *of more than 8 hours* over several days attack by downy mildew (Fig. 2).

**Lighting effects** Furtheron were investigated various lighting effects in reference to the microclimate under the leaves. In the period from 12/08/14 to 07/10/2014 was observed with NHDL lightning from 0:00 to 7:00 clock in comparison to unexposed variation in temperature increase of about 1 ° C and a humidity reduction of about 5%. An exposing 3:00 until 5:00 clock led to a correspondingly shorter-term increase in temperature and humidity reduction (Fig. 3)

**Dehumidification** *In a farm the effect of the Israeli company Drygair Dehumidification ([www.drygair.com](http://www.drygair.com)) was 2015 examined on the microclimate in basil stocks. Comparison between the climatic situation in two 1000m<sup>2</sup>-houses, one with, one without dehumidification, otherwise climate controlled technically equal. Relative humidity and temperature were measured at certain points as of 10/05/2015 until 10/12/2015. Especially in the critical hours of the night was through the dehumidification, the relative humidity decreased on average by around 90% to around 83%, the temperature can be increased by about 3 ° C (Fig. 4). This resulted in a total significantly less dew point critical situations (Fig. 5). In the house with the dehumidification it came over the entire measurement period in the portfolio to more than 6 hours continuous dew point. The critical eight hours were against to the control house never exceeded, therefor an essential prerequisite infection could be prevented for downy mildew of basil.*

### **Cultural and experimental notes**

Cltivated basil in 12er pots in ebb and flow systems. With sensors of type Testo 175H1 air temperature and humidity were depending on the experiment in the portfolio, measured 20 cm above the plants and in the height of operating sensors. Data were collected every 10 min and stored at intervals of 30 min. Based on the per hour averaged measurements the phases related dew point were calculated.

### **Critical remarks**

Adequate measurement accuracy, especially in the critical area of

more than 90%, it is imperative to calibrate the Testo sensors regularly and protect the delicate sensor area with “sinterkappen” among the plants against dripping water.

The wide variety of micro-climate situations, resulting from the control parameters heating, ventilation, irrigation, opening and closing of energy screens and shades and is also influenced by object distance and plant development, can be described in detail in its immediate impact on the infestation is difficult to verify. Therefore, the operating results were expressed as the total constellation.

With a probe only a punctual situation is detected during operation. The purchase of a dehumidifier is associated with high investment costs. Increased electricity costs have to be offset against operating individually with the possible savings in heating costs and more safety culture at Basil.

## Drafts

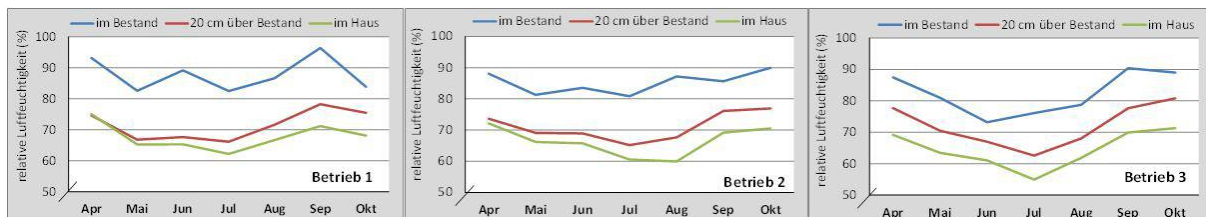


Abb. 1: Luftfeuchtheitswerte in 3 Betrieben von April bis Oktober 2013



Abb. 2: Phasen mit zusammenhängenden Taupunktunterschreitungen und Befallsituationen im Basilikumbestand bei Kultur im 12er-Topf in 3 Betrieben in den Jahren 2013/2014

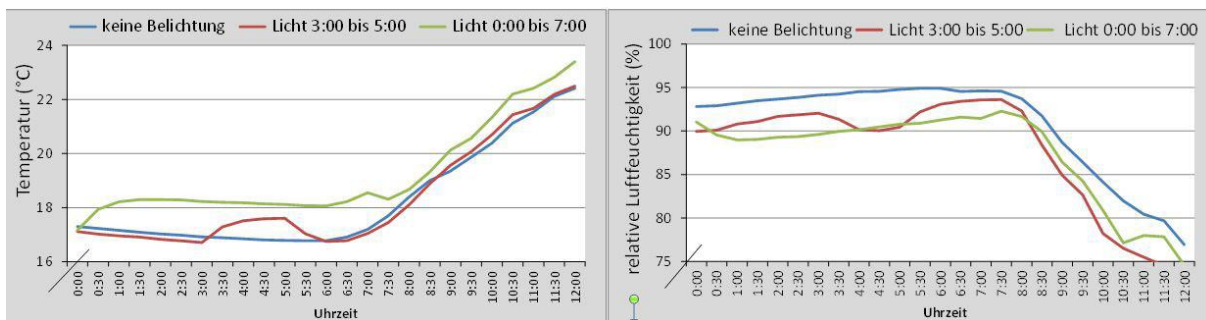


Abb. 3: Einfluss von Einfluss verschiedener Belichtungskonzepte mit NHDL auf Temperatur- und Luftfeuchtigkeitsverlauf im Basilikumbestand bei Kultur im 12er-Topf, 2014