Rapses und mit SIMPHOMA die mittlere Infektionswahrscheinlichkeit simuliert und für die verschiedenen Zeitfester miteinander verglichen.

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Effects of magnitude and frequency of heat waves on the population dynamics of cabbage aphid *Brevicoryne brassicae*

The climatic changes that have been forecasted by the IPCC not only show a gradually warming globe but also indicate that climate change will be characterized by extreme weather events. These extreme weather events will include heat waves, extremely high temperatures, high or low precipitation, frequently dry days in spring and summer especially in more Northern latitude regions. The magnitude and frequency of these extreme weather events waves have been predicted and observed to increase within a changing climate scenario. Additionally, they vary regionally. It is the complexity in occurrence that may make it difficult to predict their impacts to the ecosystem. Nevertheless, there are volumes of studies that have already been carried out to investigate the impacts of different aspects of climate change on agro-ecosystem in general and on tri-trophic interactions specifically. However, a great majority has dealt with temperature and specifically low temperatures and warmer winter. While these studies are very important in predicting how global warming may impact tri-trophic interactions, the other aspects of climate change i.e., heat waves, droughts etc, need to be put into consideration in order to have a concrete view of what to expect from climate change, especially the associated extremes in regional weather on pest-natural enemy interactions.

It is against this bac kground that the impact of simulated heat waves on population dynamics of *Brevicorynae brassicae* was investigated in controlled environments.

In all ectotherms, the physiological functions, behaviour and fitness are not only affected by the intensity of ambient temperature but also by the frequency in which it occur. The occurrence of abnormally high temperatures during past summer seasons in Lower Saxony were taken into consideration. Consequently, effects of three simulated heat waves i.e. 30, 34, 38 °C, lasting for 3 hours each and occurring at a frequency of 1, 3 and 5 days was tested on *Brevicoryne brassicae* (L.) on Brussels sprouts leaves on Petri dish arenas. Survival of L1 *B. brassicae* was significantly decreased by heat waves of 38 °C. Exposure of L1 aphids to heat waves of 38 °C at 5 consecutive days resulted in 100 % mortality. Survival at heat waves of 30 and 34 °C at all the studied frequencies was not significantly affected compared to the 20 °C control (97 ± 9.45 %). Developmental time from L1 to adult was not significantly affected by either the magnitude of the heat waves or the frequency of their occurrence. Nevertheless, a tendency for faster development was noted. At the control, aphids took 6.67 ± 1.05 days to develop from L1 to adult while at the 3 day frequency of the 38 °C heat wave the aphids took 5.02 ± 0.91, to achieve the same development. However, the emerging adults had a significantly lower lifetime fecundity of 21.37 ± 3.44 offspring at a 3 d frequency of the 38 °C heat wave compared to that of the control i.e., 67.99 ± 9.02 offspring per adult. Contrastingly, the aphids that were exposed to the heat waves lived significantly longer compared to the control treatments especially those at the frequencies 3 and 5 From this investigation we concluded that the heat waves lead to high immediate mortality of early developmental stages of *B. brassicae*. Depending on the frequency and the magnitude of their occurrence, the fecundity of the survivors is drastically reduced by heat waves while the longevity is prolonged. This means that, other factors held constant, heat waves will play a key role in reduction of *B. brassicae* populations which is contrary to most models that predict an increase in pest outbreaks with climate change.

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Klimawandel und Pflanzenschutz im Gemüsebau – Welchen Einfluss haben wiederholte kurzzeitige Hitzewellen auf die Kohlmottenschildlaus (*Aleyrodes proletella*)?

Climate change and plant protection in horticulture: Influence of repeated short-time heat-waves on the cabbage whitefly (Aleyrodes proletella)

So wie sich das Klima im letzten Jahrhundert verändert hat, ist es wahrscheinlich, dass es sich auch in den nächsten Jahren ändern wird. Als Änderung des Klimas werden vor allem Temperaturanstiege (wärmere Winter und Nächte) und die Zunahme von Extremereignissen prognostiziert (Hitzewellen, Starkregen und Trockenperioden). Diese Änderungen werden einen Einfluss auf den Gartenbau und dessen Schädlinge haben.