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Optimizing bumblebee hive schedules in winter

Whitepaper

Partners with Nature

This white paper provides technical advice for optimizing bumblebee hive introduction schedules to maximize pollination efficiency under controlled lighting conditions during the transition from summer to autumn and winter.

As effective pollination hours decrease due to shorter daylight, precise scheduling and hive management become critical for maintaining crop yield and quality. We discuss key strategies for hive introduction, adjusting hive numbers based on pollination conditions, and the importance of timely coordination with suppliers to ensure a steady supply of bumblebee colonies.

Understanding effective pollination hours

Effective pollination hours refer to the period during which bumblebees can effectively pollinate crops. This period is defined by several factors:

- **Open flowers:** Pollination is only possible when flowers are open and receptive.
- **Daylight or growing light availability:** Sufficient light is needed to stimulate bumblebee activity. This is increasingly limited as daylight hours decrease during autumn and winter.
- **Pollen condition:** Pollen must not be overly sticky, which can be influenced by humidity levels and temperature.

During the summer, effective pollination hours range from 13 to 14 hours per day. However, as daylight reduces during autumn and winter, this period drops dramatically to 2-4 hours per day around the shortest day.

Seasonal impact on bumblebee activity and pollination

The shift from longer summer days to shorter winter days directly impacts bumblebee activity. With effective pollination hours reduced by up to 80%, bumblebees must pollinate the flowers in a much shorter time frame.

Consequently, an increased number of bumblebee hives is required to compensate for this reduced activity period.

Hive introduction strategy: key considerations

To maximize pollination efficiency under shorter daylight conditions, it is crucial to implement a gradual increase in hive density:

Increase hive density: Starting from mid-October to the end of November, gradually increase the number of bumblebee hives by 1.5 to 2.5 times the standard hive density per hectare per week.

Timing: Adjust the hive introduction schedule based on observed changes in daylight and crop conditions, ensuring the hives are placed before the effective pollination hours become too short.

Adjusting hive density for row lengths and crops

If plant rows extend beyond 100 meters, add 2 extra hives per hectare per week, specifically positioned above the ends of the plant rows. This ensures consistent pollination across the entire crop area, especially in longer rows where pollination efficiency can decrease.

Removing hives more quickly in winter

The shift from longer summer days to shorter winter days directly impacts bumblebee activity. With effective pollination hours reduced by up to 80%, bumblebees must pollinate the same number of flowers in a much shorter time frame. Consequently, an increased number of bumblebee hives is required to compensate for this reduced activity period.

Increasing pollination period

As the effective pollination period increases, adjust your hive introduction schedule accordingly. This can be done by gradually reducing the number of new hives introduced. In practice, this adjustment should begin when flower closing times extend to around 17:00, or when the artificial light cycle shifts to a later start time, such as 03:00 instead of the previous 00:00.

These changes indicate longer pollination windows, allowing existing hives to maintain adequate pollination coverage without the need for additional colonies.

Coordinating with suppliers for timely hive availability

Effective planning and communication with bumblebee suppliers are critical for maintaining a consistent and timely supply of hives. It takes approximately 10 weeks to raise bumblebee colonies, so increased hive introduction schedules must be communicated well in advance.

Early coordination allows for adjustments based on crop requirements and changing environmental conditions.

Conclusion

Managing bumblebee hive introduction under growing lights during autumn and winter is essential for maintaining effective pollination and ensuring optimal crop yield. By gradually increasing hive density, optimizing hive placement, and adjusting hive lifespans, growers can counteract the reduced pollination hours caused by shorter days. Coordination with suppliers ensures the timely availability of hives, making it possible to meet the pollination needs of crops even in challenging conditions.

For more information and best practices on greenhouse pollination, please visit our website or contact us for expert consultation.

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