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Lights and Water Traps For Alfalfa Leafcutter Bee Incubators

Norman D. Waters

More and more alfalfa seed producers are turning to incubation rooms for rearing alfalfa leafcutter bees*. The incubation room is proving to be a valuable management tool.

The alfalfa leafcutter bees emerge from their overwintering nest after 19 to 21 days of 85 degree F temperature. Knowing this, the seed producer can set the date he wants to have his bees ready to work by holding them in cold storage at 35 degree F temperature until about three weeks before he needs his bees, then place them in the rearing room and carefully maintain the temperature at 85 degree F during the three week incubation period.

However, large numbers of parasitic, predaceous, and nest destroying insects live in all alfalfa leafcutter bee nesting materials. To make the incubating room as efficient as possible, means must be used to destroy as many of these undesirable insects as possible before the bees emerge.

Artificial light that lures these insects into water pan traps is such a method. Research conducted at the Parma Branch Experiment Station during 1968 and 1969 has helped provide answers as to what kinds of lights are attractive for different insects. Information from this research is presented here to help alfalfa seed producers solve their particular insect pest problems.

Three types of lights were tested. They were:

1. An ordinary 40 watt, incandescent, electric light bulb.
2. A 6 watt, flourescent, filtered black light, BLB6.
3. A 6 watt, flourescent, non-filtered black light, BL6.

Megachile rotundata (Fabr.)

ABOUT THE AUTHOR: Norman D. Waters is Assistant Research Professor of Entomology at the Parma Branch Agricultural Experiment Station.

AGRICULTURAL EXTENSION SERVICE AGRICULTURAL EXPERIMENT STATION
COLLEGE OF AGRICULTURE ★ UNIVERSITY OF IDAHO

1968 Test of Black Lights

In this experiment, only the two types of black light were used. Tests were conducted in a small excluder room (see current information series entitled "Alfalfa Leafcutter Bee Excluder-Trap.") which was attached to the back of a modified field shelter. The room contained fifteen old bee boards and sixty boxes of soda straws, all badly infested with several species of harmful insects.

The water traps were constructed of inverted lids of styrofoam ice chests, 9 x 15 inches in size. The water in each lid was almost an inch deep. This type container was chosen so that harmful insects would have no difficulty climbing the sides in order to drop into the water. A tablespoonful of dishwashing detergent was mixed with the water in each lid. This reduced the surface tension and helped wet the insects causing them to sink more rapidly. The lights were centered over each pan about an inch above the water.

The tests were started June 24 and ended July 3, 1968. Every second day the traps were checked. Water that had evaporated was replenished. Insects trapped in the water were counted and identified.

Results

Table 1 presents the results obtained. The two types of black light appeared to be equal in attractiveness to the dermestid beetle population, composed primarily of *Trogoderma glabrum* (H bst.). Neither light appeared to attract the numerous black flour beetles, *Tribolium madens* (Charp.), which were in the room. Very few checkered flower beetles, *Trichodes ornatus* Say, or blister beetles, *Nemognatha lurida* Lec., were present; therefore, no conclusions could be drawn.

The filtered black light was the most effective (58 percent of the total) in trapping the wasp parasite, *Sapyga pumila* Cress.

Table 1. Summary of insects harmful to alfalfa leafcutter bees caught in water pan traps inside an excluder room, Sand Hollow, Payette County, Idaho, June 24-July 3, 1968.

	Black light used as lure	
	Non-filtered, BL6	*Filtered, BLB6*
Leafcutter bee pests	*No. caught (Percent)*	*No. caught (Percent)*
Monodontomerus obscurus	31 (43)	42 (57)
Dermestid beetles	217 (52)	196 (48)
Black flour beetle	3 (75)	1 (25)
Sapyga pumila	507 (42)	705 (58)
Nemognatha lurida	0	1
Trichodes ornatus	2	2
Totals	760	947
Percents	(44)	(56)

1968 Incubation Room Test

In this experiment, a 10 by 20 foot room contained over a thousand bee boards and several hundred filled boxes of soda straws being incubated. All three types of light were tested over the water-filled, styrofoam lids placed on the floor. Tests were conducted from June 14 through June 18, the last five days of incubation before the bees were removed and taken to the field.

Results

The results in Table 2 indicate the pests which emerged and were caught during this five day test period.

The incandescent 40 watt bulb caught only 5 percent of the total pests trapped. However, it was almost equal to the non-filtered black light in attracting the black flour beetle.

With the exception of checkered flower beetles and blister beetles, the filtered black light appears to range from 10 to 30 percent more attractive to the rest of the pest species trapped than was the non-filtered black light.

Table 2. Summary of insects harmful to alfalfa leafcutter bees caught in water pan traps, in an incubation room, comparing three types of light, Sand Hollow, Payette County, Idaho, June 14-18, 1968.

	Incandescent, white light	*Non-filtered black light*	*Filtered black light*
Leafcutter bee pests	No. caught (Percent)	No. caught (Percent)	No. caught (Percent)
Monodontomerus obscurus	276 (5)	2322 (41)	3150 (54)
Dermestid beetles	48 (4)	504 (42)	636 (54)
Black flour beetles	33 (25)	30 (22)	70 (53)
Sapyga pumila	3 (2)	62 (39)	94 (59)
Leucospis affinis	7 (8)	32 (34)	54 (58)
Nemognatha lurida	21 (26)	26 (32)	34 (42)
Trichodes ornatus	1 (4)	11 (44)	13 (52)
Totals	389	2987	4006
Percents	(5)	(40)	(55)

1969 Incubation Room Test

These tests were conducted in an insulated semi-trailer which had been converted to a cold storage room for overwintering leafcutter bees. During the conversion, the trailer was designed so it could also be used for spring incubation without moving the bees a second time. The interior was 8 x 8 x 35 feet and contained about 450 bee boards and 1000 boxes filled with 4¼ inch long soda straws. The infestation by harmful insects of these boards and soda straws were visually classified as ranging from light to moderate.

Two black lights and the 40 watt incandescent white light were set over each styrofoam water trap container, after the temperature in the room had been elevated to 85 F. Tests were started May 21 and ended June 10, 1969.

Results

Table 3 presents the results obtained. The pests caught in 1969 are more typical of the species and numbers that might be trapped from an average grower's bees during an entire incubation period, in contrast to the ones reported in the 1968 tests.

The Indian meal moth, *Plodia interpunctella* (Jub.), and the dried fruit moth, *Vitula edmandsae serratilineela* Rago., were similarly attracted by each of the three lights. The white light was least attractive, the non-filtered black light was intermediate, and the filtered black light attracted the most, about 45 percent of both species.

The non-filtered black light proved to have the highest attraction for *Monodontomerus obscurus* West. Over half of the very large population present was lured into this trap. There was little difference between the numbers of *Monodontomerus* caught in the other two light traps.

Large numbers of dermestid beetles, mostly *Trogoderma glabrum*, were caught in the water pan traps. The differences in attracting power of the three types of light were very noticeable. The filtered black light attracted 60 percent, the non-filtered 26 percent, and the white light only 14 percent of the total number caught.

Although the two black lights were more attractive to the black flour beetle than white light, a daily inspection indicated 5 percent, or less, of the observed population present in the room were collected in all the water pan traps. Evidently, these three types of light are not very attractive to this pest species.

Few of the chalcid wasp, *Leucospis affinis* Say, or the parasitic wasp, *Sapyga pumila* Cress., were collected in water pan traps. This was not unexpected, because their histories are very closely tied to those of the alfalfa leafcutter bee and they mostly emerge along with the leafcutter bees after being removed from the incubator and placed in field shelters. No checkered flower or blister beetles were trapped in this experiment.

Table 3. Summary of insects harmful to alfalfa leafcutter bees caught in water pan traps in an incubator room, comparing three types of light, Arena Valley, Canyon County, Idaho, May 22-June 11, 1969.

	Incandescent, white light	*Non-filtered black light*	*Filtered black light*
Leafcutter bee pests	No. caught (Percent)	No. Caught (Percent)	No. caught (Percent)
Indian meal moth	813 (23)	2724 (34)	3392 (43)
Dried fruit moth	72 (22)	99 (30)	157 (48)
Monodontomerus obscurus	4831 (23)	10694 (50)	5894 (27)
Dermestid beetles	207 (14)	394 (26)	900 (60)
Black flour beetle	119 (18)	333 (50)	218 (32)
Leucopsis affinis	17 (37)	18 (39)	11 (24)
Sapyga pumila	15 (25)	30 (50)	15 (25)

Summary and Recommendations

Incubating alfalfa leafcutter bees at controlled temperatures following their overwintering in cold storage should be a method used by all growers using these bees as pollinators. Growers are often unaware of the numbers of, or the amount of, damage caused by harmful insects infesting their overwintering bees. As shown by the water pan traps with attractive lights, great numbers of these harmful insects do infest bee nests.

Many observations made, in addition to the results presented here, indicate that the combination of a white light plus one of the two types of black light is more efficient in luring harmful insects into water pan traps than any of the three types of light used alone. The choice of lights should be governed by the primary pest species each grower has.

One word of caution should be given. Growers with incubators exposed to the sun's rays or those who have well insulated incubator rooms should excercise great care to make sure that heat given off by the lights does not raise the room temperature too high, resulting in bee mortality.

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James E. Kraus

JAMES E. KRAUS, *Director*

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