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IMPLEMENTATION OF MICRO-CONTROLLER BASED ECO-FRIENDLY SOLAR INSECT TRAP FOR PEST CONTROL

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ABSTRACT

This revolutionary paintings became performed to broaden a version sun mid entice as a way to be handiest to manipulate the bugs and utilization of fertilizers. For this motive device is more advantageous with a few new advancements. It is sun powered device managed via way of means of a micro controller named Arduino nano consisting of solar panel, charging unit, battery, LDR sensor and UV LED bulb mounted with the sun insect entice device. The newly advanced sun insect entice version is greater powerful to display insect pests and it's a green entice for the sphere of agriculture because it has low fee involvement so it could be utilised via way of means of the farmers. Lastly it's far the handiest mild entice which give higher protect to the character in evaluation to the opposite approach of pest control.

Keywords: Insect entice, Arduino nano, Agriculture, LDR sensor, UV LED bulb

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1. INTRODUCTION

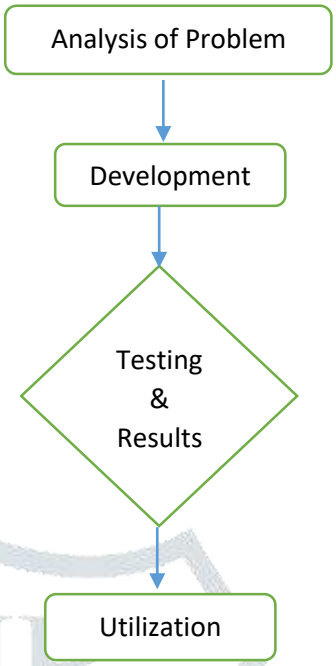
Insect traps are both used to screen or at once less population of insect pests. Visual lures use light, hues and shapes to draw pests. Insect traps are on the occasion utilized in pest control packages for mass trapping however are extra regularly used to evaluate the seasonal and distributional styles of pest occurrence. This facts may also then be utilized in different strategies in pest control. Therefore, trapping strategies are one of the important gear in insect pest control packages. The capacity to draw unique insect species to the traps relies upon at the sort of trapping equipment. Placement of traps is vital they need to be located in this kind of way that pests, if present, are possibly to return back into touch with them. Equally vital is an wide variety of traps for powerful monitoring. Water, land, formers and residing things(consisting of humans) enjoy the discount of dangerous insecticides. The intension of decreasing pesticide use is to create a higher surroundings and offer a long time aid for farmers. Agriculture is a important profession for farmer. Every 12 months farmers face pest troubles which critically ruin crops. There are many preventions and exterminations of pest troubles, such as mechanical technique bodily technique, organic technique, and chemical technique. Using insecticides and chemical technique at once impacts on agriculturists and consumers, for example, pests are chemical resistant which leads farmers the usage of increasingly more insecticides. This reasons plant residue that's risky for consumers, and additionally impacts on surroundings and ecology.

2 . LITERATURE REVIEW

Matheus Cardim Ferreria Lima et al. (2020), The identify and tracking of insect pests the usage of automated traps brings a unique method to the included pest management. Systems that use photo reputation strategies and neural networks are the maximum studied ones, being dependable for the absolutely automatized identity of orders and counting of bugs; however, now no longer such a lot of proposed fashions are capable of perceive the species level. Other promising photo-primarily based totally structures advanced are those that purpose to ship the insect photo to a expert after which the bugs can be recognized and counted remotely in actual time. The infrared sensor traps had been proven to be beneficial for counting bugs, however are constrained due to the fact they cannot perceive the species, that can end result to deceptive records with inside the survey. Audio traps are any other deeply studied method for tracking pests.

Gavhande et al. (2019), The monetary feasibility of the sun photovoltaic insect mild lure become evaluated the usage of bargain coins float method. The monetary parameters are gift really well worth of cost, gift really well worth of benefit, internet gift price and payback duration become determined. The most performance of 10 Wp solar panel become located to be 14.25%. The most running hours of SPV mild lure become 10-13 hours. The battery become complete charged in 6 hours with the assist of SPV panel. The extra bugs had been attracted through extremely violet coloured mild lure as opposed to blue and yellow coloured mild lure. The region of insurance of UV blue mild lure become located to five acre according to traps. The sun insect mild lure become located green extra powerful for the manipulation of various insect pests of all plants with none use of chemical insecticides with inside the agricultural fields in close to future.

3. METHODOLOGY



The Solar Energy Based Insect Pest Trap is a experimental analysis. The purpose of the trap is to produce and invent sun entice based energy trap by using ultraviolet LED bulbs as light source. It has effective wavelength to tempt insects. Solar cells convert heat energy into electrical energy. Then the trap taken to test the pest trap in agricultural areas.

4. AURDINO PROGRAM

```
int LDRInput=A0; //Set Analog Input A0 for LDR.
int LED=2;
void setup() {
Serial.begin(9600);
pinMode(LDRInput.INPUT);
pinMode(LED,OUTPUT);
}
void loop() {
int value=analogRead(LDRInput);//Reads the Value of LDR(light).
Serial.print1n('LDR value is :')//Prints the value of LDR to Serial Monitor.
Serial.print1n(value);
If(value<300)
{
```

```
digitalWrite(LED,HIGH);//The LED turns ON in
Dark.
}
else
{
        digitalWrite(LED,LOW);//The LED turns
OFF in Light.
          }
        }
```

5. RESULT AND DISCUSSION

A. Calculation of solar panel

This below table explains about the panel,

S.NO	Operational activity	Output
1	Loaded power	35 Watt-hour
2	Total energy needed	45 Watt-hour per day
3	Panel capacity	13.37
4	Number of solar panels	1

Table:5.1 Panel calculation

B. Battery input and output energy

The below table describes about the input and output energy,

Input Energy	Output Energy	
44 watt	**Item**	**Description**
	Bulb energy	5 watt
	Loss of energy	0.3 watt
	Total power required	5.3 watt
	Glowing hours	7.32 hours

Table:5.2 Battery energy calculation

C. Performance in field

Fig:5.1 Model of the Trap

This picture explains about the day view of the trap.

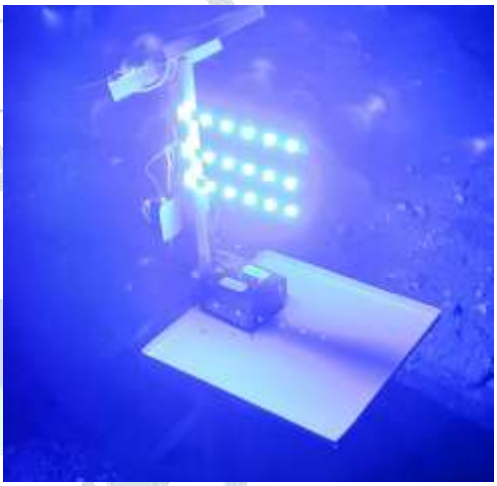


Fig:5.2 Trap

The insects were categorised primarily based their individual order. The dominant insect pests like Yellow Stem Borer (YSB), inexperienced homopteran, white homopteran, leaf folders, larva and rice bug that were found in every light weight entice. In keeping with the findings, largest numbers of insects were unfree within the month. Most of the harmful insects were seen in encompassing the sunshine entice which can have an effect on the rice field. It's counseled that light weight entice ought to be fitted a minimum of one meter aloof from the rice fields. This result demonstrates that star light-weight are going to be a promising technology in fields in terms of blighter management tool.

D. Bulb performance in graphical representation

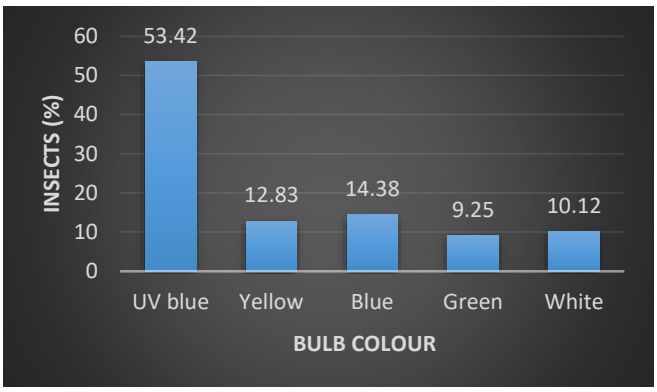


Fig:5.3 Percentage of insects attracted

In compare with all types of light traps the performance in UV LED blue light trap act as a better insect collector. Most of the danger insects are attracted by the UV collector which is beneficial for integrated pest management.

6. FUTURE SCOPE

The gadget may be carried out over a big location of discipline or even in far off areas. For one of these consideration, many structures may be used which could talk with every different and a gasp gadget. It might then grow to be the undertaking of the grasp gadget of that location to transmit the facts of that big location to the controlling station or satellite, because the case can be i.e. The farmers are relieved of any worries in anyway approximately the gadget status. This gadget may be absolutely automatic where in the grasp gadget controls the subsystems and makes a decision the time of switching on or off and the time of facts assimilation. This is of gigantic utility, as the desired employees might realize a way to make the gadget active. Thus, the dependency at the farmers for the purchase of facts might be removed to a incredible extent. Thus, the paintings turns into a extra dependable venture.

7. CONCLUSION

This project "Solar Insect Trap" were advanced and examined successfully. Insect manipulate is a largest trouble to the crop cultivation in all around the world. This proposed sun lure effects an awful lot higher than different present pest manipulate methods. By this implementation inexperienced revolution generation with inide the crop subject for presenting vital shield to the character through presenting vital chemical loose nature. The UV mild may be ON all through night time and switched OFF at day time routinely through integrating LDR sensor manipulate. Also, this sun insect lure economically powerful for all styles of farmers and boom the productiveness at the same time as harvesting. In future, it will likely be grown to mega stage with inside the all areas and result in IOT generation to ease forming.

8. SUGGESTION

This suggestions from this study are:

1. This trap did not applicable for all tall and leafy trees because the sunlight cannot able to reach the trap, so the solar cells cannot able to transfer power to the battery
2. The trap should be developed for scattering of light in 360 degrees from the trap. The LED bulb must be effective for the insect pests.

9. ACKNOWLEDGEMENT

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