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A Study on the Pest of Dried Fish

Nitu[1]* Dr. Ravinder Pal Singh[2]

[1] Research Scholar of OPJS University, Churu, Rajasthan

[2] Associate Professor, OPJS University, Churu, Rajasthan

Abstract – Fish drying is an age old practice and was adopted as a practical method of preserving fish that have not been immediately consumed or sold in the fresh market. Improved fishing techniques and infrastructure resulted in increased fish catch, better marketing, processing and curing facilities. The advent of multiday trawling at the Visakhapatnam Fishing Harbour further boosted the availability of fish and its processing into value added products. However, drying still remains the cheapest and popular mode of fish preservation. Irradiation has distinct advantages over other commercial methods of pest control. Apart from being less energy consuming than fumigation, it does not leave toxic residues in the product. It has been observed that a dose of 0.5 kGy can effectively disinfest dried fish and fishery products at a moisture level of below 40%.

Keywords: Fish, Dried, Pest

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1. INTRODUCTION

The elytral punctures of most taxa become out of date in the apical fourth and individuals from a few subfamilies may have a swoon, pale midelytral belt. The intricate shading examples shown by the family earned them the regular name "the checkered insects". In any case, not all species have designs that are "checkered" nor do all species have shading designs by any means, albeit once in a while so. Individuals from all subfamilies for which there are common history records are referred to be entomophagous as immature and as grown-ups, in any event to a limited extent. Special cases are grown-ups which may utilize dust as an elective wellspring of protein. Most entomophagous taxa are predacious on bark creepy crawlies and other wood-exhausting scarabs. The hatchlings of numerous species have been recorded as predators of Hymenoptera. The Korynetinae and Tarsosteninae go after put away item bothers and larval Hydnocerinae have been watched benefiting from chalcidoid hatchlings in nerves as immatures while being generally experienced on blooms as grown-ups. The Clerinae, Enopliinae, and Epiphloeinae are regularly experienced on trees swarmed with Scolytidae, Buprestidae, Cerambycidae and Lyctinae (Bostrichidae). The hatchlings and, at times, the grown-ups can be found in the exhibitions shrewdly benefiting from all life phases of the prey species.

At the point when not found at the site of a host plant pervasion a few clerids will be found on blooms, in high lush natural surroundings, or running here and there the stems and parts of trees and bushes. Adding interest to the Cleridae is that "except if one happens to be at the correct spot, at the perfect time, when grown-up rise and predation on developing lignicolous creepy crawlies are in worldly synchrony...these beetles are probably going to be assembled a couple of examples at any given moment".

The recognizable proof of bugs plaguing sun-dried R. argentea and O. niloticus was done utilizing the manual of Haines and Rees . In a nutshell, tests of the creepy crawlies (scarabs) plagued fish were put in a paper pack at that point stapled. The examples were then analyzed in detail on a plate in the research facility, by separating the bugs cautiously utilizing light weight forceps, and the hatchlings, pupae and grown-up bugs distinguished utilizing a low-control "dismembering" magnifying instrument. The creepy crawlies were then kept in all around named containers and encouraged with dried fish tissues to permit them breed and be utilized for progressively controlled analyses. The primary creepy crawlies distinguished were Necrobia rufipes and Dermestes maculatus types of insects. To set up controlled investigations, bits of new dagaa were utilized entire and new tilapia tissues were cut into roughly 5cm2 pieces. The dagaa fish pieces or tilapia tissues were then weighed to around 10 grams and each absorbed distinctive salt focuses extend (arranged in refined water) of 5%, 10%, 15%, 20%, 25%, and 30%. The dousing or brining of the dagaa and tilapia fish tissues was accomplished for two hours. 10g fish tests were likewise absorbed refined water without salt to go about as controls. Toward the finish of two hours, they were individually dried at encompassing temperature and afterward gauged (to 5 grams) each of dagaa or tilapia tissues

at various salt fixations and put in discrete marked compartments. Sound grown-up creepy crawlies (two females and one male of Necrobia rufipes and Dermestes maculates), individually, were set in the various compartments with 5 grams fish tissues with various salt focuses and kept for 48 days, the whole span of the examination. Perceptions on the creepy crawlies and their larval and grown-ups practices and mortalities were made and recorded for day 18 and 38. Toward the finish of 48 days, the rest of the fish tissue parts from the distinctive salt focuses were gauged and the loads used to ascertain the rate weight reduction of dagaa and tilapia because of pervasion, utilization and debasement by Necrobia rufipes and Dermestes maculates bugs, weight reduction due to Dermestes spp bug's pervasion of control (unsalted) fish was 62.2% for dagaa and 68.8% for tilapia.

Various centralizations of salt on fish had huge decrease on weight reduction, with 5-10% having about 6% misfortune (for dagaa) and 10% misfortune (for tilapia). There was decrease in weight reduction with increment in salt fixation, with <0.6% misfortune for dagaa and 0.4% misfortune for tilapia at 30% salt focus. Rate weight reduction due to Necrobia spp scarab's pervasion of control (unsalted) fish was 51% for dagaa and 54.6% for tilapia, Table 5. Various centralizations of salt on fish had colossal decrease on fish weight reduction, with 5-10% having about 1.6% misfortune (for dagaa) and 5% misfortune (for tilapia). Necrobia spp. was profoundly defenseless to the salt focus and in 10% salt fixation there was no pervasion subsequently no weight reduction in the event of dagaa. Then again for tilapia, 25% salt focus caused invasion restraint on the bugs coming about into no weight reduction. Following 48 days of Dermestes and Necrobia spp insects invasion, the mean load of unsalted dagaa and tilapia fish tissues consolidated was altogether diminished to 2.05g contrasted with the mean load of 4.68g of 5% salted dagaa and tilapia fish tissues joined, p=0.0002, Students t-Test.

Fish is extremely wealthy in basic amino acids, nutrients and minerals (FAO, 2004). Fish is additionally significant as far as business/salary age, neediness easing, outside trade income and arrangement of crude materials for the creature feed industry. Nigerians are high fish customers with an all-out yearly utilization figure of 1.2 million metric tons (FDF, 2005). In any case, fish is exceedingly helpless to harm by creepy crawlies and microorganisms when it is gotten. BOSTID (1988) evaluated post-collect misfortunes of fish in many creating countriesat half of landed catch. Fish post reap misfortunes in Nigeria have been assessed at 30-40% (FAO, 2004). In such manner, an assortment of handling techniques, for example, salting, drying and smoking have been created to save fish.

Fish is susceptible to beetle infestation once the moisture content is lowered. Both the adults and the larvae feed upon the fish, causing large quantitative losses up to 50% of edible material, and fragmentation of the remaining product (Haines and Rees, 1989), leading to substantial losses in the nutritive value offish during storage. Thus, fish is subject to beetle infestation throughout storage and transportation, and so the potential for losses is great. These pests proliferate and grow on the dried fish, thus changing its appearance and powdering the fish making it unfit for consumption and marketing (FAO, 1981). Inaddition to this, insect pests of fish often transmit

2. REVIEW OF LITERATURE

A portion of the Tillinae and Clerinae penetrate settles and are predators of honey bees and wasps while others are not predacious at all as grown-ups, being found on blossoms and evidently encouraging just on dust. The immatures of Trichodes complete their advancement on the egg units of grasshoppers or inside the cells of honey bees and aculeate wasps (Opitz, 2002: 268, Knull, 1951: 271). Others, particularly hydnocerines, have been recorded to carry on as endoparasites in cynipid nerves, the pupal cells of moths, and have even been experienced in egg homes of periodical cicadas (Russel and Stoetzel, 1991: 385). Hydnocerines have been found in nerves and in the substance cavity of larval cells of Xylocopinae in domatia in Sri Lanka (Krombein, 1999: 28). Lecontella and Cymatodera have been found in larval cells of Eumeninae (Vespidae), Megachilidae, and Sphecidae. While numerous clerids are predators of bark bugs of all life arranges, and are viewed as woodland creepy crawlies, Mawdsley (2002: 15) was the first to discover direct relationship between these bugs and prairie verdure. At the point when found in meadows clerids ought not be relied upon to be found on their host plants, but instead an expansive scope of plants the same number of grown-ups feed as generalist predators on little creepy crawlies, wasps, aphids, genuine bugs and flies. Since numerous clerids have thickly pubescent bodies and expend dust as an auxiliary (or even essential) wellspring of protein, they likewise work as pollinators.

Control of creepy crawly irritations occupying regions in which dried fish is put away and took care of might be accomplished utilizing a bug spray splash. The point is to deliver a tireless bug spray store on all surfaces where bugs slither particularly on perpetual capacity sheds or taking care of regions in business sectors (Walker and Donegan, 1984; Taylor and Evans, 1982; Guillon, 1976; Golob et a l ., 1987; Halliday, 1986 and Halliday, 1988). Bug sprays to be utilized for such application must be adequately lethal to the objective bug bugs while not leaving buildups hurtful to the buyer. Pirimiphos-methyl and chlorpyrifos-methyl are two of the couple of bug sprays which may be adequate as texture splashes where dried fish is dealt with or put away (Golob, 1987).

Rules used to decide saie buildup levels are the Maximum Residue Limits (MRL) prescribed by the FAO/WHO Joint Meeting for Pesticide Residues (JMPR) and the Codex Alimentarius Commission. The right now suggested MRLS on fish are pyrethrins 3mg/kg and piperonyl butoxide 20mg/kg, proposals which are equivalent to the pyrethrum buildup limits for grains (FAO, 1978; 1981c).

The viability of a specific bug spray will rely upon the surface to be dealt with, the nature of the bug, the speed of activity of the bug spray, regardless of whether the bug spray is brief or steady and the application strategies and hardware. Space fumigation and space treatment are the most usually utilized put away item creepy crawly irritation control application techniques in nourishment tasks. Effective space fumigation may render a structure practically free of living bugs including the youthful stages. This strategy for treatment is, in any case, costly, requires extensive time and is without a doubt a dangerous technique for controlling creepy crawlies. Space treatment is faster and substantially less costly than fumigation and can be cultivated in only hours as opposed to days. Space treatment, be that as it may, won't infiltrate a pile of boxes or sacks and does not anticipate reinfe station.

The principle sorts of use gear being used are warm mist or smoke generators, packed air gadgets, pressurized vaporized compartments and ultra-low volume (ULV) splashing hardware. Warm fogger chips away at a guideline whereby fluid bug spray is encouraged into the hot fumes gas, following which the vapor gathers to thick insecticidal haze. These are commonly compelling against flying creepy crawlies, for example, grown-up moths, flies and mosquitoes. Be that as it may, medications have not been powerful against put away items bugs, for example, flour creepy crawlies and dermestids. This decreased viability is credited to the size of bug spray beads. Insecticidal hazes contain a high level of little beads, short of what one micron

Baur, (1983).These beads won't encroach on bugs to the degree important to be taken into their bodies in adequate amount to impact a slaughter (Baur, 1983). Additionally, the warmth utilized to produce the bug spray haze may lessen the viability of certain contact bug sprays (Baur, 1983). Gadgets that work by compacted air has a little spout opening to make a tasteful vaporized. Stopping up of the spouts, brought about by contaminations in the compacted air supply or in the bug spray itself, every now and again happens. Pressurized vaporized holders that convey a thin range of little beads can be successful for control of put away items bugs in nourishment activities.

Bug spray expenses might be higher for such holders yet this might be counterbalanced by sparing the expense of costly application hardware and the work required for its activity. Near cost examination would be important to choose the proper procedure.

One method of controlling the size of droplets is by using acent rifuga1- energy nozzle - spinning discsor cups, (Matthews, 1978; Matthews, 1979). The droplet size can be adjusted by varying the rotational speed and flow rate so spray volume depends on the selected size and d roplet density required. The hand - held battery operated spinning – discsprayr has been used exten sively in the tropics on field crops such as cotton.

The common name of D maculatus is the leather beetle (USA: hide and tallow Dermestid; some countries: skin beetle). D maculatus was first described by Degeer in 1774 and was originally thought to be a pest of hides and skins only, hence its common names "hides beetle" and "leather beetle". Details of the life cycle and behaviour of D maculatus have been reported by Scoggins and Tauber (1951), Paul et: a_l (1962), Taylor (1964), Toye (1970) Azab et al (1972) and Osuji (1975b).

In tropical regions, maculatus is generally associated with dried fish, especially during its storage, transportation and marketing stages. The species is also associated with dried meat. In other countries, D, maculatus and other related species, notably D a ter Degeer and D frischii kug. Have been identified with smoked meat, dried fish, bones, hides and skins, and other stored commodities of animal origin. Records of damage caused by Dermestid attack to hides and skins, dried fish, smoked meat and related products in various countries include those in Indonesia (Kalshoven, 1954); India (Pillai, 1957); Japan (Kimura and Takakura, 1919; Nonaka, 1952); Senegal and Mali (Mallamaire, 1958); Zambia (Proctor, 1970, 1972); South Arabia (Green, 1967); Britain (Williams, 1956) and Nigeria (Giles, 1962; Osuji, 1976). Dermestidae are compact, obovate to nearly round.

Position occurs regularly within 12hrs in the presence of water (moisture), whereas females not provided with water lay no eggs within 4 days of copulation, and subsequently they lay few eggs irregularly (Osuji, 1975). Eggs are occasionally laid singly but often in batches of 4, 6 or 8 eggs, sometimes up to 20; females may lay an average of 17 eggs per day, over a period of about 14 days (Osuji, 1975b). Hatching occurs 36 to 60 hrs (mean 48hrs) after oviposition. The rate of larval development is affected by several factors. The optimum temperature lies between 30 and 35°C (Howe, 1965).

Development is completed in an average of 20 days (Azab et a l , 1972). Under unfavourable conditions, there is an increase in the larval period and consequently an increase in the number of larval moults from 5 to as many as 11 (Azab et a l , 1972). In a total larval developmental period of 32 to 36 days (mean 33 to 35 days) under uncontrolled laboratory conditions, the larva underwent 6 to 8 moults (mean 7) before pupating and the final instar

attains a body length of 13 to 15mm (Osuji, 1975b). The first two stadia are short, each being only one or two days, the third and the seventh are the longest, being seven days each. The only change noticed during larval development is an increase in the size from one instar to the next; no morphological differences are observed. Cast larval skins are often found in infested fish and are easily confused with the larvae. To pupate, the larvae burrow into available solid substrate such as the muscle tissue of dried fish itself or timber supports. The larvae then become shorter, thicker and quiescent, and finally moult to become pupae. This tunnelling activity prior to pupation and the normal feeding of larvae causes extensive damage to marketed fish in which prepupae and pupae of D maculatus are usually observed in tunnels or chambers within thick muscle blocks of dried fish. The period between the completion of the pupal chamber and the emergence of the adults, (pupal period) lasts for about 10 to 12 days (mean 11 days) (Osuji, 1975) and under optimal conditions, the numbers of D . maculatus can increase by a factor of 30 in a 4 week period (Howe, 1965). The adults can fly and m ay use their wings and legs as an effective means of dispersal.

3. REPRODUCTION

This is the main study of its sort to decide the fruitfulness of this nuisance on an eating routine of dried fish and furthermore to comprehend the impact of temperature and photoperiod on fertility. C is the favored temperature at a:The results demonstrate that 32.5 photoperiod of L: D 12:12 to acknowledge higher fertility when contrasted with the C. It is likewise seen that uncovering the insects:C and 30:temperatures 25 C decreases fecundity.:C and 30:to a photoperiod of L: D 24:0 at 25 The longest oviposition period was seen at 32.50C, L: D 12:12 and the briefest at 250 C; 24:00. Crisply mated females after numerous mating produce a greater number of eggs than 15-day-old different mated females and twofold mated females at all 4 C) and photoperiods (00: 24, 24:00 and 12:12): temperatures (25, 30, 32.5 tried.

It was likewise seen in N. rufipes that inside a temperature routine, C) a photoperiod of 00:24 was the perfect one to acknowledge the: C or 30:(either 25 most extreme fertility. This again shows N. rufipes is adjusted to murkiness and will flourish in such conditions.

4. FOOD CONSUMPTION

The most elevated sustenance consumption (0.371111g) was seen at a C and L: D 00:24. The: temperature–photoperiod combination of 30 photoperiod L: D 00:24 was the perfect photoperiod for better nourishment C and L: D:C. At 30: consumption among all the photoperiods tried at 30 12: 12, 24:00 and 00:24, there was an expansion in sustenance consumption from the 1 st instar to the fourth instar. The aggregate sum of nourishment devoured by every one of the instars at 32.5 (0.367342g) was seen to be more prominent than at all different temperatures tried C only: C at a photoperiod of L: D 12:12. In any case, at 35:30□C and : viz; 35 0.170257g of dried fish was devoured which was the most minimal. This demonstrates C is the perfect temperature for greatest food: that at L: D 12:12, 32.5 consumption. Be that as it may, this is lower than the all-out nourishment consumption (0.37111g) at C, 00:24. The present study uncovers that the sustenance consumption is at its: 30 C and:peak throughout the late spring season when the temperature was over 30 C.:below 35

5. CONCLUSION

The decrease in grown-up development can likewise be ascribed to the contact impact of the plant material. This is in concurrence with the findings of who announced that orange strip powder diminished offspring improvement and slowed larval advancement of. Weight misfortune because of the exercises demonstrated a pattern that mirrored the number of surviving hatchlings and grown-up that rose up out of the respective treatment dishes. The control (untreated) recorded the most noteworthy weight reduction. This could be as a result of bolstering of D. maculatus hatchling on the fish, which along these lines caused the weight reduction. The fish has low moisture content in this way giving sustenance to scarabs, especially the hatchlings and, to lesser degree the adults .The larval stages more often than not represent about 93.2%of the creepy crawlies and record for 62.7% weight reduction due to its invasion. The hatchlings particularly at the 1 st – 4 th instar larval stage are ravenous eaters in light of the fact that of growth necessities, rather than the grown-up insects which will in general have a diminished nourishing habit.

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Corresponding Author

Nitu*

Research Scholar of OPJS University, Churu, Rajasthan