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RESEARCH ARTICLE

AMAZINGLY NEGLECTED: DUNG BEETLE THE UNSUNG HERO OF THE ENVIRONMENT

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ABSTRACT

Dung beetle feeds on the faecal matter they use the faecal matter for the various purposes like feeding, reproduction, breeding. This divine creature have great social as well as economic importance for us such as nutrient cycling, soil aeration and reduction of carbon dioxide and methane emissions, control of parasites and secondary seed dispersal. They are also important in food webs not only as decomposers but also as prey for birds, bats and other insectivorous animals. But today even after being nature's friend thereis lack of awareness and information in people about these beetles. Their population is declining day by day by the human activities such as use of harsh pesticides, insecticides, antibiotics used on crops and cattle for maintaining their population and yield. Even today no proper conservation measures are in force for the conservation of this divine creature and we are losing the natural cleanup crew. Strategies and policies for the conservation should come into implementation in order to conserve this super divine but yet so neglected creature.

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INTRODUCTION

Dung beetles belong to the zoological order Coleoptera (largest order which include beetles and weevils) and family Scarabaeidae. The members of Scarabaeidae (sub family Coprinae) are commonly called as Dung beetles. The majority of dung beetles feed on dung, both in their adult and larval phase. However, many dung beetles feed on a variety of things, including mushrooms, decomposing leaves and other rottening matter. Adult dung beetles have mouth parts which are specially adapted to feed on liquefied material and can break down a dung pad very efficiently by burying the dung underground to use when breeding.On the basis of behavior of handling dung, they can be classified into three categories-The Rollers which remove the balls of dung and roll it to tunnel away from dung pile. The Dwellers which burrow lay eggs and feed with in it or jus tbelow fresh dung piles. The tunnelers which dig tunnel below dung pile, move dung into the tunnel and lay eggs. In size ranges from 2mm (0.1inch) to 60mm (2.5 inches). The front legs have serrated edges which they used for digging tunnels. Their body color ranges from black to brown to red and can have metallic appearance. Seasonal activity in dung beetles is determined by factors like temperature, rainfall, resource availability and life history strategies. Dung beetle activity is strongly influenced by rainfall seasonality. Rainfall determines the quality and quantity of dung, which is the primary source of food for most dung beetle, affects the reproductive performance of dung beetles, provides humidity to the soil and triggers the emergence and the onset of activity in the beetle species.

Dung beetle activity is greatest during moist and minimal during dry periods and abundance of scarab beetles increases strongly after heavy rainfall. Majority of dung beetle species that exhibit environmentally induced seasonality are active during favorable periods. Dung beetles play economically major and vital role in our ecosystem. They are often called as natural cleanup crew because they feed on dung (pastures), breakdown it into smaller balls and use it for housing and as food for their young ones and thus remove the dung pile from soil but while doing so they left behind fertilizer and that's how they do their contribution in increasing soil fertility as well as in nutrient recycling and that's why they are called as friend of farmer. At the same time they also destroy the breeding grounds of parasites which uses dung to lay egg, these parasites get their nourishment from moisture present in dung but the activities of dung beetles absorb all water present in dung and makes it dry and eventually this leads to the death of parasite's egg and that's how they also prevent disease transmission in domestic as well as wild animals.

Life history cycle: A pair of dung beetles (a male and a female) may work together, digging a nest to create a burrow beneath the dung pad. The dung is taken into the burrow in either a ball or an irregular mass. The female lays her eggs in the burrow. The eggs hatch into larvae, which feed on the dung surrounding it. Female digs while male helps haul soil from tunnel, female lays one egg in each ball and seal the brood ball followed by sealing of tunnel.

The larvae will go through three skin changes to reach the non-feeding pupal stage. Male larvae develop into major or minor males depending on how much dung is available to them during their larval phases. In a week larva hatches within brood ball and feeds on 40-55% of interiror content of ball. In 3 weeks larva pupates. In 4 weeks adult emerges forms a new tunnel to comeout through , goes in search of fresh manure wait for 2 weeks and they breed. Some dung beetle larvae are able to survive unfavourable conditions, such as droughts, by stopping development and remaining inactive for several months. The pupae turn into adult dung beetles, which break out of the dung ball and dig their way to the surface. The newly formed adults will fly to a new dung pad and the whole process starts over. Social Importance of dung beetle. Dung beetles are not just great for pasture, livestock health and the environment they are also great for us. Dung beetle plays following roles in the environment:

Clean-up crew*:* They breakdown dung pile into smaller balls and use it for housing and as food for their young ones and thus remove the dung pile from soil.

Friend of farmer: They feed on dung and while doing so they left behind fertilizer and that's how they do their contribution in increasing soil fertility as well as in nutrient recycling and that's why they are called as friend of farmer.

Pollination: The dung of the fruit-eating vertebrates may have seeds – so the rollers act as dispersal agents, taking the seeds to places far away, providing it with nutrients from the dung for germination, and so helping with forest regeneration.

Improve soil: As they roll, dig and tunnel, their actions also 'build' the soil, changing the texture of soil particles, increasing porosity and percolation and shifting and distributing the microorganisms.

Prevent disease transmission: In rainy season number of parasites increases around / on cow pat vegetation, cow feed on vegetation and eventually got affected by parasites. Larvae of parasites required moist condition for growth but dung beetle activity dries dung which causes death of larvae and thus they are also play role in cow – buffalo welfare.

Tackle methane emission: methane which is a key green house gas require anaerobic condition to borne , methane is released from gut of cattles and from dung pile, the tunneling activity of dung beetle cause aeration and thus release carbon which is intake by plants. Dung beetle play vital role in maintaining soil health and carbon storage as well as they also helps in controlling flies. Dung beetles can improve soil, reduce water runoff, reduce livestock parasites, sequester carbon and reduce emissions, improve pastures and reduce bushfly and buffalo fly populations. That's how they also prevent disease transmission in domestic as well as wild animals. They are also important in food webs not only as decomposers but also as prey for birds, bats and other insectivorous animals.

Negative impact of human activities: According to a new report from IUCN-Med, dung beetles are facing major losses of suitable habitats due to the decline of traditional livestock farming practices and the abandonment of rural environments, as well as chemical contamination of dung by veterinary medical products. Moreover, the comprehensive use of veterinary medical products leads to contamination of livestock faeces. The majority of these substances are poorly metabolised by livestock and expelled unaltered in their faeces, affecting non-targeted fauna such as dung beetles. It is therefore necessary to improve legislation to regulate the use of veterinary medical products for parasite control, and implement measures to prevent their unnecessary administration from causing pollution. Dewormers and insecticides used on cattle, and the resulting impact on dung beetle populations. They appear to reduce weight gain in dung beetle larvae, which increases the time it takes them to develop.

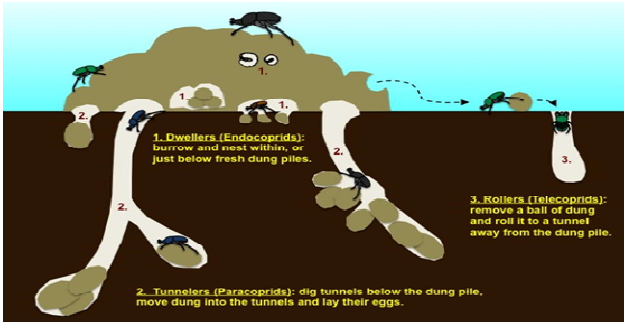

Figure 1. Categories of dung beetle

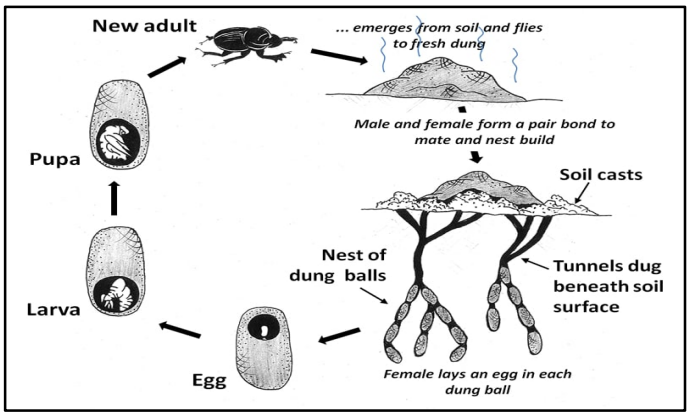

Figure 2. Life cycle of Dung beetle

Need of awareness and conservation: Dung beetles influence ecosystem in many ways , they play such crucial roles in environment like nutrient cycling, dung decomposition, increase soil fertility ,prevent disease transmission and increase water holding capacity of soil by their tunneling behavior, etc. Even after being such natural friend of environment there is lack of awareness and information in people about these beetles. Their population is declining day by day by the activities such as use of harsh pesticides, insecticides, antibiotics given to cattle for maintaining their population and yield ,since there are least conservative practices is in force for the conservation of these divine creature we are losing the our natural cleanup crew. Strategies and policies for the conservation should come into implementation in order to conserve this super divine but yet so neglected creature. Today even after being such beneficial insect for our society and agriculture, people are least concern about their conservation so that's why more research should be conduct on these beetles so that the world can know more about them and these unsung heroes of our ecosystem can be conserved and more valued.

CONCLUSION

Dung beetles are really very interesting creature on this planet; they serve the society through many ways like they feed on dung or excreta of animals and got the name of cleanup crew while doing so they increase the soil fertility by enriching the soil with the nutrients. As they roll, dig, tunnel by this action they renew the soil texture, increase porosity and percolation by shifting and distributing microorganisms present in soil. By removing the dung they prevent parasite flies to lay egg in the dung and hence also a true friends of farmer. Even after being such beneficial insect there is lack of knowledge in layman about them and in today's lifestyle their population is declining just because of use of harsh pesticides as well as increased use of antibiotics injection to cattle. More awareness should be spread in common people about the good deeds of this divine creature and conservative practices should be come in force so that the population of this wonderful friend of farmers can be conserved. Policies are therefore needed to highlight the importance of

preserving or introducing farming practices and livestock grazing systems that ensure that healthy natural and agricultural habitats supporting the population of dung beetle to flourish.

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