

LOCUST MAYHEM AND NEED FOR A RESURGENCE IN RESEARCH

It is pleasure to pen an editorial for the unique venture “Indian Entomologist”, second in the series- of the youngsters actively practicing Entomology in India. When I look back into the few months that passed away, there had been many entomology happenings in the country. Of these, the striking one is that of the “desert locust”, the *Schistocerca gregaria* Forskal. In simple terms- “all locusts are grasshoppers, but not all grasshoppers are locusts”. The one that develops the behaviour of swarming and migration over continents with regular seasonal variations, and effect plague cycles becomes a deadly “locust”. Of the four or five grasshoppers which acquire this habit of “plague cycles”, India is usually afflicted with only *S. gregaria*.



Plague cycles are a period of two or more consecutive years of widespread breeding, swarm formation and crop destruction. In India, such plagues were recurrent in the 19th century, up to 1950s, with the last one being in 1959-62. Subsequently, there have been only isolated ‘upsurges’. The one fresh in my mind is of 1973-76, immediately after my entry to IARI, New Delhi. But this fizzled out as an insignificant one in real terms. Then came 2019, with 1,500 swarm attacks, and 27 so far in this year. Fear of “plague” came thus, during summer when crops were few, in Punjab, Haryana and north Rajasthan, with a warning that it will return to Rajasthan in July for breeding. The damage is yet to be assessed in real terms. Fortunately, Delhi just escaped, but not without frightening the Delhiites- I recollect here a frantic call, during end of May, by one Dr Jyoti Chugh, from north Delhi to help save her “potted plants, valuables” on the terrace from this “locust army”.

I cannot end this editorial without reminding the need for a resurgence in research, and the way forward. I will cite only few, who dedicated their lifetime for locust research, and we need to introspect, and emulate.

1. Sir Boris P Uvarov (1889 -1970), who pioneered locust research, referred to as “Uncle Boris”. Boris gave “phase theory in locust” with his >60 years (1910 onwards) of expertise in taxonomy, and ecology. These stand as testimony of the need for the taxonomy fundamentals in any entomology work. Much of what we find in the “Desert Locust Information Service, the famous “DLIS” of FAO are his contributions, a distinction to remain forever!

2. M.L. Roonwal, a taxonomist, who stay put in Jodhpur, focused on desert and locusts (in addition to his monumental termite’s work in the desert regional station, Zoological Survey of India). He established a theory on the 11-year cycle of mass-increase in *S. gregaria*. He confirmed Uvarov's work on the existence of two phases, being produced at will by the process of crowding and thinning (published in Nature way back in 1947). His later (1980) taxonomic finding that eye stripes are indicators of polymorphism/ population flux is a taxonomy marvel.

3. Y. Ramchandra Rao, again a taxonomist, whose work culminated in a ICAR Monograph (No. 21; pp. xix+ 721; 59 plates, published 1960) .“Uncle Boris” while writing a review of this work in Nature (1962) stated that it is an “extensive investigation for nine years, of the biology and ecology of the locust, extending over Pakistan and India”; and “not merely a detailed report but augmented by the abundant data carefully extracted”. Boris stated “it is a comprehensive monograph which have no parallel in any other locust-infested part of the world”; yes, indeed, credit goes to ICAR which published it! He added that the intrinsic value of the book is so great that it will always remain a classic example; with work carried out with inspiration and determination resulting in far-reaching conclusions.

There emanates a large number of facts on the current status, as reviewed by one of the experts in 2006- “when such seasonal rains fall sequentially, populations develop into an upsurge and eventually into a plague unless checked by drought, migration to hostile habitats, or effective control”; “Increases in the proportion of gregarious populations as the plague develops alter the effectiveness of control; “As an upsurge starts, only a minority of locusts is aggregated into treatable targets and spraying them leaves sufficient unsprayed individuals to continue the upsurge”; “Spraying all individuals scattered within an entire infested zone is arguably both financially and environmentally unacceptable”; “More of the population gregarizes and forms sprayable targets after each successive season of good rains and successful breeding”; “Eventually, unless the rains fail, the entire upsurge population becomes aggregated at high densities so that the infested area diminishes and a plague begins”; “These populations must continue to increase numerically and spread geographically to achieve peak plague levels, a stage last reached in the 1950s”; “Effective control, aided by poor rains, accompanied each subsequent late upsurge and early plague stage and all declined rapidly”; “The control strategy aims to reduce populations to prevent plagues and damage to crops and grazing. Differing opinions on the optimum stage to interrupt pre-plague breeding sequences remain”

Thus, in its management, facing of these intriguing facts will require inertia, strength and potential, in terms of rigorous exploration of fundamentals in taxonomy integrated with ecology. These were there luxuriously indeed, in the dedication and devotion of BP Uvarov, ML Roonwal, and Y Ramchandra Rao, the stalwarts!

Will there be a revival of such essential action and competence in taxonomy in addressing S. gregaria? Will the desired motivation be in place soon? It is inevitable, if one need to face the challenges, especially in these times of climate change! I am confident it will be, and one has to find ways! After all, where there is a will, there is a way!

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