more during summer than in other seasons, and their frequency of occurrence decreased during rainy season but increased in early winter.

Of the algal taxa presently observed *Aphanocapsa, Calothrix* and *Lyngbya* were also reported in the atmosphere of Delhi[4,5]. Gregory and Sreeramulu[8] reported a very high concentration of *Gloeocapsa* over an estuary of Thorney Island in UK whereas Gregory *et al*[9] found fewer colonies in an interior land site at Harpenden and London. In the present survey it was found that there were two seasons for the incidence of algae in the air at Bareilly, and the climatic factors play a vital part in such occurrence. The higher frequency of air-borne algal forms during the period February-June, is associated with high wind velocity, higher temperature, low relative humidity and low rainfall. In the rainy season (July-August) algal forms were practically absent in the atmosphere as may be normally expected. The algal growth during the rainy times, account for the higher incidence of air-borne algal materials in September-October.

The air-borne algae have been considered to cause bronchial allergy and there is scope for testing allergenicity of the aerial forms presently recorded for the disease. Inspite of being allergenic to human beings, the filaments or spores which are carried by the rain from the air to the earth or to water bodies may also serve as a source of water pollution–eutrophication (increasing the organic matter in water bodies).

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1. McGovern, J. P., *Ann. Allergy*, 1966, **24**, 145.
2. McElhenney, T. R., *Ann. Allergy*, 1970, **28**, 467.
3. Ramalingam, A., *Proc. Indian Acad. Sci.*, 1971, **B74**, 227.
4. Mittal, A., Agarwal, M. K., Goyal, S. K. and Shivpuri, D. N., *Aspects of allergy and applied Immunol.*, 1973, **7**, 41.
5. Mittal, A., Agarwal, M. K., Goyal, S. K. and Shivpuri, D. N., *Aspects of Allergy and Applied Immunol.*, 1974, **7**, 52.
6. Parswanath, H. V. and Ramalingam, A., *Curr. Sci.*, 1979, **48**, 956.
7. Singh, N. I., *Cryptogam Algol.*, 1981, **2**, 105.
8. Gregory, P. H. and Sreeramulu, T., *Trans. Brit. Mycol. Soc.*, 1958, **41**, 145.
9. Gregory, P. H., Hamilton, E. D. and Sreeramulu, T., *Nature (London)*, 1955, **176**, 1270.

FRESH WATER TURTLES AS STRONG PREDATORS OF WATER HYACINTH

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THE bio-ecology of Indian fresh water turtles has not received any significant attention since almost over five decades[1-4]. In the course of studies on food and feeding habits, it has been realised that most fresh water turtles help in removing harmful organisms by their predatory activities. Smith[5] has revised the earlier contribution made by Boulenger[6] on the reptilian and batrachian fauna of this region. The most common species of fresh water turtles in this region of the country are *Trionyx lethi Gray; Lissemys punctata granosa* (Schoepff); *Geomyda trijuga* (Schweigger) and *Kachuga tectum tentoria* (Gray). This paper deals with the voracious feeding activity of *K. tectum tentoria.*

Specimens collected from the field were allowed to settle in large laboratory glass tanks, cleaned every day. Feeding experiments were conducted to see their dietary habits. Food was offered every day after removing the left overs. Order of preference was determined on the basis of percentage consumption within twenty four hours by the weight of the left over phytal matter.

Among the turtles maintained in this laboratory it was noticed that *K. tectum tentoria* attacked all emergent vegetation. Five species of plants, *Pistia stratioites,* Linn; *Echhornia crassipes,* Solms; *Salvinia natans,* Roxb; *Hydrilla verticillata,* Royle and *Lemna minor*, Linn were tried on selective basis. Each turtle was given a known quantity (250 g) of plant material of single species of mixed variety. Since this is a known vegetarian group, no animals or flesh were offered. It was observed that *K. tectum tentoria* devoured as much 125-250 g of plants daily. This species can climb on the stolons and stems to eat the leaves and more especially the growing apical bud. The destruction of growing apical shoots, the ruthless cutting of stolons, devouring the succulent leaves cripple the plant to lose their gravity. In such an angular position the plants get washed away by the water currents easily.

K. tectum tentoria is strictly phytophagus and eats enormous quantities. What is more amazing is that by its powerful snapping jaws it destroys all the vital parts of the plants and all menacing weeds. Daily observation showed that apical buds were the first target of maceration followed by tender leaves, stems, stolons and root-tips in that sequence. Out of the five species of plants given, 100% each of *E. crassipes, P. stratiotes,* and *H. verticillata* and 60% of *S. natans* and 25%

of *L. minor* were consumed by *K. tectum tentoria* daily. These observations were made over six months.

The plants so destroyed were unable to grow. The most telling results flow from the feeding activities of *K. tectum tentoria* which is an all powerful enemy of *Echhornia, Hydrilla, Pistia, Salvinia* and *Lemna* in that order. *K. tectum tentoria* can be termed as a predator. Recent multiple studies on the biology of the above mentioned species have revealed some fascinating features of scavenging activity of this largely ignored group common in any fresh water ecosystem. The details will be published in due course.

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1. Bruce, B. B., *Population ecology of fresh water turtles, in Turtles: Perspectives and research*, (eds) M. Harless, and H. Morlock, John Wiley and Sons, New York, 1979, p. 695.
2. Bustard, R. H. *Population dynamics of sea turtles in Turtles: Perspectives and research*, (eds) M. Harless and H. Morlock, John Wiley and Sons, New York, 1979, p. 695.
3. Harless, M. and Morlock H., Turtles., *Perspectives and research*, (eds) M. Harless and H. Morlock, John Wiley and Sons, New York, 1979, p. 695.
4. Tonapi, G. T., Fresh Water animals of India–an ecological approach Oxford and IBH Publishing Co. New Delhi, 1980, p. 341.
5. Smith, M. A., *The Fauna of British India: Reptilia and Amphibia*, Vol 1, Loricate testudiness (ed) J. Stephenson, Taylor and Francis Publ. London, 1931, p. 185.
6. Boulenger, G., *The Fauna of British India: Reptilia and Batrachia*, (ed) W. T. Blanford, Taylor and Francis Publ. London, 1890, p. 541.