ABATEMENT OF Culex quinquefasciatus, Say POPULATION IN AN URBAN AREA: AN INTEGRATED APPROACH

ADDENDUM

ATANU BANDYOPADHYAY

DEPARTMENT OF MEDICAL ENTOMOLOGY
SCHOOL OF TROPICAL MEDICINE
CALCUTTA - 700 073. INDIA
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Introduction:

The effectiveness of a variety of control measures on *Culex quinquefasciatus* in an area adjoining Calcutta needs to be further evaluated in the light of experience in certain areas of more developed countries. Where mosquito breeding is not a problem, the advantageous role of water hyacinth in water purification has been highlighted. In areas with salt water collection, stonefish has been suggested as a predator in water collections of one nature (either vast sheet or small collection, flowing or stagnant, polluted or non-polluted); the decision of choice of method is simpler. Where the level of public health engineering and health consciousness is extremely variable, choice of method is once again a problem.

In the study area with modern housing and polluted and over crowded slums small collections and vast sheets, flowing water and stagnant water, covered or uncovered by water hyacinth, no one method can be necessarily effective. An integrated approach has, therefore, been recommended.

1. Water hyacinth present on the surface of water provides mechanical support to the larvae of *Culex quinquefasciatus*, protect it from excessive sun exposure and also partially prevent the activity of predatory fish. In areas where mosquito breeding is a problem these actions of water hyacinth more than counterbalance the role of water hyacinth as an agent for water purification.

There is no doubt that even in the study area utilisation of organic matter of the water for growth of water hyacinth contributes to its partial purification. The balance of useful and harmful effects of water hyacinth varies from season to season. In season with lot of mosquito breeding, water hyacinth needs to be removed because its harmful effect outweighs its water purifying role. Only in seasons when mosquito breeding is not important, water hyacinth on the water surface can be, and is, left undisturbed to utilise its role as a water purification agent.

Released guppies were found to be highly effective in the
control of larvae of *Culex quinquefasciatus* in the study area. Their effectiveness would have been enhanced if removal of water hyacinth could have resulted in increased visibility of the larvae by predatory guppy.

Stone fish by virtue of being smaller could have been even more effective as a predator of *Culex quinquefasciatus* immatures. As stone fish are tropical marine fishes they could not be evaluated in the fresh water collections of the study area.

Although the study area is commonly referred to as Salt Lake city the collections of water are all of fresh water, in which marine fishes would not survive.

2. The ecofriendly biological methods of control of *Culex quinquefasciatus* larva would have been ideal if they were fully and certainly effective when used above. Since mechanical factors like water hyacinth interfere with the effectiveness of biological methods, chemical methods (more costly, less ecofriendly) need to be advocated as an ancillary method in those situations. The experience of the present study shows that in sites like gullypit whether water hyacinth was not an interfering factor and migration of the predator guppy far away from the site of release was not possible, biological methods without concurrent chemical methods were highly effective.

Till such time that a predator fish of adequate effectiveness (capable of growing in the fresh water) is readily available, ancillary chemical methods will require consideration from time to time.

Moreover, in small collections of water as in K-drains where stagnation and dumping of polluting material has made the water unsuitable for survival of guppy, mosquito breeding (if not controlled by physical/sanitary engineering methods) will continue to require chemical control methods. Such collections are often short term and mosquito breeding occurs to a phenomenal extent within a brief span of time. The necessity of control is urgent and the time required for predatory fish to become effective cannot be allowed. This means that even if the stagnant polluted water was of such nature as to allow survival of predatory fish, the latter could not be recommended.
3. The study area was in a relatively new and better planned area compared to the main city of Calcutta. A majority of the residents of the study area were aware of health problems posed by mosquitoes even before the study began. But portions of the township included in the study area were occupied by typical slums and by population ignorant about health hazards. A major portion of mosquito breeding is attributable to these pockets. It is reasonable to say that experience gathered even in this study area would be applicable to the main city of Calcutta which also is a mixture of modern planned township areas and overcrowded polluted slum areas.

Breeding of mosquitoes in tiny pockets such as latrines have been largely controlled by physical methods. Where that is not adequate the alternative is definitely the use of a chemical method, as biological method cannot be made applicable to such small setting.

The problem of biological methods being applied to the stagnant water collections where immediate control of mosquito breeding is required, needs to be re-emphasized.