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P49 : RESISTENCE EVOLUTION IN INSECTICIDES

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Resistence: Development of ability to gain tolerance by the other individuals of same population against a given dose of a toxic substance that is identified as killing most of the individuals in a normal population is called resistence. More than 500 species of arthropods have developed resistence against one or more insecticides. Insecticide resistence is mentioned firstly in 1946 in Musca domestica against DDT.

Types of Resistence
1)Special Resistence: Appears of insect's characteristic features.
2)Behavioural Resistence: Avoidance of insect from insecticide contact mechanism.
3)Structural Resistence: Adaptation of body structures of insect like decreasing insecticide contact surface or prevention of insecticide transportation.
4)Physiological Resistence: Tolerance of insect against insecticide.
5)Cross Resistence: Appearance of an existing resistence against a particular insecticide in new ones.

Factors Effecting Resistence Evolution
Biological factors: Generation time,number of individuals in each generation, biological migration...
Genetic factors: Frequency and dominance of resistence genes, achievement of resistent individuals..
Functional factors: Human related factors as insecticide usage and chemistry...

Resistence Evolving Mutation Types
• Proliferation of gene copies (Gene amplification)
• Overexpression of genes
• Structural changes (Aminoacid shift)
• Absence of alleles
Resistence related enzymes: Esterases, Glutathion-S-Transferase, Monooxygenases, Hydrolases

Resistence Status
• Significant DDT, malathion, pyriproxyphene and methoprene resistence in Aedes albopticus is indentified in a research in USA.
• Increased resistence in field species of Cydia pomonella in comparison with laboratory species against chlorpyriphos and carbaryl is identified in a research in China.
• Significant resistence evolution in past ten years in Anopheles sinensis against deltamethrin cyfluthrin is identified in a research in China.
• Resistence against nicotinoids in more than half of the Myzus persicae species is identified in a research in Greece

Result
Increased resistence against different insecticides in different species is an important human and environmental health problem.

Keywords: Insecticide, Public Health, Resistence