Insect Resistance Management by systemic insecticide border row treatment using egg parasitoid

*Shunichi Shibuya, hymenoptera072@outlook.jp, 7-6 kiyozumi funaoka shibata-town shibata-county miyagi Prefecture Japan.

It is known, when systemic insecticide treatments will be more than 6 times on new minimum, restoration is born of detoxification to the inhibition of DNA & protein synthesis in fat body which surround ovary. This oogenesis with sub-lethal toxicity cease the following embryogenesis to early embryonic stage before blastoderm on which egg parasitoids are available in host egg anytime. Therefore, all eggs are existing as a target of egg parasitoid, following high parasitism. In contrast, in the case of normal embryogenesis, the parasitism corresponds to the embryonic developmental stage before the movement of "dorsal closure" which surround a yolk in embryo, is lower than a third term in egg of *Chrysomelidae.*

In June of 2014, high parasitism cumulative from 6th to 15th (98adults/100eggs), of *Anaphes nipponicus* for *Oulema oryzae*'s egg was observed in paddy fields treated with Fipronil 8 time from 2002 to 2012 in which there were laying eggs, but they couldn't hatch. If it is being under this insecticide pressure on and on, the embryogenesis of resistance population will be restored by detoxification so that the huge population of egg parasitoid will be lost. To keep the mixture of sensitive population and resistance population, to maintain sub-lethal toxicity, we must save the sensitive population to insecticide in low density part of pest insect. *Oulema oryzae* show higher density in the frame part of their entrance to invade into rice plant. As a result of this partial control, high parasitism of *Anaphes nipponicus* for *Oulema* oryzae's egg with sub-lethal toxicity continue permanently by means of biological control without chemical in middle part and with chemical in border row part of paddy fields.

Abnormal oogenesis with sub-lethal toxicity are described on Spiromesifen, Novaluron, Chlorantraniliprole, Chlorfluazuron and so on. This IRM is useful for insecticide makers (permanent use of insecticide and sales of egg parasitoid), crop farmers (sustainable agriculture), honey bee keeper (pollinator protection without insecticide rotation), food consumers (high price crop) and new insecticide developers (long strategy). When will pest insect gain the sub-lethal toxicity and then perfect insecticide resistance in the field which neonicotinoid such as Imidacroprid be used successively already 7times? On a new insecticide such as spiromesifen, DuPont should be beforehand with the sub-lethal toxicity to have a nursery of egg parasitoid to manage insecticide resistance.