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WHO/TDR Asian Biosafety Training 2009:Genetically Modified Mosquitoes

Summary: The WHO/TDR Asian Biosafety Training was aimed to disseminate information on Genetically Modified mosquitoes and it's advantageous as a new tool in vector control. Due to the severity of dengue fever and dengue haemorrhagic fever which is causing hundreds of mortality cases in the region, this new vector control is much needed as the current vector control has failed to curb the disease transmission. Hence, it is believed that the transgenic mosquitoes will be able to reduce the vector population below the threshold in a sustainable manner.

Keywords: Genetically modified mosquitoes, vector control, dengue fever and dengue haemorrhagic fever

DENGUE CASES SITUATION IN ASIA

Over the years, all available control measures have been taken to reduce dengue cases and mortality rates, however; statistical data showed increasing trend of dengue incident. Total dengue cases reported in 2009 and 2010 is 41486 and 46171 cases, respectively (MOH, 2011). It is almost 85.5% increment as compared to dengue cases reported in 2000 which was only 6692 cases (WHO DengueNet, 2006). The increase in mortality rate was also observed from 45 deaths reported in 2000 to 134 deaths in 2010 (MOH, 2011).

The same trend was also observed in other neighboring country. Indonesia with larger population reported high number of dengue fever incident yearly, showed a significant hike every year since the last 10 year. Likewise, Singapore which has a very good vector control measure also observed similar trend of dengue fever cases incident (Vassan, 2009). This scenario painted a critical situation faced by the countries in Asia and elsewhere.

FACTORS ATTRIBUTED TO DENGUE CASES

Major global demographic changes (unplanned urbanization and concurrent population growth), increased travel by airplane and non effective mosquito control programme (Singh, 1996; Kindhauser, 2003), insufficient and non-dependable water supply and inadequate solid waste management (CTD, 1995), increasing resistance of vectors and pathogens, decreasing number of new insecticides and drugs and finally expanding of habitats because of global warming (Yap *et al*., 2003) had attributed to the re-emergence of dengue fever.

VECTOR CONTROL ACTIVITIES

Basically, vector control activities were executed thru several approaches such as source reduction and environmental management, biological control, chemical control (adulticides and larvicides), personal protection and environmental management (Lee, 2000). However, the high incidents of dengue cases reported in the region have clearly showed that the current control methods such as adulticides (pyrethroids) and larvicides (temephos), are unable to reduce vector population below the threshold in a sustainable manner. Hence, a better and effective control method is urgently needed to counter this situation.

THE AIM OF THE WHO/TDR ASIAN BIOSAFETY TRAINING

The objective of this training is to expose trainees from various fields to Genetically Modified mosquitoes (GM mosquitoes) and its obstacle to have it recognized by the public as one of effective vector control measure. Genetically Modified mosquitoes are actually a supplement to current vector control. Its purpose is to bring down the vector population below the threshold of dengue transmission.

Genetically Modified mosquitoes are often mistakenly understood as Sterile Insect-pest Technique (SIT). SIT is a product of a conventional method which means exposing insects to radiation while Genetically Modified mosquitoes are a mosquito with lethal gene. Both techniques have similar outcome which is to bring down the vector population. However, Genetically Modified mosquitoes produce fitter insects which are competitive in the nature and provide better monitoring due to the presence of marker gene. Furthermore, this technique will ensure that any escapees will not have viable progeny outside the laboratory facilities.

The most challenging aspect of this course is to identify the potential hazard of the technology to the ecology, human and non target species. Various issues concerning the technology were brought up by the trainees who were given task to think like NGOs and GM researchers. All issues were carefully

listed during Risk Assessment (RA) session and discussed during the following session which is Risk Management (RM). This course also focused on Cartagena Protocol which is an international agreement that provides the basic bio-safety regulatory frameworks and also legislative of local government of each trainee's country of origin.

OTHER ASPECT OF TRAINING

Other issue that was covered during the training was ethical and social aspect, biosafety of GM technology and other GM insects which had been successfully employed in several countries. Another most important aspect of this training is the introduction of Arthropod Containment Laboratory (ACL) and Bio-Safety Laboratory (BSL) to the trainees and its importance. As some of the researchers work directly or indirectly with vectors or highly contagious pathogens, we might not be aware of the importance of having such laboratories. In order to contain the risk of having distributed pathogens unintentionally, it is best to employ a good laboratory facility. This course was quite interactive as we were given chance to question the laboratory finding and expected hazard while the researchers were allowed to defend the technology.

CONCLUSION

Overall, this training is an eye opener to the trainees of the importance of the new technology. It has been collectively agreed that there are no such thing as risk free and that the researchers are not GOD to manipulate genetic of another species though it is causing death. However, in order to protect the life of millions, it is not wrong to try a new technology which promises good public health care.

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REFERENCES

1. *CTD. 1995. Progress Report of 1994-1995. World Health Organization. P. 50. (Control of Tropical Diseases).*
2. *Kindhauser, M.K. 2003. Dengue: Global defence against the infectious disease threat. World Health Organization Geneva.pp. 140-143.*
3. *Lee, H. L. (2000). Aedes: mosquitoes that spread dengue. In: Mosquitoes and mosquito-borne diseases. F.S.P Ng and H.S Yong (eds). pp. 45-61.*
4. *Ministry of Health. 2011. Available from World Wide Web: http://www.infosihat.gov.my/menuutama/Press_Denggi_Chiku/KPK_Epid_52_2010.pdf*
5. *Singh, S. 1996. Dengue situation in Malaysia including summary of the global situation past and current trends and the reasons for current upsurge. Persidangan Denggi. 9-11 May 1996. Institute Penyelidikan Perubatan, Kuala Lumpur.P. 19.*
6. *Vassan, S.S. (2009). Transgenic Insects: From Laboratory to Field. WHO/TDR Asian Biosafety Network Meeting. Madurai, India. 16-26 June 2009.*
7. *WHO DengueNet. 2006. Available from World Wide Web:http:// www.intlglobal atlas/data Query.*
8. *Yap, H.H., J. Zairi, Y.W. Lee and C.R. Adanan. 2003. Chapter 5: Mosquito Control. In: Urban Pest Controls. A Malaysian Perspective . 2nd (edn). C.Y. Lee, J. Zairi, H.H. Yap and N.L Chong (eds). Vector Control Research Unit, School of Biological Sciences, Universiti Sains Malaysia. pp. 53-53*