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Alternative vector control methods to manage the Zika virus outbreak: more haste, less speed

As stated by Laith Yakob and Thomas Walker,[1] the need for efficient and novel mosquito control methods in the context of the Zika virus outbreak is undisputed. However, technologies such as Release of Insects carrying Dominant Lethal genes (RIDL) are not flawless. Transgenic *Aedes aegypti* larvae die if they are not fed with a diet supplemented with an antibiotic (tetracycline). However, deprivation of the mosquitoes from the antibiotic results in 5% survival of transgenic larvae,[2] resulting in the uncontrolled diffusion of the transgene in large-scale deployment in the field. Moreover, tetracycline is widespread in surface waters in countries where the Zika virus is rapidly progressing, including Brazil.[3]

By contrast, the Sterile Insect Technique (SIT) is safe and is undergoing field validation against *A aegypti* and *Aedes albopictus*, but has received little attention to date. SIT does not raise public opposition or require regulatory approvals and no intellectual property issues are involved. Most importantly, the released sterilised insects cannot become established in nature. We believe that the SIT could be further boosted by use of sterile males as conveyors of biocides to their wild counterparts.[4] A European project, titled Revolutionizing insect control, was launched in 2016 to study the dispersion of densovirus (a species-specific natural entomopathogenic virus)[5] from sterile males to wild females and then to their larval habitats as a result of their skipping oviposition behaviour (figure). This strategy might enlarge the effect of the SIT, offering unprecedented opportunities for the control of Zika virus and other mosquito-borne diseases.

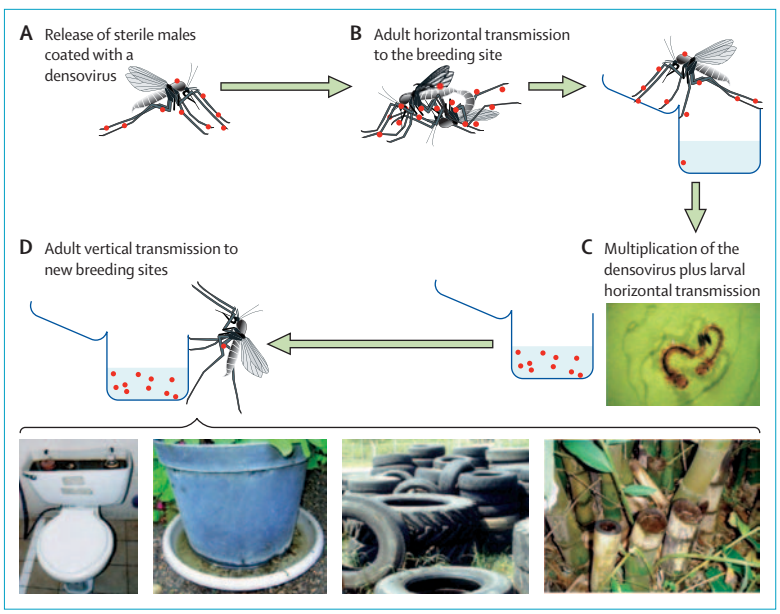

Figure: **Principle of the boosted sterile insect technique using a densovirus**
(A) Sterile males of *Aedes aegypti* or *Aedes albopictus* are coated with crystalised densovirus (AeDNV)5 and released by air. (B) Part of the virus is transmitted to the females during mating and the females that are induced sterile carry it to their breeding sites. (C) The virus contaminates larvae in the breeding sites and multiplies with a long-term persistence. (D) Some larvae survive and emerge as contaminated adults that subsequently deliver the larvicide to neighbouring larval habitats.

Although transgenic mosquitoes might be exciting to the media, more biosafe alternatives should not be neglected.

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