The genomes of several plant species contain endogenous geminiviral sequences

To cite this version:
Denis Filloux, Sasha Murrell, Maneerat Koohapitagtam, Michael Golden, Charlotte Julian, et al.. The genomes of several plant species contain endogenous geminiviral sequences. 8. International Geminivirus Symposium, Nov 2016, New Delhi, India. 1 p., 2016. hal-02798133

HAL Id: hal-02798133
https://hal.inrae.fr/hal-02798133
Submitted on 5 Jun 2020

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The genomes of several plant species contain endogenous geminiviral sequences

Endogenous viral sequences are essentially ‘fossil records’ that can sometimes reveal the genomic features of long extinct virus species. Although numerous known instances exist of single-stranded DNA (ssDNA) genomes becoming stably integrated within the genomes of bacteria and animals, there remain very few examples of such integration events in plants. The best studied of these events are those which yielded the geminivirus-related DNA elements (GRD) and the geminivirus-like elements (EGV) found respectively within the nuclear genomes of several Nicotiana species (Kenton et al. 1995; Bejarano et al. 1996; Ashby et al. 1997; Murad et al. 2004) and various Dioscorea spp. of the Enantiophylliaceae family (Filloux et al., 2015).

1. The genomes of many yam (Dioscorea spp.) species contain transcriptionally active endogenous geminiviral sequences that may be functionally expressed

2. New D. alata sequence resources available to further explore yam EGVs
   - Draft genome of D. alata now available on GenBank (CZHE02000000)
   - Four D. alata BAC clones containing EGVs are now sequenced (CNRGV, INRA, Toulouse, France)

3. Several other plant species contains EGVs

We recently found using in silico searches that other EGVs are included within complete or draft genomes of various plant species, including apple (Malus domestica), black cottonwood (Populus trichocarpa), several Coffea spp., eggplant (Solanum melongena), lettuce (lactuca sativa), and Tepary bean (Phaseolus acutifolius), which suggests that endogenous geminiviruses may be more common in plant genomes than has previously been appreciated.

References


Dioscora spp., eggplant (Solanum melongena), lettuce (lactuca sativa), and Tepary bean (Phaseolus acutifolius), which suggests that endogenous geminiviruses may be more common in plant genomes than has previously been appreciated.