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PRELIMINARY RESULTS OF ERADICATION OF AVOCADO SUNBLOTCH VIROID (ASBVd) AND POTATO SPINDLE TUBER VIROID (PSTVd) IN AVOCADO

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Leaf samples of 473 avocado (*Persea americana* Mill) plants of 35 varieties grown at La Molina Experimental Sation – INIA, Peru, were studied to identify the Avocado sunblotch viroid (ASBVd), and the Potato spindle tuber viroid (PSTVd). Detection of the two viroids was carried out at the International Potato Cente's laboratories, La Molina, Peru by means of the nucleic acid spot hybridization (NASH) technique. Our first results show that 93 (19.6%), and 55 (11.6 %) of the studied samples were infected by ASBVd and PSTVd respectively. The varieties showing the two diseases were: villacampa, collinred, naval, hass**,** and bacon. All the plants showing to be NASH positive were rooted out and burned to prevent dissemination of the viroids. We have currently identified viroid-free plants to propagate avocado either as rootstocks, buds for grafting, or the two strategies. Our results will benefit nursery avocado activities, and avocado growers, which in turn will result in a sustainable commercialization domestically and abroad.

Key words: sunblotch, viroid detection, avocado, potato spindle tuber viroid

INICIO DE LA ERRADICACIÓN DEL AVOCADO SUNBLOTCH VIROID (ASBVd) Y POTATO SPIDLE TUBER VIROID (PSTVD) EN PALTO

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Muestras de follaje de 473 plantas de palto (*Persea americana* Mill) de 35 cultivares del Centro Experimental La Molina del INIA fueron colectadas para evaluar la presencia de los viroides Avocado sunblotech Viroid (ASBVd) y Potato spindle tuber viroid (PSTVd) La detección de ambos viroides se realizó en los laboratorios del Centro Internacional de la Papa (CIP) para el que se utilizó la técnica de hibridación de ácidos nucleicos (NASH). Del total de muestra evaluadas, 93 (19.6 %) y 55 (11.6 %) resultaron infectadas con ASBVd y PSTVd respectivamente. Los cultivares en los que se registraron la presencia de infecciones mixtas fueron Villacampa, Collinred, Naval, Hass y Bacon. Todas las plantas que resultaron infectadas fueron descartadas con la finalidad de evitar la diseminación de ambos viroides. En la actualidad se tienen identificadas plantas madres libres de ambos patógenos a partir del que se están generando portainjertos y yemas para multiplicar material de propagación de calidad. En el futuro estos resultados permitirán que los viveristas mejoren la calidad de los plantones que producen, los agricultores tengan acceso a plantas de mejor calidad y la exportación de la palta tenga sostenibilidad en el tiempo.

INTRODUCTION

Exportation of avocado in Peru has increased from 5 million US dollars in 2002 to 38 million in 2006.(Grozo et al., 2006) despite the lack of technical support for a sustainable growing. The disease called avocado sunbloth viroid (ASBVd) or sunblotch is one of the main constrains for avocado production. The disease has been identified in Peru both in commercial plantations and nurseries (Vargas et al., 1991). The potato spindle tuber viroid (PSTVd) has also been identified in avocado plants in Peru. The nucleic acid spot hybridization (NASH) technique has been use to identified the two viroids (Salazar et al., 1988), which has been shown to be highly reliable and fast for indexing a great number of samples. The aim of the current work is to eradicate both the ASBVd and PSTVd from INIA's avocado plants to provide viroid free material to nurseries.

MATERIAL AND METHODS

Each of the 473 avocado plants belonging to 35 cultivars was carefully labelled at the field of La Molina Experimental Station -INIA. At least three branches per plant were chosen at random followed by taking a young leaf from each branch also at random. The leaves were put in a polyethylene bag carefully identified with the plant number and taken to laboratory for viroid detection. . From each sample, a sub sample of about 1 g was taken at random using a hollow punch, after which each sub sample was put in a polyethylene bag clearly identified. The sub samples were macerated by the method suggested by Salazar et al. (1988). Four µl of sap per sub sample were put on a nitrocellulose membrane, and left at 80°C for 2 hours to fix the nucleic acids. Nucleic acids were hybridized using phosphorus 32. Each membrane had positive and negative controls.

RESULTS

Ninety three avocado plants (19.6%) out of the 473 studied were found to be NASH positive for ASBVd, and 55 (11.6%) out of the 473 were also found infected by PSTVd. Avocado plants infected by the ASBVd showed yellowish leaves and grooves on the fruits' surface with yellow spots. The avocado plants infected by the PSTVd, on the other hand, showed prolific inflorescence with erected young stems. The two viroids were identified in the cultivars *villacampa, collinred, naval, hass* and *bacon*, in which the plants showed stunting, widening of the goblet, and lack of fruit setting.

DISCUSSION

It was extremely important to identified both healthy and infected avocado plants. The latter ones were rooted out and burned. The healthy plants on the other hand, were carefully re-tested to prevent any escape. The NASH technique, which has been used to identify PSTVd in Potato by the International Potato Center, has also been successfully utilized to identify both ASBVd and PSTVd in avocado plants. Although NASH technique has shown to be highly sensitive and reliable one, allowing the treatment of a great number of samples, it would be important to introduce innovative changes in the technique in order not to depend on phosphorus 32.

CONCLUSIONS

It has been identified viroid free plants (ASBVd y PSTVd) of avocado plants at INIA's Experimental Station. The healthy plants will be used by INIA as mother ones to propagate and provide them to nurseries, which in turn will provide to farmers. We hope that this work will provide technological support to sanitation for future exportation activities of avocado

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