A MECHANICAL HARVESTER FOR DIOSGENIN-PRODUCING YAMS

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SUMMARY

It is possible to harvest yams which are distributed through large volumes of soil by lifting the entire soil volume with the kinds of machines usually used for digging and grading road-building materials and employing screens which can separate out the yam from the main body of the soil.

RESUME

Il est possible de récolter 1'igname semée sur une large surface de sol en soulevant toute la surface du sol à l'aide d'engins ordinairement utilisés pour creuser ou d'équipements de construction routière, et en utilisant des cribles pouvant débarrasser 1'igname de la motte de terre.

RESUMEN

El ñame que se encuentra distribuído a través de grandes volúmenes de suelo, se puede cosechar volteando el volúmen completo con máquinas de las usadas para la excavación y nivelación de los materiales de construcción de caminos y utilizando cribas que pueden separar el ñame del suelo en sí.

INTRODUCTION

There has been considerable interest for about twenty years in developing commercial production of *Dioscorea* spp. containing diosgenin as a starting material for the production of steroidal compounds. Several projects directed towards the development of the necessary technology for commercial production are, or have been, in progress in Puerto Rico, Mexico, Guatemala, Costa Rica, Kenya and India[1]. Considerable work on the diosgenin-rich *Dioscorea* spp. has been carried out at Federal Experiment Stations in Puerto Rico and in Florida, U.S.A.[1,4,5].

Of the diosgenin-bearing species[2], *D. composita* Hems[1]. and *D. Floribunda* Mart. and Gal., having been most seriously considered for commercial production because of their yield potential and their high diosgenin content and purity[4,5]. Of the two, significantly greater root and diosgenin yields per unit of land area are obtained from *D. composita* in Guatemala, making it the better prospect for commercial production. The vines of *D. composita* also grow more vigorously and the shade provided by the thick foliage helps control weeds. The white-fleshed roots are firm but brittle, and at harvest, range in thickness from 2 to about 15 centimeters.

One of the problems of the large scale, commercial production of *D. composita* is the irregular, deep position in the soil of the tuberous roots. They may occur as far as 30 centimeters to the side of the planting row, and, depending on soil conditions, may occur to a depth of over 90 centimeters during a three-year crop cycle. The major portion of the root yield is located at less than 76 centimeter depth. No common harvesting implement can dig roots from this depth, so that it was necessary to develop one. The aim was to reduce the cost of harvesting below that of hand harvesting at prevailing labour rates.

PREVIOUS ROOT AND TUBER HARVESTERS

Most authors suggest a simple, soil-loosening tuber-lifting implement for the harvest of *Dioscorea species. Martin and Gaskins*[5] suggest a large moldboard plough and Martin *et al.*[4] mention a lister bottom plough as possibilities for turning up the tubers for subsequent collections by hand. An early cultivation project conducted by Merk & Company in Guatemala developed a soil-loosening implement for harvesting *Dioscorea* species based on the model of a seedling tree lifter. Coursey[2] describes the construction and operation of a tuber-lifting plough for edible *Dioscorea* species after the use of which the tubers were raked by hand from the loosened soil. It was designed to harvest the tubers from ridges of soil which is the common method of growing edible *Dioscorea* species. Efforts to select cultivars with regularly shaped roots for easier, mechanical harvesting were being made.

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