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To direct, fund, promote and communicate horticultural research, which increases the quality and value of ornamental plants, improves the productivity and profitability of the nursery and landscape industry, and protects and enhances the environment.

Development of a Computer Database for Vegetative Propagation of Trees and Shrubs[1]

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Abstract

Rooting data from more than 40 different publications for the last 60 years were collected and organized into a computer database. The database contains 1400 records representing 300 genera, 700 species and 750 cultivars. Information can be retrieved from the database using keywords common to rooting literature including genus, type of cutting, time of year, rooting medium, time to root and location. The information in the database details specific propagation techniques which is retrieved using the MS-DOS software askSam™.

Index words: rooting, asexual propagation.

Significance to the Nursery Industry

Information on the methods for vegetative propagation is of key importance to nurserypersons and propagators, especially those producing liners. This database along with a personal computer provides a ready reference for the propagator to search for information that may help improve propagation success. Specific rooting information (eg., what kind of cutting, when to take cuttings, rooting medium, growth regulator treatment and rooting environment) can be obtained from the database by searching for keywords such as genus, species, cultivar, cutting type, location or propagator's name.

Version 1.0 of the rooting database is available from the authors for $25.00 (check made out to the 'Regents of the University of California'). The text information found in the database is available on the bulletin board managed by the American Society for Horticultural Science, Alexandria, VA (703-836-2418) and via the Internet by sending an electronic mail request to dwburger@ucdavis.edu.

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prunus
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          Name:  Prunus persica
      Cultivar:  Bicentennial
  Cutting Type:  semi-hardwood, leafy cuttings
     Age-Stage:  after cessation of terminal growth
    When taken:  August
        Medium:  vermiculite
         Auxin:  2500 ppm IBA
     Structure:  mist
   Bottom Heat:  no bottom heat
     % Rooting:  94%
  Time to root:  4 weeks
          Care:  [
      Location:  Georgia
     Reference:  Couvillon, G.A. and A. Erez. 1980. HortSci 15:41-43.

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Fig. 1. Example of one screen output after searching for the keyword "prunus".

Introduction

Specific, written information describing successful methods of vegetatively propagating woody plants is often difficult to find and can quickly become outdated. Reference works exist that contain specific propagation information (2, 3, 5), but no reference exists that provides detailed vegetative propagation information supported by primary research results. Other references only deal with a specific family or group of plants (1, 4, 6, 7, 8). The professional plant propagator needs a resource that can be easily searched and updated as new information is generated by researchers and other professionals in the field.

The computer database described here, in conjunction with commercially available database software, is a collection of references to provide that useful resource. It contains over 1400 records representing more than 300 genera, 700 species, and 750 individual cultivars. Only the generic name is necessary to find propagation information if the plant is part of this database.

Our objectives were to provide: 1) a computer database for the collection and maintenance of vegetative propagation information for woody, landscape plants, 2) detailed propagation methods for those plants included in the database, and 3) research-based references that might lead the user to additional information.

Materials and Methods

References from research, extension and commercial publications collected over a period of 20 years were used to develop this database. This information had been stored in written form and organized alphabetically in loose-leaf notebooks. As new information was found it was added to the existing collection. This kind of information has become well-suited for development of electronic databases as microcomputer hardware and software have become more commonplace and easier to use. The software chosen to manage the information in this database was the MS-DOS-based information manager, askSam™ (askSam Systems, Perry, FL) because it was readily available, fast, and easy to use. The database was assembled using the complete askSam™ software package. A version of askSam called Hypersift™ (which can be distributed freely under license) gives users direct access to the information, but cannot be used to alter or edit the database information.

The database was constructed to contain the most important rooting information needed to successfully propagate woody plants. Information for each plant in the database is organized as records or pages. Each record contains the rooting information for only one plant (Fig. 1). The information in each record is further organized into fields (eg. Name, Cultivar, Cutting Type, etc.). In the example shown in Fig. 1, rooting information for the keyword "prunus" was desired. Keywords can be entered in any combination of upper or lower case. The fields (eg., Name, Cultivar, Cutting Type, etc.) are shown on the left side of each record. The "Name" field contains the plant's botanical name and is the most important field to use to find rooting information. The extensive use of common names was avoided because of the inherent confusion associated with them. Specific cultivars can be found in the database by searching on the "Cultivar" field. The types of cuttings used and how they were treated are in the "Cutting Type", "Age-Stage", "When taken", "Medium", "Auxin", "Structure", and "Bottom Heat" fields.

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prunus hardwood
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            Name:  Prunus domestica
         Cultivar:  Brompton
    Cutting Type:  hardwood, basal cutting
       Age-Stage:  [
      When taken:  December
          Medium:  peat + sand (1:1)
           Auxin:  IBA 5000 ppm + wounding
       Structure:  cold frame (45-48F)
     Bottom Heat:  no bottom heat
       % Rooting:  68-92%
    Time to root:  3-4 months
            Care:  [
        Location:  Vineland Station, Ontario, Canada
       Reference:  Tehrani, G. and J.W. Lay. 1975. The Plant Prop. 21(1):9-11.

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Fig. 2. Example of database output after searching for the keywords "prunus" and "hardwood".

Table 1. Distribution of records in the database based on genus.

Genus	Number of records in the database
Acer	88
Arctostaphylos	29
Ceanothus	23
Chamaecyparis	60
Cornus	35
Ilex	17
Juniperus	72
Magnolia	29
Picea	55
Pinus	15
Prunus	93
Rhododendron	294
Syringa	34
Taxus	31
Thuja	35
Ulmus	26
Viburnum	93

The "Structure" field refers to whether overhead mist was used or some other type of enclosure (eg., humidity tent) was used. If bottom heat was used it is stated and the temperature provided. The rooting results are in the "% Rooting" and "Time to root" fields. The "Care" field refers to how cuttings were treated after rooting. The location where the information was obtained and reference for the information are provided in the "Location" and "Reference" fields. Fields having no information are shown with a single "[". If there are additional records that contain the searched keyword "- MORE-" will appear on the bottom of the screen (Fig. 1).

More than one keyword can be entered during each search. For example, if information on hardwood propagation of prunus is desired, "prunus" and "hardwood" could be entered as keywords. Any record containing those two words would be presented on the screen (Fig. 2).

Results and Discussion

The quality of the database is reflected by the number of records it contains, the number of different genera included, the publications in which references were obtained and the time frame of the collected information. This rooting database covers a wide range of plant materials with some genera represented by more than 200 records (Table 1). Seventeen genera have 15 or more entries for each with *Rhododendron* having the greatest number, 294. More than 40 journals, proceedings and books are represented in the database. About half the entries came from the *Proceedings of the International Plant Propagators' Society* (725). National and international, non-horticultural journals (*Physiologia Plantarum, Canadian Journal of Plant Science, Nature*), horticulture journals (*HortScience, Journal of the American Society for Horticultural Science, Journal of Horticulture Science, Horticulture, Horticulture Research, Scientia Horticulturæ*), nursery magazines (*American Nurseryman, Nurserymen's Newsletter, Tree Planter's Notes*), botanical journals (*Arnoldia, Journal of the Arnold Arboretum, Journal of the New York Botanic Garden*), state and regional journals (*Massachusetts Experiment Station Bulletin, Ohio State University Nursery Notes, New York Agriculture Experiment Station Bulletin*) and other respected publications (*Journal of Forestry, Journal of the American Society of Agronomy, California Agriculture, Plant Disease Reporter*) are represented. References from these journals cover the time period from 1931 to the present.

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