

REGISTRATION AND RELEASE OF IMPROVED FOREST TREE MATERIALS

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Abstract.--Improved forest tree materials are now being produced by cooperatives, state and Federal agencies, and private breeders. Most of this material has not been formally released in a manner that agronomists and horticulturists have been doing for many years. This paper explores some of the policies that our colleagues in these fields have developed, and also looks at the machinery that has been set up to implement them. A number of suggestions are offered whereby improved forest materials can be registered and, eventually, be released.

Additional keywords: Cultivar, Federal Seed Act, Plant Patent Act, Plant Variety Protection Act.

Forest tree improvement programs are now reaching a stage where improved germplasm is being made available to growers by both public and private agencies. Because the public has an important stake in tomorrow's forests, there should be provided reliable means whereby the types of trees grown can be identified and evaluated. As long as wild plants were used for reforestation, it made little difference what parentage was involved, and there was no need to identify any plant except as to species. But today, what do we have? In loblolly and slash pines, our most highly-bred tree species, a partial summary of the types of seed stocks available for reforestation includes: (1) geographic provenances (2) seed production area material, (3) open-pollinated seed orchard stock - general or by family lines, (4) control-pollinated seed orchard stock, general or by families, (5) disease-resistant stock, (6) special production stock such as high gum-yielding strains, high and/or low specific gravity stock, etc., (7) interspecific hybrids, (8) open-pollinated natural hybrids, (9) inbreds, and, finally, (10) wild stock. In fact, the papers presented at this conference are proof of the great range of materials that are being or that soon will be produced. In a few other species such as cottonwood there is one additional category: (11) clonal lines. How do we identify all this material? Presumably, each agency keeps its own records and in the cooperatives, there is some sort of general control. Should there not, however, be a central registration agency within the field of forestry that will keep records of the type of stock that is produced, and to which any qualified person can go to find out matters of parentage, performance, and adaptability? In attempting to answer that question let us see what our colleagues in Agronomy and Horticulture, with their long experience in developing improved crop varieties, have done about this matter.

Related topics that fall into consideration here include the following:

(1) Federal and State seed laws, (2) seed certification, (3) release of new germplasm, (4) registration of cultivated materials, (5) maintenance and propagation of basic stocks, (6) plant patents and variety protection; and (7) crop germplasm preservation. Primary emphasis in this paper will be directed toward items (3) and (4) although other topics will be referred to as needed.

The methods followed by public-agency breeders are standardized throughout the country and vary little from state to state. The basic document (dated June 26, 1972,) is entitled 'A Statement of Responsibilities and Policies Relating to the Development, Release, and Multiplication of Publicly Developed Varieties

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of Seed Propagated Crops.' (11) It was prepared by the Experiment Station Committee on Organization and Policy (ESCOP) and the ARS and SCS, agencies of the U. S. Department of Agriculture. The policy is limited to seed stocks of field and horticultural crops and does not cover material that is propagated vegetatively. The policy statement covers such topics as breeding to develop superior varieties, testing and evaluating experimental varieties, release and registration, maintenance and increase of seed stocks, and publicity policy on new releases. A few excerpts from this publication relative to release and registration are quoted here:

"Decisions on the release of new varieties should be made for each state by the appropriate agricultural agency of that state. It is recommended that in each state there be a policy committee or board of review charged with the responsibility of reviewing the proposal for the release of a new variety." 2/

"A variety should not be released unless it is distinctly superior to existing varieties in one or more characteristics important for the crop, or it is superior in overall performance in areas where adopted and is at least satisfactory in other major requirements. A single major production hazard which a new variety can overcome, e.g., a highly destructive disease, may become the overriding consideration in releasing a variety." 3/

"A new variety should be given a permanent designation before it is released . . . Brevity in designation is desirable. When this designation is a name, one short word is preferable; two short words are, however, acceptable. Meaningful number designations . . . are also acceptable . . . The International Code of Nomenclature for Cultivated Plants provides guides for the naming of varieties. It is recommended that this source be consulted with respect to variety 4, names." 5/

"Under no circumstances should a variety be distributed under more than one name nor should the same name be used more than once in a given crop. Similar names should also be avoided . . . Once established, a legitimate varietal name should not be changed" 6/

"New varieties of corps should be registered. Information for the registration or listing of varieties should be submitted promptly following registration of the variety with the Crop Science Society of America (CSSA) or the listing of the variety with the American Society for Horticultural Science (ASHA)." 7/

At the local level each Agricultural Experiment Station has a crop variety and release committee which meets one or more times yearly to consider the release of new varieties. Upon its recommendation the Experiment Station Director then approves the release. Where other cooperating agencies are involved such as

2/ Section 5, Part (a).

3/ Section 6.

4/ The word 'cultivar' is considered synonymous with 'variety.'

5/ Section 7, Part (a)

6/ Section 7, Part (b)

7/ Section 7, Part (c)

ARS, the release is made jointly. The local committee also makes policy relating to crop variety recommendations. This may vary from state to state, but usually will include representatives of the seed industry, various state organizations, the Extension Service and the Agricultural Experiment Station.

The breeder's function in this procedure is to submit a proposal for release of an improved variety or strain when sufficient performance data and other records indicate that it has merit. Ordinarily the breeder maintains breeder seed until it is turned over to a designated authority, often a foundation seed association, who increases it as needed for the production of foundation seed. Foundation seed is then used for commercial production. All classes of seed so produced come under the regulation of Federal and state seed laws and certification procedures are required.

Most private breeders are attached to the large seed companies. The general procedure in releasing new varieties is to grow breeder seed for several generations in order to build up stock, then build up foundation seed by contract to growers. Before being sold this seed goes through seed certification procedures. Breeders or their companies may apply for Certificates of Protection under the Plant Variety Protection Act. This Act allows them exclusive rights to sell or market seed under a protected variety name. Release notices are sent out through advertising by the seed company and by announcements through the National Council of Commercial Plant Breeders (NCCPB). Private breeders may also register their seed with the Crop Science Society of America (see below).

Let us turn next to the policies and procedures of the two major professional societies in registering and listing releases.

The Crop Science Society of America has a formal mechanism for registration of crop cultivars, parental lines, and elite germplasm. This is outlined in the Nov.-Dec. 1971 issue of Crop Science (8). The procedure was developed by the Variety Registration Committee of the Society. Crops that may be registered include cereal grains, cotton, forage-, range-, and turf-grasses, legumes, oilseed crops, sugarbeets, sugarcane, and tobacco. Material to be registered must ordinarily have been released after January 1, 1960. Registration is accomplished by submitting an appropriate form obtained from the Subcommittee Chairman responsible for a particular crop and is accompanied by a registration article. The latter is published in Crop Science. The following information concerns the registration article:

"Registration articles must be concise and include the following:

- a. Name of identification assigned at time of release.
- b. Botanical name, including the authors of the binomials.
- c. Experimental number or designation used during development.
- d. Names of agencies and organizations involved in the development and evaluation of the plant.
- e. A brief description including distinguishing characteristics and breeding procedures.
- f. Probable region of adaptation, generations of seed increase, and area of seed production, where applicable, for cultivars.

g. The institution or organization that will maintain basic stocks of these materials.

h. Any limitation on the availability of parental lines or germ plasm."^{8/}

Registration numbers are assigned by the Chairman of the Registration Committee. Numbers are assigned serially, and are grouped into three categories, i.e.,

For cultivars - no prefix before the number;
For parental lines - number is prefixed by PL;
For elite germplasm - number is prefixed by GP.

A reference file for all registered material is maintained by the CSSA.

Guidelines for registering parental lines include their demonstrated merit in applied breeding programs, their official release, and a description or citation to original source for the material from which they were derived.

Elite germplasm is any material that is improved by breeding procedures but does not fall into the category of variety (cultivar), or parental line. It may include clonal (non-seed propagated) material, composite crosses, or mixtures of germplasm.

Certificates are issued for each cultivar registered, but not for parental lines or germplasm.

In my opinion the CSSA has progressed the farthest on the question of registration than any other group, and its policies and procedures could prove valuable to foresters when the time comes to set up registration for improved forest tree materials.

The American Society for Horticultural Science (ASHS) does not register plant materials directly but does have vegetable varieties, fruit and nut varieties, and various horticultural crops and plants listed in the journal HortScience. There have been various ways of listing these new varieties, but until recently most of them were very brief - not much more than announcement of new plants, their names, and a few outstanding characteristics. A decision made this past year was to standardize the form for announcing new cultivars, and to publish a more detailed description of them. The first of these new cultivar descriptions was published in HortScience in its January 1973 issue (2). The information published in HortScience follows a certain format, e.g.

"1. Title (e.g., 'Sureglow' Strawberry).

2. Author(s).

3. Text.

- a) identification (to include species, purpose, region of adaptation);
- b) origin (parentage, development, breeders responsible);
- c) description (plant, flower, fruit) - photos may be included;
- d) outstanding characteristics and uses (performance results, pest resistance);
- e) availability (sources of seed or clonal materials).

The three major commodity groups in ASHS handle the announcements separately. Information on new vegetable varieties is coordinated with the American Seed Trade Association (ASTA) and is standardized on a card form that includes the following information (5):

Name of variety and (where needed) experimental designation number;

Originator's name and address;

Breeding category (F hybrid, O-P line, etc.) and parentage;

Distinguishing and outstanding characteristics;

Disease resistant features;

Regional adaptation;

Reference to published description;

Date of release.

The form is available from ASTA or ASHS.

A descriptive list of all vegetable varieties introduced between 1936 and 1968 has been published jointly by the two societies.

For listing its varieties of new fruits and nuts, the ASHS has a two page card form which is called a register. The basic data called for on the card consists of (6):

Name of variety, species, and synonyms;

Originator's name and address;

Patent number, date, and assignment of patent;

Date variety was introduced commercially;

Place or origin;

Parentage and breeding category;

Description of fruit or nut including refining and harvesting date;

Hardiness, vigor, disease resistance;

Size and shape of plant;

Record of productivity.

The card form is available from ASHS.

The University of California Press has recently published a Register of New Fruit and Nut Varieties, describing all important new commercial varieties introduced between 1920 and 1970.

Certain federal laws apply to propagated plant material. The Federal Seed Act of 1939 gives authority to Seed Certification Associations in setting up and enforcing standards for various classes of seed and sets standards for purity, germination, etc. The Plant Patent Act of 1930, amended 1954 (21), allows a breeder or grower to obtain exclusive rights to the propagation and sale of asexually produced plants (including most horticultural clones and a few crops such as potatoes). The Plant Variety Protection Act of 1970 (22) allows breeders and growers to obtain rights to the propagation and sale of sexually produced plants (by seed). This law went into effect on November 27, 1972 (18). Applications for variety protection were accepted as of January 1, 1971 and by December 31, 1972, the Plant Variety Protection Office had received 303 applications. Thus it appears that breeder-growers are taking advantage of the opportunities afforded under the Act, and that it is filling a real need. Applications received are printed in the official Journal of the Plant Variety Protection Office (19). The Protection Office is currently developing 'objective descriptions of varieties' for the plants that can be protected under the Act, but it is expected that it will take several years before the work is completed. After certificates have been issued (none as of March 31, 1973), the Registry of protected varieties will begin. These will also be published in the Official Journal.

A second group of societies and agencies is concerned with the registration of cultivars of ornamental plants - those that are asexually propagated. The number of names of cultivated plants in the literature run into the tens of thousands, and it has been no easy task to catalog them, much less to identify them.

Registration for ornamental plants has been urged by several International Congresses of Botany and Horticulture and by the International Union of Biological Sciences. This last association is now responsible for the International Code of Nomenclature for Cultivated Plants, first published in 1952. The latest edition (4th) dates from 1969 (15).

A recent article by DeWolf (10) of the Arnold Arboretum points up several serious problems in the naming and identification of plants. The International Code has stressed that the basis of varietal nomenclature must be a series of Registration Lists.

"Such lists, when completed, will form the basis for future registration of distinctive cultivated plants under equally distinctive names. The List should enable one to determine the validity of existing names which are to be regarded as cultivar names and clearly indicate names which have been used previously within a genus and therefore may not be used again. Only a few such lists exist." (10)

The oldest list in current use is that for orchids which was begun in 1896.

The code has strongly urged that Official Registration Authorities be appointed to register new cultivars in certain plant groups. The authorities are, commonly, professional or quasi-professional plant societies specializing in particular plants (e.g., the American Iris Society, Holly Society of America, Royal Horticultural Society, etc.). Approximately 40 plant groups (mostly individual genera, but in some cases, botanical families, and miscellaneous collections, are now assigned to 22 International Registration Authorities (4). Reasonably complete lists of recognized cultivars are available for orchids, tulips, daffodils, hemerocallis, rhododendron, azaleas, camellias, hollies, dahlias, iris, gladiolus, and dwarf conifers. The Arnold Arboretum with extensive

experience in compiling lists has been appointed as Registrar of eleven woody genera. It also publishes new cultivars of miscellaneous woody genera for which no authority has been designated. There is one forestry organization in the group of International Registration Authorities. It is the International Poplar Commission in Rome and its assignment is to prepare a list of forestry cultivars in the genus Populus (poplar).

Cultivars registered by the Arnold Arboretum have been published in Arnoldia since 1960. The most recent list of 21 cultivars was published in the Arboretum and Botanical Garden Bulletin for April 1973 (13).

This has been a brief survey of the fields on registration and release as it applies to improved field crops, fruits, and ornamentals. What insight does this give us in application to improved forest trees? I would like to suggest the following:

First: to recognize that in considering improved forest trees we are dealing with a domesticated crop that is mass-produced-and-harvested just as is any agricultural or horticultural crop. (The acreage devoted to such crops will of necessity be restricted because this is a single use of forest land and there are many social and ecological demands upon forests where single uses cannot apply.)

Second: to recognize that the public has a great stake in our future forests and are entitled to know what kinds of trees (pedigreed or otherwise) are being planted.

Third: to recognize that public laws dealing with the seed trade can, and in all probability will, apply to forest tree seeds as to agricultural seeds. In fact, in some states, seed certification laws have already been established to cover tree seeds.

Fourth: to recognize that International tree seed exchange requires a careful documentation of seed source origins and pedigrees, and that the demands for such seed exchange are growing.

Fifth: to recognize the rights of breeders and developers in protecting their improved varieties of forest trees and to realize a profit from them.

And finally: to recognize that progress in forest tree improvements require ready and open cooperation among all agencies and individuals working in the field.

For these reasons, I believe that first steps should be taken by our profession to provide a means whereby improved forest tree varieties can be officially registered. Paralleling the efforts of the Crop Science Society of America which has its Crops Registration Committee, the Society of American Foresters, through its Tree Genetics and Improvement Working group, could establish a similar committee. The first duty of such a committee would be to ascertain the real need for and interest in such a registry. Later, it could function to establish policies and procedures and suggest a time when they could be implemented.

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