

STATE OF WASHINGTON
DEPARTMENT OF AGRICULTURE
Olympia

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STATE OF WASHINGTON
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RULES AND STANDARDS FOR THE CERTIFICATION OF HOP ROOTSTOCKS

I, Joe Dwyer, Director of Agriculture of the State of Washington, by virtue of the authority vested in me under Chapter 15.14, Revised Code of Washington, after due notice and public hearing held at Yakima, Washington on January 31, 1964, (pursuant to Chapters 43.32 RCW and 34.04 RCW), do hereby establish Rules and Standards for the Certification of Hop Rootstocks.

Rootstocks of hops (Humulus spp.) may be designated as Foundation stock, Registered stock and Certified stock when inspected, tested and found to be true-to-name (not off-type) and discernibly free from virus (not virus infected) and virus-like diseases, Downy mildew, Verticillium wilt, Crown gall, Rootknot nematode, Hop Cyst nematode or other serious pests, by procedures and inspections outlined in this program. Certification does not imply any warranty on the part of the Department or any employee thereof.

Participation in this program shall be voluntary.

REGULATION I. Definitions

- A) "Virus infected (affected)" means presence of virus(es) in a plant or plant part.
- B) "Virus-like" means a disorder of genetic or non-transmissible origin.
- C) "Off-type" means not true-to-name.
- D) "Indicator plant" means any herbaceous or woody plant used to index or determine virus infection.
- E) "Index" means to determine virus infection by means of inoculation from the plant to be tested to an indicator plant or by any other method.
- F) "Foundation rootstock" means rootstock indexed as specified by the certifying agency and found to be free of serious virus. This stock will be maintained by or through the Washington State Department of Agriculture.
- G) "Registered rootstock" means rootstock produced from Foundation and Registered rootstock and has met the requirements as herein provided.
- H) "Certified rootstock" means rootstock produced from Registered rootstock and has met the requirements as herein provided.
- I) "Verticillium wilt" means the disease caused by Verticillium albo-atrum Reinke & Berth. or hop strains of this organism.
- J) "Downy mildew" means the disease caused by Pseudoperonospora humuli Miy. & Tak., G. W. Wils.
- K) "Crown gall" means the disease caused by Agrobacterium tumefaciens E.F.Sm. & Towns., Conn.
- L) "Rootknot nematode" (Meloidogyne sp.)
- M) "Hop cyst nematode" (Heterodera humuli) Filipjev

REGULATION II. Field standards for production of Registered and Certified Hop Rootstock.

A) Land requirements

- 1) A field to be eligible for production of Registered or Certified hop rootstocks must never have grown hops, provided that a field is eligible to be replanted with the identical hop strain of equal standards.
- 2) Land proposed for producing Registered and Certified hop rootstocks must be approved by the Department in respect to location, drainage and adaptability.

B) Isolation requirements

- 1) A field to be eligible for production of Registered or Certified hop rootstock must be at least 1/4 mile from any other hop plants unless these plants also meet the requirements of this program.
- 2) A grower of Registered or Certified hop rootstocks may grow only one hop strain. Planting must be supervised by the Department of Agriculture.

C) Plant requirements

- 1) Only propagations from hop roots of approved strains which have been grown as foundation or registered stock may be planted for the production of registered stock.
- 2) Only propagations from hop roots of approved strains which have been grown as registered stock may be planted for the production of certified rootstock.

D) Handling the crop

- 1) Plant pests and weeds are to be effectively controlled until August 15.
- 2) Evidence of any unauthorized roguing will be sufficient reason to reject a field.

REGULATION III. Inspections

A) Field - At least 3 field inspections must be made annually.

- 1) The first for downy mildew infection when the crowns are pruned for rootstocks.
- 2) The second for downy mildew, Verticillium wilt and other pests.
- 3) The third depending on suitable weather conditions, would be primarily for detection of viruses.

B) Rootstocks

The planting material, slips or rhizomes and layered stem cuttings, must be inspected at digging and planting to determine freedom from serious pests.

The presence of Verticillium wilt will disqualify the field.

Other disease that might be found would not necessarily disqualify the field but these diseased plants must be removed immediately on approval in order for the field to qualify for rootstock production. Harvested rootstocks must be examined for downy mildew, crown gall, insect infestation, rootknot nematodes, hop cyst nematodes and otherwise unhealthy appearing roots. (See specific requirements in Regulation VI).

REGULATION IV. Application and Fees

- A) The applicant grower shall furnish to the Department all information pertinent to the operation of this program and shall give his consent to the Department to take material for examination and testing. Application for inspection and testing of Registered and Certified stock must be filed with the Department by February 1 of each year accompanied by a \$40.00 application fee.

Field inspection fees are \$12.50 for each acre or fraction thereof per inspection.

- B) Final fees shall be due and payable upon completion of the last field inspection.

REGULATION V. Tagging and identity

- A) Tagging: The Department will issue a certificate covering hop rootstocks that meet the requirements of this program and authorize the use of official certification tags for the identification of such rootstocks.
- B) Identity: Any person selling certified hop rootstock is responsible for the identity of the stock bearing each tag and for such stock meeting the requirements of this program. Persons issued tags authorized by the program shall account for stock produced and sold and keep such records as may be necessary. Containers for hop rootstocks must be new.

REGULATION VI. Standards for hop rootstock (Early & Late Cluster type)

- A) WASHINGTON NO. 1 shall consist of hop slips or rhizomes and/or layered stem cuttings of one strain, not less than 5 inches in length and containing one visible bud, 1) which are fairly fresh, 2) firm, 3) moist, 4) fairly clean, 5) and free of mold, 6) freezing injury, and 7) broken or mutilated rootstocks.

- B) Tolerances

In order to allow for variations incident to proper grading and packing, not more than a combined total of 5 percent, by count, of the rootstocks in any lot may fail to meet the requirements of the above grade. However, not to exceed 2 percent of this tolerance shall be allowed for damage caused by split or broken rootstock or mechanical injury, and not more than 5 percent of the rootstock may have rhizomes or layered stem cuttings less than 5 inches in length.

- C) Application of tolerances

The tolerances for the standards are on a container basis. Individual packages in any lot may not contain more than 5 percent by count of plants that fail to meet the above grade, provided the averages for the entire lot based on sample inspection, are within the tolerances specified. Individual packages in any lot may contain not more than one and one-half times the tolerances specified.

- D) Packing: Hop plants are to be packed in such a manner that they will retain a fresh condition.

Specific Requirements:


Disease or pest	Maximum infestation permitted	
	Registered	Certified
Aphids	trace	moderate
Crown gall	0	0
Downy mildew	0	0
Mites	trace	moderate
Nematodes (cyst)	0	0
Nematodes (rootknot)	Trace	trace
Off-type	0	0
Powdery mildew	trace	trace
Strawberry root weevil injury	trace	moderate
Verticillium wilt	0	0
Virus	0	trace

HOP DISEASES RECOGNIZED IN WASHINGTON

European hop, Humulus lupulus L, American hop, H. americanus Nutt from U. S. D. A. Handbook #165, 1960 and Washington State College Station Circular 336, 1958.

- 1) Rust, Aecidium humuli Hotson.
- 2) Crown gall, Agrobacterium tumefaciens E.F.Sm. & Towns, Conn.
- 3) Sooty mold on cones, Fumago vagans Pers. ex Sacc.
- 4) Anthracnose, Glomerella cingulata (Ston) Spauld & Schrenk.
- 5) Downy mildew, Pseudoperonospora humuli (Miy. & Tak.) G.W. Wils.
- 6) Hop cyst nematode, Heterodera humuli Filipjev.
- 7) Virus:
 - a) Mosaic
 - b) Ringspot-line pattern.

I hereby certify that the foregoing is a true and correct copy of the regulation promulgated by the Department of Agriculture.



Joe Dwyer
Director of Agriculture
State of Washington

Signed at Olympia, Washington

Date: April 13, 1964