PROTOCOL FOR THE EXAMINATION OF VALUE FOR CULTIVATION AND USE OF

SPRING BARLEY VARIETIES

In The Netherlands

2025

Raad voor plantenrassen (Rvp)
Plant Variety Board

Commissie Samenstelling Aanbevelende Rassenlijst (CSAR)
Recommended List Committee

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Contents

1. Introduction

This protocol sets out the procedures to be used for the examination of the Value for Cultivation and Use (VCU) of spring barley varieties in the Netherlands and for decisions based on VCU regarding listing and recommendation of spring barley varieties in the Netherlands.

VCU testing of spring barley varieties comprises the following items:

- Regional yield trials spanning a total of three years – a two-year trial period (RL1 and RL2) for varieties to be included in the National List followed by a third year (RL3) for varieties to be included in the Recommended List;

This protocol is based on the assumption of sufficient basic knowledge of the agronomy of spring barley; commonly used methods and treatments are not explicitly described. Unless otherwise indicated it is assumed that the agronomy should follow the best local practice of an average Dutch arable farm.

Varieties only qualify for testing:

- if applied for listing in the Dutch Plant Variety Register at the Plant Variety Board or
- if listed in one or more member states of the European Union or
- if otherwise approved for marketing in The Netherlands

After RL2, the *Raad voor plantenrassen* (Plant Variety Board) decides whether or not the variety can be included in the National List based on the VCU results. Varieties included in the National List are approved for marketing.

After RL3, the *Commissie Samenstelling Aanbevelende Rassenlijs*t (Recommended List Committee) decides whether or not the variety can be included and classified in the Recommended List.

See the annex for contact details.

2. Examination of the Value for Cultivation and Use

2.1. Trial seed

The submitted seed must be untreated. Information regarding the germination rate must be supplied by the breeder/representative. For all trials, the Trials Coordinator makes an inventory of the quantity of seed needed per variety,
Each Trial Operator must inform the Trials Coordinator of the amount of seed required for the varieties to be tested.
Before 25 January the applicant must submit the amount of seed of each variety to be tested to the Trials Coordinator as specified by the Trials Coordinator.
The Trials Coordinator treats the seed and distributes it among the Trial Operators.
Along with the seed, the Trials Coordinator submits a list specifying the thousand seed weights and supplies information on the germination rate of the seeds.
The identity of the varieties in the trials is to be checked by breeders and examiners on the basis of their knowledge (of these varieties). The Trials Coordinator retains 100 grams of untreated seed of each variety that is tested in the regional yield trials in a conditioned seed-store. If necessary, that sample can be used for authentication purposes. The authentication samples are stored for a period of three years. The seed supplied by the applicants is exclusively intended to be used for the official examination of the Value for Cultivation and Use.

2.2. Trial design

2.2.1. General

Yield trials must be carried out in complete replicates. These replicates (blocks) are subdivided in sub-blocks of 5, 6 or 7 plots. The varieties of each replicate should preferably be grown in a single lane. In case replicates need to be split, due to local field conditions, the boundaries of the (sub)blocks must be observed. If treated and untreated trials are carried out at the same site, the trials must be separately randomised.
The plots should be at least 1.4 m wide and their length must be at least three times their width. Yield trials must consist of two replicates if the plot area is at least 7.5 m^2 and must consist of three replicates if the plot area is less than 7.5 m^2.

2.2.2. Regional yield trials

Each regional testing cycle (RL1, RL2 and RL3) comprises four trial sites. The trials should be carried out in the different regions as follows:

Region	Number of treated yield trials	Number of untreated yield trials
Central marine clay	1	1
Southwestern marine clay	1	1
Northern sandy soil	1	1
North-eastern peat soil	1	1

Treated (for disease control) and untreated yield trials are performed in every region (Central marine clay, Southwestern marine clay, Northern sandy soil and North-east reclaimed peat soil). Each trial must consist of at least two replicates.

2.2.3. Brewing quality trials

Each year, the varieties are tested for their processing characteristics in the barley-malt-beer chain for NIBEM (Netherlands Institute for Malting Barley, Malt and Beer). This test is performed by VLB (*Versuchs- und Lehranstalt für Brauerei*) in Germany (Berlin). The samples are collected and dispatched by the Trials Coordinator. The protocol for testing malting and brewing quality is described in the "Protocol for testing malt and brewing characteristics of barley varieties within the Netherlands" of NIBEM.

2.3. Varieties to be tested

Standard varieties
All the A (generally recommended) and N (newly recommended) varieties of the Recommended List are included in the regional yield trials as standard varieties. If a standard variety is withdrawn from further testing, the breeder concerned must report this withdrawal to the Trials Coordinator, to the Plant Variety Board and to CSAR (Recommended List Committee).

Varieties to be tested
Since 2014, there has been no limitation on the number of varieties entering the regional yield trials. Based on their own trials, breeders are free to submit an unlimited number of varieties both for agricultural and for quality testing. The applicant must supply the results of at least two trials of new varieties submitted for testing, tested at least in two replicates including three standard varieties from the A- or N-category of the latest Recommended List and carried out both on sandy soils and on clay soils.

2.4. Trial layout, Trial operations and Trial husbandry

The trial plan is an incomplete block design with discard plots on either side of the trial. The Trials Coordinator sets up the trial plans and sends them to the Trial Operators.
Trial fields must be as regular as possible. The fields must be uniform, or must have undergone treatment to make them uniform without any after-effects. In case of drained fields, the trial lanes must run parallel to the drains and the plots must be cross-drilled to the direction of the drains. Treatments and husbandry must be done in the direction of the trial lanes as much as possible. Furthermore the agronomy should follow best local practice of an average Dutch arable farm. This also holds for the preparation of the seedbed and for weed control. Sowing times must comply with local practice. The trials must be sown as early as possible, preferably before 15 March, however no later than 15 April. Different sowing times may be used in extreme years. The right plant population is achieved by adjusting the seed rate depending on the thousand seed weight and the germination percentage. Adjusted seed rates are included in the list of thousand seed weights which is supplied to the Trial Operators. The germination percentage should be adjusted to 100%. Seed rates may differ due to differences in soil type, sowing conditions or sowing time. Fertiliser should be applied taking into account the advisory publications for arable farming. The Trial Operator therefore takes a soil sample in spring to determine the mineral Nitrogen concentration as a basis for additional fertilisation.

The Trial Operator may adjust the fertilisation on the basis of his experiences with the field concerned. Fertiliser applications should be aimed at brewing quality; the aim is to achieve a protein content between 10 and 11%. Nitrogen fertiliser is applied in one treatment in spring at sowing. A second fertiliser application can be given depending on the crop development. Growth regulation can only be applied as an emergency measure.

In two adjacent replicates, diseases are to be controlled following best local practice. This means that foliar diseases should always be controlled, with due allowance for the fact that the maximum level of infection of the standard varieties is 5% of their leaf area. No control of foliar diseases must take place in the other two replicates. Insects (aphids mainly) must be controlled following best local practice. The plants must be regularly checked for aphids. If insecticides are to be used, the entire trial must be treated.

The front and back of the plots must be trimmed to their final length after emergence. Numbered labels must be placed at the front of the plots.
A trial may be ended prematurely due to irregular or poor emergence of the crop, or at a later stage due to other irregularities or poor growth. In June, the Trials Coordinator gathers information on the condition of the trials and informs the applicants. If there is any doubt about the validity of a particular trial, the Trials Coordinator, the Plant Variety Board and interested applicants should inspect the trial together. The Trials Coordinator and the Plant Variety Board will then establish the validity of the trial for further examination. The same procedure should be followed if anything seriously wrong occurs later in the season. The Plant Variety Board holds final responsibility for decisions regarding the validity of trials for further examination. The financial compensation is reduced by 30% if a trial is ended prematurely before harvest.

2.5. Observations and measurements during the growing season

2.5.1. Data recording

The field observations are carried out by the Trial Coordinator. The observations should be recorded electronically or in writing in the format.

2.5.2. Characteristics

The following characteristics must be observed by the Trial Coordinator:

Plant population after emergence
Straw strength
Length of the straw
Earliness of ear emergence
Ripening date
Powdery mildew
Scald (*Rhynchosporium secalis*)
Net blotch (*Drechslera teres*)
Leaf rust, yellow rust, ear loss or ear breakage, brackling and sprouting where appropriate.

Characteristics should be scored at the widest possible range of scores. A high score implies a negative assessment of the characteristic concerned and a low score a positive assessment (1 = breeding objective).

Disease observations must be repeated should a disease situation change in any way. Observations are finalised when the earliest variety starts showing senescence. The level of infection is to be expressed in a score, with 1 indicating no infection and 9 severe infection. The scores must correspond to the level of infection: if the highest level of infection in a trial corresponds to score 5, the highest reported score must also be 5, and not 9. At each time of observation, the levels of infection of the most and least infected plots must be reported as a percentage of infected leaf area.
For reliable statistical analysis, it may be necessary to convert the field observations into a different scale.

Plant population after emergence

If there are no differences in plant population and if the plant population is sufficient, no observations need to be made. If the plant population is frequently low, plants from three plots (3 x 0.25 m^2 per plot) must be counted. In the event of major differences in plant population (>20%) between plots, all plots and all replicates must be scored. A low score then indicates a high plant population. The plots with the highest and the lowest score must also be counted (3 x 0.25 m^2 per plot).

Straw strength

In the event of lodging, several observations must be made. The first observation must be made immediately after lodging and repeated if further lodging develops. The last observation must be made just before harvest. The observations must be recorded on a scale of 1-9, with 1 representing the least amount of lodging and 9 the most.
In addition, an impression must be given of the degree of lodging in the plot with the most amount of lodging and of that in the plot with the least amount of lodging.

Length of the straw

The length is to be measured in cms. All replicates of the yield trials (treated and untreated) should be measured, with the exception of the untreated disease observation trials.

Earliness of ear emergence

Observations are to be made at the time when the ears of the earliest variety have emerged. The observations must be scored on a scale of 1-9, with 1 being early and 9 late. In addition, an impression must be given of the degree of ear emergence in the earliest and the latest plots. All replicates of the regional yield trials (treated and untreated) should be measured. The untreated disease observation trials should not be measured.

Ripening date

The observations must be scored on a scale of 1-9, with 1 being early and 9 late. The observations with the highest and the lowest scores must also be described. Only treated replicates are to be observed of all four regional yield trials.

Powdery mildew
The first observations must be made as soon as the most susceptible varieties are infected. In case mildew infections increase afterwards, observations should be repeated about every two weeks,

Scald (*Rhynchosporium secalis*)
Observations should be made at a stage that provides good discrimination between the plots.

Net blotch (*Drechslera teres*)
Observations should be made at a stage that provides good discrimination between the plots.

Leaf rust, yellow rust, ear loss or ear breakage, brackling and pre-harvest sprouting.
Observations should be made where appropriate.

Other observations
Any other observations that may be of importance in examining the trial must be made, for example in the case of irregularities in the trial, damage to any of the plots, soil structure effects, damage caused by drought or birds, losses during harvest, etc.

2.6. Harvest

2.6.1. Harvesting method and time

The trials are to be harvested with a plot combine harvester at the time when at least 90% of the varieties have reached a moisture content of 15 to 16%. If this is impossible due to the weather conditions in a particular year, the samples must be dried to a moisture content of 15% immediately after harvest.
Each trial must be harvested in one go. If, due to adverse weather conditions during harvesting, it proves to be impossible to harvest a trial in one go, then at least the replicate that is being harvested at the time must be completely harvested.

2.6.2. Determination of the yield

The yield can be determined in two ways:

1. all samples are dried until a constant moisture content of at most 15% is achieved, after which the yield of each plot is recorded;
2. the yield of each plot is recorded and the moisture content of each plot is determined.

2.6.3. Sampling

In spring the Trials Coordinator sends the Trial Operators a list specifying the required samples per variety. After the yields have been determined, each Trial Operator takes a sample of each plot. The Trial Operator then combines those samples into a mixed sample per variety. The mixed samples are labelled and dispatched to the Trials Coordinator. The labels and sample bags are supplied by the Trials Coordinator. The Trials Coordinator specifies the following on the label: the trial location, the crop, the variety name/code and the sample weight.
The samples of the regional yield trials must be submitted to the Trials Coordinator as soon as possible, yet no later than two weeks, after harvest.

2.6.4. Harvested grain

The grains remaining after sampling must be combined into a single mixed lot, to be sold as feed.

2.7. Quality testing

Tests for malt and brewing quality are performed parallel to the agricultural evaluation. The protocol for testing malt and brewing quality is described in the “Protocol for testing malt and brewing characteristics of barley varieties within the Netherlands” of NIBEM.

2.8. Trial Log

All the operations described in this chapter, plus any irregularities or unforeseen matters that may affect the trial results must be recorded in a log. After the trials have been harvested, the log must be submitted to the Trials Coordinator, who will keep it for six years.

Annex Contact details

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