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COMMENTS ON THE WORKING PAPER ON TEST GUIDELINES FOR MUSHROOM

Comments prepared by experts from the Netherlands

SUMMARY OF REMARKS RECEIVED ON THE PROVISIONAL DRAFT GUIDELINES FOR MUSHROOMS

The comments were received from three persons working in mushrooms. Two of them are real mushroom specialists: Dr A.S.M. Sonnenberg (PPO Horst, The Netherlands, (NL)) and Mrs. Anne Rodier (Centre Technique du Champignon, Saumur, France, (F)). These last comments were gathered by Mr. S. Semon.

The other comments came from a DUS specialist, Miss Julia Borys, Poland, (PL).

A number of the comments have been included in TWV/36/3 but an overview is given for other more general remarks:

Front page / title and Chapter I :

(F): Is it correct to call the guidelines “Working paper on draft test guidelines for **mushroom**” if it is only applicable to *Agaricus* spp. (see chapter I – Subject of the guidelines), since there are also plant breeders’ rights applications for other mushroom genera of edible fungi (e.g. *Pleurotis*)?

Chapter II -1:

(NL): “vegetative mycelium” or “spawn”
There are no standards for moisture or quantity of mycelium on grains in spawn. Some characteristics generally seen as “quality features” might be added: (see document).

Chapter III –2/3:

(PL): Some years ago, we tested the varieties of *Agaricus bisporus*. It was not easy to observe and measure their characteristics because of the very fast development of mushrooms. Our test was conducted in the randomised blocks design in 8 replicates. Therefore I think that 6 replicates are necessary.

(F): It is important to note that the location for the establishment of testing can have an influence on the conditions for the culture, which may itself have an influence on the expression of the characteristics from the spawn.

E.g.: the culture in the Netherlands is done on a peat layer, whilst in France it is normally done on a calcareous layer; a spawn obtained and described in one of these countries may not therefore be best adapted to the cultural conditions of another country and/or may not present the same morphological and agronomic characteristics.

Chapter IV –1/2:

(F): The text does not appear sufficiently clear on the definition of the observed sample: 30 mushrooms per elementary plot and per replicate seems to have been adapted, since the morphology of mushrooms from a given spawn can vary somewhat between replicates. The

description of the characteristics must therefore be made replicate by replicate, and the comparisons made between identical replicates.

Chapter IV-2:

(NL):“fruit body”, “head” read “cap”
.....at harvest maturity (button....). More up-to-date: ...at maturity (button stage 1,2 and 3 for hand picked mushrooms, button stage 2, 3 and 4 for mechanically harvested mushrooms).

Chapter IV-3:

(NL):“In case.....separately”. Downy mildew is not a pathogen in mushroom crops. Re-phrase: All resistances should be tested separately on each race and separately for each pathogen.

(F): Aside from the pathogens *sensu stricto*, the notes for tolerance (lesser sensitivity) are equally interesting, and can be evaluated just as well under controlled artificial infection conditions, with a defined pathotype.

Chapter IV-4:

“Uniformity and stability”

(F): The definition of off-types poses a problem in these species: varieties of *Agaricus* are clones which are exclusively propagated vegetatively. All the mushrooms in a plot are not different individuals in a population, but organs from the same individual.

Mushrooms from the same plot which present different characteristic posses the same genotype, and there are therefore no off-types *sensu stricto*. Their different phenotypes are therefore due to the effect of micro-environments on the development (micro-climate, competition between mushroom ...)

Chapter IV -5:

(NL):Unfortunately, there are no “normal” growing conditions for the cultivation of mushrooms. There are a number of “standard” growing conditions, each with its own characteristics (ruffling, caching, time of ventilation after mycelium growth in casing soil, CO₂ levels at pinning, relative humidity in cell, etc.).

I suggest to re-phrase: “All example varieties mentioned in the Table of Characteristics might be influenced by cultivation conditions/cultivation systems. The variety descriptions should, therefore, always state which relevant conditions/systems were used in the tests.

Chapter V –1/2:

“Reference Collection”

(F): Various example varieties cited in the table of characteristics (VII) are no longer produced on a commercial basis. Would these spawns be obtainable from a germplasm bank? If so, where would this reference collection be held?

(NL): A lot of the mentioned example varieties are no longer available in trade.

Comment: We are aware of this problem, but since we did not test any mushrooms for the last 9 years we do not have reliable and more recent information available.

Chapter VII: Table of Characteristics:

Char.

1 (NL): “Basidium”. Wild *A. bisporus* strains were found some 10 years ago that produces 4 spores on each basidium. Hybrids between the 2-spored and 4-spored varieties and their offspring show an elevated number of spores per basidium (between 2 and 4 spores **er** basidium). or the species *Agaricus bisporus* the character should now be defined as “2-spored” and “elevated spore-number ($2 < n < 4$).

2 (NL): Stipe length is related to cap width. It would be better to give a ratio of these characters. Stipe length is highly influenced by culture conditions/systems. Absolute measurements (3, 5 and 7) are, therefore, not useful. This applies to more characteristics mentioned in the Table.

7 (NL): The stipe structure strongly depends on culture conditions. The present-day hybrids show no differences in this character.

(PL): Is it structure or shape in longitudinal section? If you think about structure then “hollow” seems to be not correct. Shape of stipe can be: hollow, semi-hollow, flat and convex (when exist).

15 Color of cap:

(NL): Most strains of *A. bisporus* (99% of the cultivated *Agaricus* species) are white. The whiteness is an important character and should be defined in an objective way. Color assessment by Computer Image Analyses (Lab values) should be used.

(F): For the evaluation of the color of the cap, a method for its quantitative measurement has been published (system L, a, b, chromometer Minolta, c.f. international publications). This method is more precise and more discriminatory than a simple visual evaluation.

As regards the brown reference varieties, it is proposed to use the spawn “C9” (firm Le Lion, 49400 Varrains, France).

16 (NL): Cap firmness strongly depends on developmental stage. Since this is not defined in the DUS test, the character should be deleted.

17/23 (PL): Does not “depressed” mean the same as “flat”? We propose “depressed” to change into “hollow” or “concave”?

18 (NL): Use objective measurements, define as Lab values. The character also varies from flush to flush.

19 (NL): The character is ill-defined. Not an important character for the present-day hybrids. Suggests to delete.

24 (NL): Character strongly depends on developmental stage. Delete.

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