Cichorium intybus L. Forage Chicory
National protocol: NP/VCH/1

Examination office	Naktuinbouw	
Reference of the protocol	NP/VCH/1	
Date of preparation of the protocol	16/03/2026	
Date of entry into force of the protocol	29/10/2024	
Botanical taxon:	*Cichorium intybus L.* Forage Chicory Group	
Common Name (when known):	Forage Chicory	
Way of propagation of the plants to be examined	Self or cross pollinated seed propagated ☒ Vegetatively propagated ☐	
Number of growing cycles:	1 ☐ 2 ☒ Other ☐ specify	
List of grouping characteristics	Yes ☒ if yes put as annex I No ☐	
Minimum number of plants in trial	Vegetative:	Seed:100
Minimum number of plants observed by measuring or counting:	Vegetative:	Seed: 60
Give description of when observations should take place	See growth stages at characteristics	

Uniformity:

This National Protocol has been developed for the examination of seed propagated varieties. For varieties with other types of propagation the recommendations in the UPOV-General Introduction to DUS and document TGP/13 “Guidance for new types and species”, Section 4.5 “Testing Uniformity” should be followed.
The assessment of uniformity for cross-pollinated varieties should be according to the recommendations for cross-pollinated varieties in the UPOV-General Introduction to DUS.
For the assessment of uniformity of open-pollinated varieties, relative uniformity standards should be used.
For the assessment of uniformity of hybrid varieties relative uniformity standards should be applied, excluding clearly recognisable inbred plants. A population standard of 3% with an acceptance probability of at least 95% should be applied. In the case of a sample size of 100 plants, 6 off-types are allowed.

Table of characteristics	Present ☒ Not available ☐
Literature (when present, please annex to this document)	Present ☒ Absent ☐

Annex 1

1.Test Design

Each test should be designed to result in a total of at least 100 plants, which should be divided between two or more replicates.

The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

1.1 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations should be made on 60 plants or parts taken from each of 60 plants.

1.2 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

2. Grouping of Varieties and Organization of the Growing Trial

2.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

2.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

2.3 The following have been agreed as useful grouping characteristics:

- Ploidy (characteristic 1)
- Foliage: attitude (characteristic 3)
- Leaf: length (characteristic 4)

2.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

3. Legend

MG: Single measurement of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants
VG: Visual assessment by a single observation of a group of plants or parts of plants
VS: Visual assessment by observation of individual plants or parts of plants

(a)-(b) See Explanations on the Table of Characteristics at the end of the document

(+) See Explanations on the Table of Characteristics at the end of the document

Table of Characteristics

	Characteristic	Note	Expression
1	Ploidy MS/MG (+)	2 3 4	diploid triploid tetraploid
2	Plant: height VG (+) (a)	1 2 3 4 5 6 7 8 9	very short very short to short short short to tall medium medium to tall tall strong to very tall very tall
3	Foliage: attitude VG (a)	1 2 3 4 5	erect erect to semi-erect semi-erect semi-erect to horizontal horizontal
4	Leaf: length VG (+) (a)	1 2 3 4 5 6 7 8 9	very short very short to short short short to medium medium medium to long long dark to very long very long
5	Leaf: width VG (+) (a)	1 2 3 4 5 6 7 8 9	very narrow very narrow to narrow narrow narrow to medium medium medium to broad broad broad to very broad very broad
6	Leaf: intensity of green colour VG (a)	1 2 3 4 5 6 7 8 9	very light very light to light light light to medium medium medium to dark dark dark to very dark very dark

7	Leaf: glossiness	1	absent or very weak
	VG	2	very weak to weak
	(a)	3	weak
		4	weak to medium
		5	medium
		6	medium to strong
		7	strong
		8	strong to very strong
		9	very strong
8	Leaf: shape in cross section	1	concave
	VG	2	flat
	(a)	3	convex
9	Leaf: blistering	1	absent or very weak
	VG	2	very weak to weak
	(a)	3	weak
		4	weak to medium
		5	medium
		6	medium to strong
		7	strong
		8	strong to very strong
		9	very strong
10	Leaf: anthocyanin coloration of midrib	1	absent or very weak
	VG	2	very weak to weak
	(a)	3	weak
		4	weak to medium
		5	medium
		6	medium to strong
		7	strong
		8	strong to very strong
		9	very strong
11	Leaf: undulation of margin	1	absent or very weak
	VG	2	very weak to weak
	(a)	3	weak
		4	weak to medium
		5	medium
		6	medium to strong
		7	strong
		8	strong to very strong
		9	very strong
12	Leaf: number of incisions of margin	1	very short
	VG	2	very short to short
	(a)	3	short
		4	short to medium
		5	medium
		6	medium to long
		7	long
		8	long to very long very long
		9	very long

13	Leaf: depth of incisions of margin	1	very shallow
	VG	2	very shallow to shallow
	(a)	3	shallow
		4	small to medium
		5	medium
		6	medium to deep
		7	deep
		8	deep to very deep
		9	very deep
14	Root: length	1	very short
	VG/MS	2	very short to short
	(b)	3	short
		4	short to medium
		5	medium
		6	medium to long
		7	long
		8	long to very long
		9	very long
15	Root: maximum width	1	very narrow
	VG/MS	2	very narrow to narrow
	(b)	3	narrow
		4	narrow to medium
		5	medium
		6	medium to broad
		7	broad
		8	broad to very broad
		9	very broad
16	Root: shape of shoulder	1	flat
	VG	2	slightly rounded
	(+)	3	moderately rounded
	(b)	4	conical
17	Root: total sugar content	1	very low
	MG	2	very low to low
	(+)	3	low
	(b)	4	low to medium
		5	medium
		6	medium to high
		7	high
		8	high to very high
		9	very high
18	Bolting tendency (early sowing)	1	absent or very weak
	VG	2	very weak to weak
		3	weak
		4	weak to medium
		5	medium
		6	medium to strong
		7	strong
		8	strong to very strong
		9	very strong

19	Flowering stem: height VG	1 2 3 4 5 6 7 8 9	very short very short to short short short to medium medium medium to tall tall tall to very tall very tall
20	Flowering stem: branching VG	1 2 3 4 5 6 7 8 9 1	very weak very weak to weak weak weak to medium medium medium to strong strong strong to very strong very strong very weak
21	Flower: colour VG	1 2 3	white pink blue
22	Male sterility VS (+)	1 9	absent present

Explanations on the Table of Characteristics

Explanations covering several characteristics

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Leaf: All observations on the leaf should be made on the full-grown leaf before deterioration, this means 2 to 3 weeks before harvesting the roots.

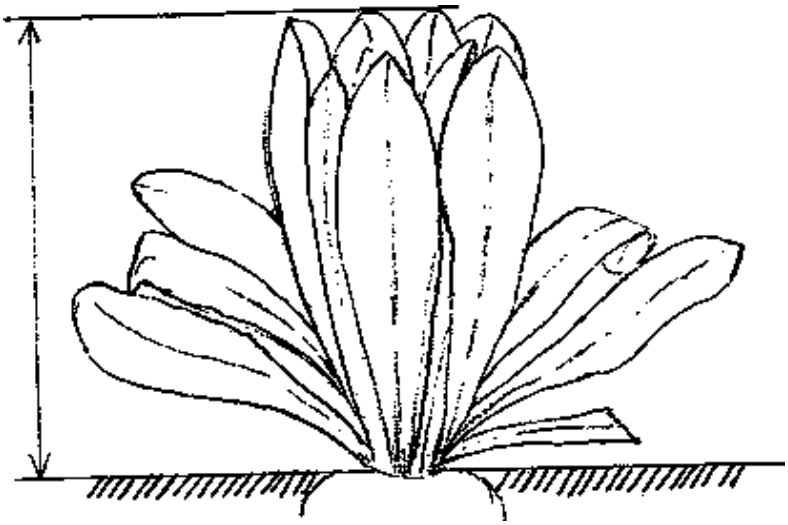
(b) Root: All observations on the root should be made immediately after harvesting.

Explanations for individual characteristics

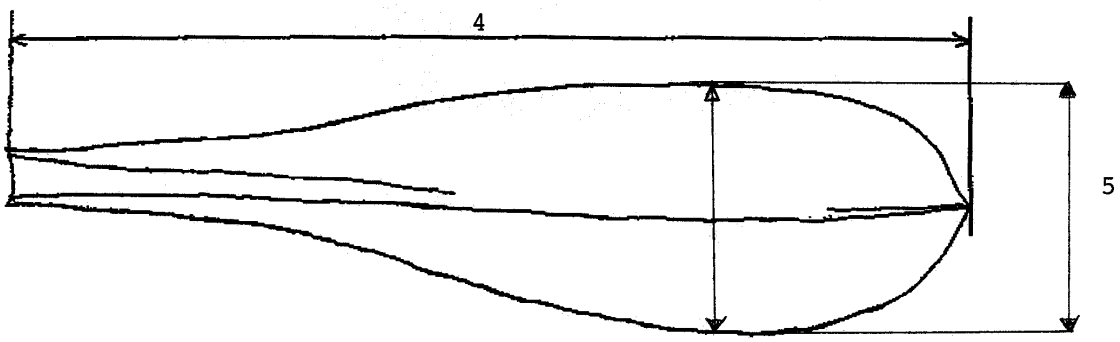
Ad. 1: Ploidy

Observations should be made by standard cytological methods such as flow cytometry (DNA quantification method).
Observations should be made on at least 5 plants.

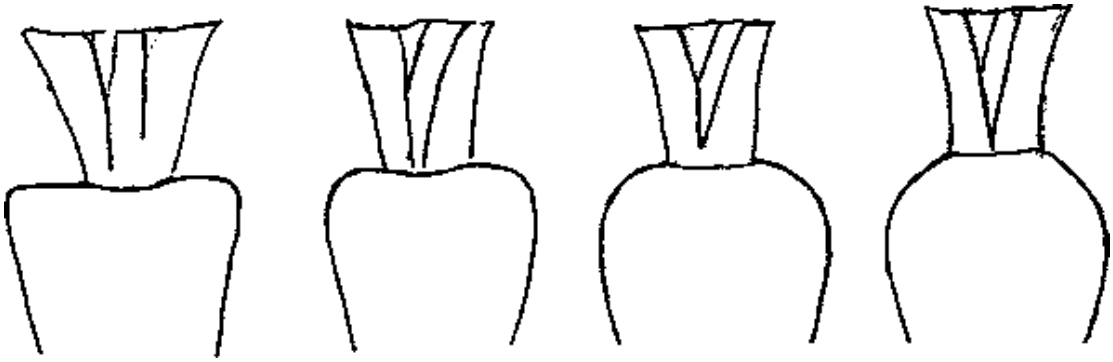
Ad. 2: Plant: height (at end of first growing season)



Ads. 4 and 5: Leaf: length (4) and width (5)



Ad. 16: Root: shape of shoulder



1	2	3	4
flat	slightly rounded	clearly rounded	conical

Ad. 17: Root: total sugar content

The total sugar content should be measured on the basis of bulk samples, within one week of the roots being harvested.
A sample of 25 roots should be taken randomly from each plot. The roots should be thoroughly washed and all impurities should be removed.

A representative sub-sample of pulp is produced by taking small quantities of material from throughout each of the roots i.e. from the top to the base, at equal distances, and from the outer to the central part of the root. This can be achieved, for example, by making incisions to the center of the root at 2-3 cm intervals along the length of each root.

The sub-sample of pulp is homogenized and the resultant juice is then filtered under pressure. Readings for the juice are then taken from a refractometer. Three separate readings should be taken to obtain a representative result.

Ad. 22: Male sterility

Check presence of pollen on stamen:

(a) if pollen on stamen is present than male sterility is absent;
(b) if pollen on stamen is absent than male sterility is present.

Literature

1. TG/37/10 General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of new Varieties of Plants http://www.upov.int/tgp/en/
2. INDUSTRIAL CHICORY (Cichorium intybus L. partim) CPVO-TP/172/2 Date: 01/12/2005
3. INDUSTRIAL CHICORY UPOV guideline TG/172/4 Rev. Date: 2005-04-06. TG/172/4 Rev.