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## Introduction and Aim

Cabbage, *Brassica oleracea* L. var. *capitata* is a herbaceous plant whose leaves make a characteristic compact head.

In our region, on a small geographic territory, many different populations may be found as source of high variability which may be used in breeding programs, such as cabbage cv. "Brgijski".

**AIM:** The aim of this research was to determine the variability of cabbage landrace grown in the Matulji area, as potential plant genetic resource for further breeding programs.

## Materials and Methods

Seeds were collected from local growers. The experiment was set in four replications at planting distance 0.5 m x 0.7 m (Figure 1a).

Morphological analysis were conducted according to Guidelines for distinctness, uniformity and stability test (DUS): UPOV/TG/48/7 - EN 31/3/2004. All traits were observed on 10 plants per replication in technological maturity (mid October) in the field or straight after harvest (Figure 1b).



Figure 1: a) Seedling and b) mature plant of cabbage cv. „Brgijski“

Table 1: Descriptive statistics for qualitative traits and applicable UPOV trait number

Qualitative trait (UPOV number)	MOD <sup>1</sup>	F MOD <sup>2</sup>	TRAIT	MIN <sup>3</sup>	MAX <sup>4</sup>	VW <sup>5</sup>	SD <sup>6</sup>	VAR <sup>7</sup>
Plant: attitude of outer leaves (4)	3	40	Prostrate	3	3	0	0	0
Outer leaf: profile of upper side of blade (7)	3	40	Convex	3	3	0	0	0
Outer leaf: degree of blistering (8)	1	36	Absent or very weak	1	2	1	0,3	0,092
Outer leaf: size of blisters (9)	0	36	/	0	3	3	0,91	0,83
Outer leaf: color (with wax) (11)	3	35	Grey green	2	5	3	0,64	0,4
Outer leaf: intensity of color (12)	5	32	Medium	3	7	4	0,91	0,82
Outer leaf: green flush (13)	1	40	Absent	1	1	0	0	0
Outer leaf: waxiness (14)	3	35	Weak	3	5	2	0,67	0,45
Outer leaf: undulation of margin (15)	3	36	Weak	1	5	4	0,64	0,41
Outer leaf: reflexion of margin (16)	1	40	Absent	1	1	0	0	0
Head: shape in longitudinal section (17)	2	33	Transverse elliptic	1	6	5	0,72	0,52
Head: shape of base in longitudinal section (18)	2	28	Flat	1	2	1	0,46	0,22
Head: position of maximum diameter (21)	2	37	At middle	1	2	1	0,27	0,07
Head: cover (22)	3	37	Covered	2	3	1	0,27	0,07
Head: reflexion of margin of cover leaf (24)	1	40	Absent	1	1	0	0	0
Head: color of cover leaf (25)	5	40	Violet	5	5	0	0	0
Head: intensity of color of cover leaf (26)	3	28	Light	3	5	2	0,93	0,86
Head: anthocyanin coloration of cover leaf (27)	3	23	Weak	3	7	4	1,4	1,8
Head: internal color (28)	4	40	Violet	4	4	0	0	0
Head: intensity of internal color (29)	5	17	Medium	3	7	4	1,5	2,2
Head: density (30)	5	17	Medium	3	9	6	1,6	2,7
Head: internal structure (31)	5	27	Medium	3	7	4	1,1	1,3

<sup>1</sup>mode (MOD), <sup>2</sup>mod frequency (F MOD), <sup>3</sup>minimal value (MIN), <sup>4</sup>maximum value (MAX), <sup>5</sup>variation width (VW) <sup>6</sup>standard deviation (SD), <sup>7</sup>variance (VAR)

Table 2: Descriptive statistics for quantitative traits and applicable UPOV trait number

Quantitative trait (UPOV number)	$\bar{x}$ <sup>8</sup>	MIN <sup>9</sup>	MAX <sup>10</sup>	VW <sup>11</sup>	SD <sup>12</sup>	VAR <sup>13</sup>	CV (%) <sup>14</sup>
Plant: height (cm) (1)	46	40	50	10	2,3	5,3	4,9
Plant: diameter (cm) (2)	68	45	87	42	8,3	70	12
Head weight (kg)	1,9	1	2,9	1,9	0,48	0,23	24
Length of outer stem (cm) (3)	12	7	17	10	1,9	3,8	16
Diameter of interior stem (cm)	5,2	4	7	3	0,64	0,41	12
Outer leaf: length (cm) (5)	46	39	57	18	5,2	27	11
Outer leaf: width (cm)	31	25	40	15	2,7	7,1	8,5
Head: length (cm) (19)	13	10	20	10	1,8	3,1	14
Length of interior stem (cm)	7,2	2	12	10	1,7	2,8	23
Head diameter (cm) (20)	22	18	30	12	2,9	8,4	13
Ratio of interior stem and head length (32)	0,57	0,17	0,90	0,73	0,15	0,021	25
Head density index	0,68	0,51	0,97	0,46	0,12	0,015	18
Days to technological maturity (34)	90						
Yield (t/ha)	54						

<sup>8</sup>mean ( $\bar{x}$ ), <sup>9</sup>minimal value (MIN), <sup>10</sup>maximum value (MAX), <sup>11</sup>variation width (VW), <sup>12</sup>standard deviation (SD), <sup>13</sup>variance (VAR), <sup>14</sup>coefficient of variation (CV%)

## Conclusion

- Significant variability of investigated traits was observed in local population of cabbage cv. „Brgijski“.
- The investigated population may be used as a source of important breeding material for further selection process.

## Results

Qualitative traits (Table 1): Cabbage cv. "Brgijski" has transverse elliptic head shape (UPOV 17), flat shape of head base in longitudinal section (UPOV 18) and maximum diameter at middle of the head (UPOV 21) (Figure 4).

Head has violet internal colouring (UPOV 28) of medium intensity (UPOV 29) and medium density (UPOV 30). Cover leaf has violet colouring (UPOV 25) (Figure 3). Anthocyanin coloration of cover leaf (UPOV 27) has a mode frequency of 23.



Figure 3: Color variability of head cover leaf and outer leaf of cabbage cv. "Brgijski" at harvest

Quantitative traits (Table 2): Cabbage cv. "Brgijski" head has an average diameter of 22 cm (UPOV 20) and length of 13 cm (UPOV 19). Interior stem has a diameter of 5,2 cm, while its average length is 7,2 cm. Interior stem length is a variable trait and its CV is 23%. Head weight has a high CV (24%).



Figure 4: Cabbage cv. "Brgijski" head longitudinal section

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