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HARMONIZATIONOFVARIET YDESCRIPTIONSINOI LSEEDRAPE

Document prepared by experts from Germany

HARMONIZATIONOFVAR IETYDESCRIPTIONSIN OILSEEDRAPE

1. At the thirtieth session of the Technical Working Party for Agricultural Crops, held in Texcoco, Mexico, from September 3 to 7, 2001, it was proposed to undertake further studies about the degree of harmonization of variety descriptions in different crops as was presented in document TWA/30/16 for barley. First results for oilseed rape were pressented in document TWA/30/12.

2. The aim of this study is to analyze the environmental influence on the states of expression of characteristics in winteroilseed rape. Variety descriptions were kindly provided by Denmark, France and the United Kingdom as shown in Table 1. Descriptions from Denmark, France and Germany refer to two individual years at 5 locations: FR -1, FR -2, DE -1, DE-2 and DK -1. Descriptions from United Kingdom refer to the mean description over two years from one location, wh ich were developed in different testing cycles. Descriptions were available for 214 varieties in total. The variety descriptions from the different countries included characteristics as shown in Table 2.

Country	2000	2001	$XX^{*)}$	
DE-1,DE -2	196(67)	214(67)		
FR-1,FR -2	154(67)	127(67)		
DK-1	164(67)	165(67)		
UK-1			61	
	°			1

Table1:Number of varieties included in the study. 67 varieties were in common at 5locationsover2years.

*)descriptionsfromdifferenttestingcycles

UPOV-No.		lo.	Characteristic	DE	DK	FR	UK
G	1	*	Seed:erucicacid	Х	Х	Х	Х
	2		Cotyledon:length	Х	Х		
	3		Cotyledon:width	Х	Х		
	4	*	Leaf:greenco lor	Х	Х	Х	Х
G	5	*	Leaf:lobes	Х	Х		
	6	*	Leaf:numberoflobes	Х	Х	Х	Х
	7	*	Leaf:dentationofmargin	Х	Х	Х	Х
	8		Leaf:length	Х	Х		
	9		Leaf:width	Х	Х		
	10		Leaf:lengthofpetiole	Х	Х		
G	11	*	Timeofflowering	Х	Х	Х	Х
	12	*	Flower:colorofpe tals	Х	Х	Х	Х
	13		Flower:lengthofpetals	Х	Х	Х	
	14		Flower:widthofpetals	Х	Х	Х	
	15		Productionofpollen	Х	Х	Х	
	16		Plant:height	Х	Х		Х
	17	*	Plant:totallengthincludingsidebra nches	Х	Х	Х	
	18		Siliqua:length	Х	Х		
	19		Siliqua:length ofbeak	Х	Х		Х
	20		Siliqua:lengthofpeduncle	Х	Х		
	01		Tendencytoforminflorescencesinyear	v	V		v
	21		ofsowingforspringsowntrials	Λ	Λ		Λ

 Table2:
 CharacteristicsincludedinthevarietydescriptionsfromFrance,Germany,Denmark

 andUnitedKingdom
 Page 201

As a first step, the standard deviation was calculated over all descriptions for 214 3. varieties and 21 characteristics. A summary is shown in Table 3. No variation was observed between the descriptions for Seed: erucic acid and Leaf: lobes. Variation of seed erucic acid inonevarietycanclearlybeexplainedasdataerror. The state of expression o fleaflobesisfor all214 varieties "present". Only91% of varieties have a fully harmonized description for the qualitative characteristic "Production of pollen". Most of the variation is caused by different descriptions for varieties with segregation in this characteristic. Therefore better harmonization should be possible by considering this situation in the Test Guidelines. An acceptable degree of harmonization was found in characteristics 4, 14, 15, 17, 18, 19 and 20. For all other characteristics, variety descriptions are influenced much more by environmental effects. Before descriptions from other years or locations are used for any selection approach, they must be evaluated carefully. No harmonization of descriptions was observed for "Leaf: dentation of margin", "Flower: color of petals" and "Tendency to form inflorescences in year of sowing." The characteristics will be discussed later inmore detail.

		FrequencydistributionofSD							Summaryin%				
		0,25	0,25 0,50 0,75 1,00 1,25 1,50 1,75 2,00 >2,00						< 0.50	< 0.75	<1.00		
1	Seed:erucicacid	213	0	0	0	0	0	0	0	1	100	100	100
2	Cotyledon:length	13	48	74	58	15	6	0	0	0	29	63	90
3	Cotyledon:width	12	74	58	52	11	6	1	0	0	40	67	92
4	Greencolor	12	56	94	47	4	1	0	0	0	32	76	98
5	Leaf:lobes	214	0	0	0	0	0	0	0	0	100	100	100
6	Numberoflobes	3	35	71	72	23	6	4	0	0	18	51	85
7	Dentationofmargin	0	1	13	95	73	26	6	0	0	0	7	51
8	Leaf:length	4	46	58	59	22	15	5	4	1	23	50	78
9	Leaf:width	10	42	62	58	29	6	6	0	1	24	53	80
10	Lengthofpetiole	5	44	62	61	23	10	7	1	1	23	52	80
11	Timeofflowering	23	58	78	33	10	11	0	0	1	38	74	90
12	Colorofpetals	1	0	1	52	137	20	3	0	0	0	1	25
13	Lengthofpetals	1	16	80	76	31	8	0	1	1	8	45	81
14	Widthofpetals	8	82	90	27	4	2	1	0	0	42	84	97
15	Productionofpollen	195	0	0	0	0	2	4	4	9	91	91	91
16	Plant:height	3	23	52	66	43	21	5	1	0	12	36	67
17	Plant:totallength	19	63	84	37	10	0	1	0	0	38	78	95
18	Siliqua:length	23	55	87	36	6	3	3	1	0	36	77	94
19	Lengthofbeak	25	72	85	19	8	4	0	1	0	45	85	94
20	Lengthofpeduncle	39	92	59	20	3	0	1	0	0	61	89	98
21	Tendencyinfloresc.	11	7	7	8	7	17	19	23	115	8	12	15

Table3:Frequency distribution of standard deviations (SD) for 214 varieties(3 to 11descriptionsforeachvariety)

4. For further evaluation of the varia tion within the provided set of variety descriptions, an analysis of variance was carried out for 67 varieties for which data were available from 5 locations and 2 years. A linear model was used to calculate the following effects: variation caused by dif ferences between varieties; variation caused by location, including environmental and "observer" effects; variation caused by years, variation caused by interaction between year and location; as well as location and variety. The mean squares for each s ource of variation are presented in Table 4.

	Characteristic	Year Location Ye		Yearxloc.	Variety	ety Var.xloc.		
1	Seed:erucica cid	0,000 ns	0,000 ns	0,000 ns	0,060	0,000 ns		
2	Cotyledon:length	0,046 ns	12,063	0,086 ns	3,838	0,689		
3	Cotyledon:width	7,941	4,823	3,251	3,128	0,656		
4	Greencolor	1,465	13,044	5,261	3,060	0,533		
5	Leaf:lobes	0,000 ns	0,000 ns	0,000 ns	0,000 ns	0,000 ns		
6	Numberoflobes	4,727	9,210	0,564 ns	4,205	1,096		
7	Dentationofmargin	0,992 ns	92,221	0,629	3,564	0,319		
8	Leaf:length	7,093	3,414	0,774 ns	2,679	0,876		
9	Leaf:width	2,254	0,470 ns	1,452	3,449	0,884		
10	Lengthofpe tiole	2,224	0,397 ns	0,993 ns	2,851	0,863		
11	Timeofflowering	1,899	10,345	17,196	10,549	0,742		
12	Colorofpetals	0,030 ns	170,186	0,415	0,154	0,081		
13	Lengthofpetals	8,927	37,628	2,027	6,124	0,584		
14	Widthofpetals	1,805	12,601	2,464	5,996	0,315		
15	Productionofpollen	0,000 ns	0,000 ns	0,000 ns	27,787	0,000 ns		
16	Plant:height	13,807	7,351	4,154	5,844	0,986		
17	Plant:totallength	10,260	9,018	25,240	8,291	0,762		
18	Siliqua:length	1,169 ns	10,057	2,221	6,599	0,476		
19	Lengthofbeak	0,076 ns	0,453 ns	1,795	8,589	0,468		
20	Lengthofpeduncle	0,205 ns	6,115	0,989	5,296	0,369		
21	Tendencyinfloresc.	508,219	70,209	123,704	17,680	1,092 ns		

Table4: ANOVA Source of variation expressed as mean squares (67 varieties, grown at 5locationsin2000and2001)

ns -notsignificant

5. Theexpression of the characteristics "Seed: erucicacid", "Leaf: lobes" and "Production of pollen" is fully harmonized for the common set of 67 varieties. Any variation is caused by varieties itself. The most important source of variation for the other characteristics depends on the characteristic, but the effect of location is greater in more characteristics than the effect of year. Interaction between location and year is also important in some characteristics, whereas interaction between varieties and locations is greaterally on the varieties.

6. The mean expression of the characteristics in the different locations in 2000 and 2001 is presented in Table 5 for all characteristics with significant environmental variation. Evaluation of these data provides explanation for r some of the non - harmonized characteristics and shows how better harmonization could be achieved.

7. A significant effect of location can be caused by: environmental influence on the expression; different scorings in dependence of the observe r; or differences in the transformation of measured data into states of expression. Even if these factors cannot be clearly separated, the mean values provides omeinformation.

8. The greatest effect of location occurs in "Flower: color of p etals" and "Leaf: dentation of margin." The difference inflower coloriscaused by the use of different scales of states. In Germany, notes are used as presented in TG/36/6, i.e. 1 to 4, with 3 for "normal yellow". All varieties have note 3. In Franc e and Denmark, more differentiation is used for describing this characteristic. The same varieties have expression 4, 5 or 6. Consequently, better harmonization could be achieved by using the same scale for assessment. The location effect on dentation of marginismainly caused by location DE -2. At this location aclear shift of the level of scale can be observed. It must be checked if this is really based on environmental effects or if it is aquestion of standardization of scale. In the latter case, more harmonization could be possible.

9. A very strong year effect was observed in the characteristic "Tendency to form inflorescencesinyearofsowing"becauseofdifferentmeanvaluesatlocationDE -1 andDE -2 in 2000 and 2001. The differen ce is attributed to the way of transforming the observed data intonotes. A fixed system of notes is used which does not reflect the specific conditions of the year. 2000 and 2001 represented extreme conditions, one with very low and the other with very strong induction of flowering. The system currently in use is considered to be appropriate for assessment of distinctness but it should be checked if better harmonization of description could be achieved.

10. In general, a difference between loc ation means, or year means, of half anoteor less is considered to occur by chance. No systematic effects have been found for characteristics 3, 8, 9, 10, 16, 18, 19 and 20. The maximum differences between location means for characteristics 2, 4, 6, 11, 13, 14 and 17 are greater with 0.6 to 1.2 notes. A more detailed study of data, way of assessment and standardization of scale is necessary to identify and perhaps to reduce systematic effects which result invariation between descriptions in the sechara cteristics.

11. In winteroilseedrape, more harmonization of descriptions is necessary, in particular for the quantitative characteristics which have a high discrimination power, in order to use variety descriptions developed in different growin g cycles in an efficient way for the selection of similar varieties. At the current level of harmonization, a large minimum distance must be used for establishing distinctness based on data coming from different growing cycles. All possibilities for an i mprovement of the frequency distribution presented in Table 3 must be checked.

Table5: Meanexpression of characteristics (67 varieties, grown at 5 locations in France
Germany -DE and Denmark -DK over 2 years)-FR,

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		Characteristic	Year	DE-1	DE-2	FR-1	FR-2	DK-1	Mean
	2	Cotyledon:length	2000	4,6	4,6			5,1	4,7
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			2001	4,6	4,5			5,1	4,8
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			Mean	4,6	4,5			5,1	
	3	Cotyledon:width	2000	5,2	5,1			5,1	5,1
			2001	5,0	4,4			5,0	4,8
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			Mean	5,1	4,7			5,0	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	4	Leaf:greencolor	2000	5,9	5,6	5,1	5,3	6,2	5,6
			2001	5,7	5,3	5,2	5,9	5,7	5,5
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			Mean	5,8	5,4	5,2	5,6	6,0	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	6	Leaf:numberoflobes	2000	5,2	5,8	5,2	5,3	5,1	5,3
			2001	5,4	5,8	5,3	5,7	5,1	5,5
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			Mean	5,3	5,8	5,3	5,5	5,1	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	7	Leaf:dentationofmargin	2000	5,4	3,4	4,9	5,3	4,9	4,8
Mean 5,3 3,4 5,0 5,4 5,0 8 Leaf:length 2000 4,8 4,5 4,9 4,7 2001 5,1 4,9 5,0 5,0 5,0 5,0 9 Leaf:width 2001 4,8 4,8 4,8 4,8 4,8 10 Leaf:lengthofpetiole 2000 4,9 5,1 5,1 5,2 Mean 5,1 5,5 4,4 4,9 5,0 11 Timeofflowering 2001 4,1 4,5 5,5 4,4 4,9 4,7 12 Flower:colorofpetals 2000 3,0 3,0 5,1 5,0 5,1 4,2 13 Flower:lengthofpetals 2000 3,0 3,0 5,1 5,8 5,1 5,8 5,1 5,8 5,2 5,5 Mean 6,0 6,0 5,2 6,4 5,2 5,5 Mean 5,6 5,7 5,1 5,8 <td></td> <td></td> <td>2001</td> <td>5,3</td> <td>3,3</td> <td>5,1</td> <td>5,5</td> <td>5,0</td> <td>4,8</td>			2001	5,3	3,3	5,1	5,5	5,0	4,8
8 Leaf:length 2000 4,8 4,5 4,9 4,7 2001 5,1 4,9 5,0 5,0 9 Leaf:width 2000 4,8 4,8 4,8 4,8 10 Leaf:lengthofpetiole 2000 4,5 4,6 4,8 4,7 10 Leaf:lengthofpetiole 2000 4,9 5,1 5,1 5,2 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 12 Flower:colorofpetals 2000 3,0 3,0 5,0 4,2 4,9 13 Flower:lengthofpetals 2000 3,0 3,0 5,1 5,0 5,1 14 Flower:widthofpetals 2000 5,7 5,4 5,1 5,7 5,1 16 Plant:height 2000 5,7 5,4 5,1 5,8 5,1			Mean	5,3	3,4	5,0	5,4	5,0	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	8	Leaf:length	2000	4,8	4,5			4,9	4,7
Mean 5,0 4,7 5,0 9 Leaf:width 2000 4,8 4,8 4,8 4,8 4,8 10 Leaf:lengthofpetiole 2000 4,9 5,1 4,9 5,0 10 Leaf:lengthofpetiole 2000 4,9 5,1 5,1 5,2 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 4,7 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 4,7 11 Timeofflowering 2000 3,0 3,0 5,0 4,2 4,1 12 Flower:colorofpetals 2000 3,0 3,0 5,1 5,0 5,0 4,2 13 Flower:lengthofpetals 2000 5,8 6,1 5,1 5,7 5,1 5,4 2001 5,5 6,0 5,1 5,7 5,1 5,4 2001 5,5 6,0 5,1 5,8			2001	5,1	4,9			5,0	5,0
9 Leaf:width 2000 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,8 4,7 10 Leaf:lengthofpetiole 2000 4,9 5,1 4,9 5,0 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 4,7 2001 4,9 4,8 4,2 4,1 5,0 4,6 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 4,7 2001 4,9 4,8 4,2 4,2 4,2 4,2 4,2 4,2 4,2 4,2 4,2 4,2 4,2 4,2 2,00 3,0 3,0 5,1 5,0 5,0 4,2 2,2 4,2 2,00 5,0 5,0 5,1 5,1 5,0 5,0 4,2 5,0 5,1 5,4 5,5 5,7 5,1 5,4			Mean	5,0	4,7			5,0	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	9	Leaf:width	2000	4,8	4,8			4,8	4,8
Mean 4,7 4,7 4,7 4,8 10 Leaf:lengthofpetiole 2000 4,9 5,1 5,1 5,0 2001 5,3 5,1 5,1 5,0 7,0 7,0 11 Timeofflowering 2000 4,1 4,5 5,5 4,4 4,9 4,7 10 Leaf:lengthofpeting 2000 4,1 4,5 5,5 4,4 4,9 4,7 10 Timeofflowering 2000 3,0 3,0 5,0 4,2 4,9 4,6 11 Flower:colorofpetals 2000 3,0 3,0 5,1 5,0 5,1 5,1 12 Flower:lengthofpetals 2000 5,8 6,1 5,1 5,2 5,7 13 Flower:widthofpetals 2000 5,7 5,4 5,1 5,8 5,2 5,5 14 Flower:widthofpetals 2000 5,7 5,1 5,8 5,1 5,4 16 Plan			2001	4,5	4,6			4,8	4,7
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Mean	4,7	4,7			4,8	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	10	Leaf:lengthofpetiole	2000	4,9	5,1			4,9	5,0
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			2001	5,3	5,1			5,1	5,2
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			Mean	5,1	5,1			5,0	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	11	Timeofflowering	2000	4,1	4,5	5,5	4,4	4,9	4,7
Mean4,54,74,94,24,912Flower:colorofpetals20003,03,05,15,05,24,220013,03,05,15,05,12,24,213Flower:lengthofpetals20005,86,15,16,25,25,720016,36,05,26,45,25,720016,36,05,15,75,15,414Flower:widthofpetals20005,56,05,15,85,220015,56,05,15,85,25,5Mean5,65,75,15,85,116Plant:height20004,84,14,84,520015,56,04,44,84,94,917Plant:totallengthincluding sidebranches20014,75,15,04,45,04,817Plant:length20005,55,35,34,94,94,918Siliqua:length20005,55,35,34,95,020015,05,05,05,05,05,05,02015,55,14,94,95,05,02015,55,35,25,15,15,018Siliqua:length20005,55,15,15,020Siliqua:lengthofpeduncle20005,55,15,15,			2001	4,9	4,8	4,2	4,1	5,0	4,6
12 Flower:colorotpetals 2000 $3,0$ $3,0$ $5,0$ $4,9$ $5,2$ $4,2$ 2001 $3,0$ $3,0$ $5,1$ $5,0$ $5,0$ $4,2$ 13 Flower:lengthofpetals 2000 $5,8$ $6,1$ $5,1$ $6,2$ $5,2$ $5,7$ 14 Flower:widthofpetals 2000 $5,7$ $5,4$ $5,1$ $5,7$	10		Mean	4,5	4,7	4,9	4,2	4,9	4.0
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	12	Flower:colorofpetals	2000	3,0	3,0	5,0	4,9	5,2	4,2
13Flower:lengthofpetals2000 $5,8$ $6,1$ $5,1$ $6,2$ $5,2$ $5,7$ 2001 $6,3$ $6,0$ $5,4$ $6,6$ $5,2$ $5,7$ 14Flower:widthofpetals2000 $5,7$ $5,4$ $5,1$ $5,7$ $5,1$ $5,4$ 14Flower:widthofpetals2000 $5,7$ $5,4$ $5,1$ $5,7$ $5,1$ $5,4$ 16Plant:height2000 $4,8$ $4,1$ $4,8$ $4,5$ 2001 $5,5$ $6,0$ $5,1$ $5,8$ $5,1$ 16Plant:height2000 $4,8$ $4,1$ $4,8$ $4,5$ 2001 $5,0$ $4,8$ $4,4$ $4,8$ $4,5$ 2001 $4,7$ $5,1$ $5,0$ $4,4$ $4,8$ 17Plant:totallengthincluding sidebranches2000 $5,5$ $5,3$ $4,8$ $5,1$ 18Siliqua:length2000 $5,5$ $5,3$ $4,8$ $5,1$ 19Siliqua:lengthofbeak2000 $5,1$ $4,9$ $4,9$ $5,0$ 200Siliqua:lengthofpeduncle2000 $5,5$ $5,1$ $5,1$ $5,1$ 201 $5,5$ $5,3$ $5,2$ $5,1$ $5,2$ $5,3$ 202Siliqua:lengthofpeduncle2000 $5,5$ $5,1$ $5,1$ $5,1$ 201 $5,5$ $5,3$ $5,2$ $5,3$ $5,2$ $5,3$ 201 $5,5$ $5,5$ $5,1$ $5,1$ $5,2$ $5,3$ 201 $5,0$ $5,5$ $5,1$ 5			2001	3,0	3,0	5,1 5 1	5,0	5,0 5 1	4,2
13Flower:lengthorpetals2000 $5,8$ $6,1$ $5,1$ $6,2$ $5,2$ $5,7$ 2001 $6,3$ $6,0$ $5,4$ $6,6$ $5,2$ $5,9$ Mean $6,0$ $5,2$ $6,4$ $5,2$ 14Flower:widthofpetals2000 $5,7$ $5,4$ $5,1$ $5,7$ $5,1$ $5,4$ 16Plant:height2000 $4,8$ $4,1$ $4,8$ $4,5$ 2001 $5,0$ $4,8$ $4,4$ $4,8$ $4,9$ 17Plant:totallengthincluding sidebranches2000 $4,8$ $4,4$ $5,5$ $6,1$ $4,8$ 18Siliqua:length2000 $5,5$ $5,3$ $4,9$ $4,9$ 19Siliqua:lengthofbeak2000 $5,1$ $4,9$ $4,9$ $4,9$ 2001 $5,0$ $5,1$ $5,1$ $5,1$ $5,0$ 20Siliqua:lengthofpeduncle2000 $5,5$ $5,1$ $5,1$ $5,0$ 21Tendencytoform inflorescencesinyearof sowingforspringsowntrials 2001 $5,6$ $5,6$ $2,7$ $2,7$	10		Mean	3,0	3,0	5,1	5,0	5,1	
2001 $6,3$ $6,0$ $5,4$ $6,6$ $5,2$ $5,9$ Mean $6,0$ $6,0$ $5,2$ $6,4$ $5,2$ 14Flower:widthofpetals 2000 $5,7$ $5,1$ $5,7$ $5,1$ $5,7$ 2001 $5,5$ $6,0$ $5,1$ $5,7$ $5,1$ $5,5$ Mean $5,6$ $5,7$ $5,1$ $5,8$ $5,2$ 16Plant:height 2000 $4,8$ $4,1$ $4,8$ $4,9$ 2001 $5,0$ $4,8$ $4,4$ $4,8$ $4,9$ 17 Plant:totallengthincluding sidebranches 2000 $4,8$ $4,4$ $5,5$ $6,1$ $4,8$ 17 Plant:totallengthincluding sidebranches 2000 $4,7$ $5,1$ $5,0$ $4,4$ $5,0$ $4,8$ 18 Siliqua:length 2000 $5,5$ $5,3$ $5,3$ $4,9$ $4,9$ $5,0$ 19 Siliqua:lengthofbeak 2000 $5,1$ $4,9$ $4,9$ $5,0$ 200 $5,5$ $5,1$ $5,1$ $5,1$ $5,0$ 20 Siliqua:lengthofpeduncle 2000 $5,5$ $5,1$ $5,1$ $5,2$ 2001 $5,5$ $5,2$ $5,1$ $5,2$ $5,1$ 21 Tendencytoform inflorescencesinyearof sowingforspringsowntrials 2001 $5,6$ $2,7$ $2,7$ $2,4$	13	Flower:lengthofpetals	2000	5,8	6,1	5,1 5,4	6,2	5,2	5,7
Image: Intermediation of the system of th			2001 Maan	0,5	0,0	5,4 5 2	0,0	5,2 5 2	5,9
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$\begin{array}{c ccccccccc} & & & & & & & & & & & & & & &$	14	Flower: widtholpetais	2000	5,7	5,4	5,1	5,7	5.1	5,4
16Plant:height20004,84,14,84,520015,04,84,14,84,94,917Plant:totallengthincluding sidebranches20004,84,45,56,14,85,117Plant:totallengthincluding sidebranches20004,84,45,56,14,85,118Siliqua:length20005,55,35,34,94,818Siliqua:length20005,55,15,05,119Siliqua:lengthofbeak20005,14,94,95,020Siliqua:lengthofpeduncle20005,55,15,15,020Siliqua:lengthofpeduncle20005,55,15,15,22015,55,35,25,15,25,121Tendencytoform inflorescencesinyearof sowingforspringsowntrials20015,65,62,74,7			2001 Moon	5,5 5,6	0,0 57	5,1 5 1	5,8 5 8	5,2 5 1	5,5
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	16	Dlant:hoight	2000	4.8	3,7	3,1	3,0	<u> </u>	4.5
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	10	T fant.height	2000	4,0 5,0	4,1 / 8			4,0	4,5
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			Mean	<i>3</i> ,0 <i>4</i> 9	4,0 4 4			4,9 4,8	ч,У
$\begin{array}{c ccccccccccc} 1.7 & Finile rotating informating intertaining intertainintertainintertainintertaining intertaining int$	17	Plant:totallengthincluding	2000	4.8	4.4	5 5	61	4.8	51
Sidebranches 2001 $4,7$ $5,1$ $5,0$ $4,4$ $5,0$ $4,0$ Mean $4,7$ $4,7$ $5,3$ $5,3$ $4,9$ 18Siliqua:length 2000 $5,5$ $5,3$ $4,8$ $5,2$ 2001 $5,3$ $5,1$ $5,0$ $5,1$ Mean $5,4$ $5,2$ $4,9$ 19Siliqua:lengthofbeak 2000 $5,1$ $4,9$ $4,9$ 2001 $5,0$ $5,1$ $5,1$ $5,1$ $5,0$ 2001 $5,0$ $5,0$ $5,0$ $5,0$ $5,0$ 20 Siliqua:lengthofpeduncle 2000 $5,5$ $5,1$ $5,1$ $5,2$ 2001 $5,5$ $5,3$ $5,2$ $5,3$ $5,2$ $5,3$ 21 Tendencytoform 2000 $2,3$ $2,3$ $2,7$ $2,4$ inflorescencesinyearof 2001 $5,6$ $5,6$ $2,7$ $4,7$ sowingforspringsowntrialsMean $4,0$ $3,9$ $2,7$ $2,7$	17	sidebranches	2000	4,0	-,- 5 1	5,5	0,1 4 4	4 ,0	2,1 4.8
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$\begin{array}{c ccccccccccc} 10 & 5 & 10 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & $	18	Siliqua:length	2000	5.5	5.3	c,c	c,c	4.8	5.2
$\begin{array}{c cccccccccc} & & & & & & & & & & & & & & $	10	2quurongui	2001	5.3	5.1			5.0	5.1
$ \begin{array}{c cccccccccc} 19 & \text{Siliqua:lengthofbeak} & 2000 & 5,1 & 4,9 & 4,9 & 5,0 \\ 2001 & 5,0 & 5,1 & 5,1 & 5,1 & 5,0 \\ & & & & & & & & & & & & & & & & & & $			Mean	5.4	5.2			4.9	0,1
$\begin{array}{c ccccccccccc} 2001 & 5,0 & 5,1 & 5,1 & 5,0 \\ \hline & & & & & & & & & & & & & & & & & &$	19	Siliqua:lengthofbeak	2000	5.1	4.9			4.9	5.0
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		0	2001	5.0	5.1			5.1	5.0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Mean	5.0	5.0			5.0	7 -
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Mean 5,5 5,2 5,1 21 Tendencytoform 2000 2,3 2,3 2,7 2,4 inflorescencesinyearof 2001 5,6 5,6 2,7 4,7 sowingforspringsowntrials Mean 4,0 3,9 2,7 2,7	-	1 0 1	2001	5.5	5.3			5.2	5.3
21 Tendencytoform 2000 2,3 2,3 2,7 2,4 inflorescencesinyearof 2001 5,6 5,6 2,7 4,7 sowingforspringsowntrials Mean 4,0 3,9 2,7 2,7			Mean	5,5	5,2			5,1	,
inflorescencesinyearof 2001 5,6 5,6 2,7 4,7 sowingforspringsowntrials Mean 4,0 3,9 2,7	21	Tendencytoform	2000	2,3	2,3			2,7	2,4
sowingforspringsowntrials Mean 4,0 3,9 2,7		inflorescencesinyearof	2001	5,6	5,6			2,7	4,7
		sowingforspringsowntrials	Mean	4,0	3,9			2,7	

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