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Cultivation of New Raspberry Cultivars Under the Conditions of The Andijan Region

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Abstract: This article presents the results obtained for the growth, development and yield indicators of the raspberry cultivars Vladimir, Maravilla and Lyachka, together with selected breeding accessions. The biometric traits analysed included the numbers of flowers, fruits, ripe fruits, branches and leaves. The findings were used to assess the vegetative and reproductive development of the cultivars.

Keywords: Raspberry, berry crops, cultivar, yield, biometric traits, breeding, vegetative development, reproductive development.

Introduction: Developing the fruit and vegetable sector, growing produce for export and providing the population with vitamin-rich foods are among the main priorities of Uzbekistan's agricultural policy. Among berry crops, raspberry (Rubus idaeus L.) is valued for its biological characteristics, high nutritional value and medicinal importance.

Raspberry fruits contain vitamins C and A, B-group vitamins, organic acids, pectins, iron, potassium and other beneficial elements. Consequently, demand for raspberries on the global market is increasing each year.

The productivity of raspberry plantations depends largely on the biological characteristics of the cultivars. Cultivars differ in growth vigour, branching, leaf production, flowering and fruit set. Agrobiological evaluation and the identification of promising cultivars therefore have both scientific and practical value. The aim of this study was to investigate the biometric traits of raspberry cultivars and breeding accessions and to identify accessions with high yield potential.

METHODS

The study examined the raspberry cultivars Vladimir, Maravilla and Lyachka, together with breeding accessions, under field conditions in the Andijan region. The assessment focused on their vegetative and reproductive development, with the aim of comparing biometric traits and identifying promising material for further cultivation.

Five biometric traits were examined: the numbers of flowers, fruits, ripe fruits, branches and leaves. Branch and leaf numbers were used to characterise vegetative development, whereas flower, fruit and ripe fruit numbers described reproductive development. These traits were considered together to assess differences in growth and fruit production among the cultivars and accessions.

The observations were evaluated through descriptive comparison of the recorded counts. Particular attention was given to the entries with the highest branch, leaf and fruit numbers, as well as differences in the number of ripe fruits. The comparison also considered whether vigorous vegetative development was accompanied by fruit production. This approach allowed the observed characteristics of individual

entries to be assessed without treating branch or leaf number alone as a direct measure of yield.

Table 1 presents the recorded flower, fruit, ripe fruit and branch counts for 11 entries. Leaf counts available in the study are described separately in the text. Dashes in the table are retained as reported and are not interpreted as numerical zeros.

RESULTS

The field observations showed differences in the biometric traits of the raspberry cultivars and breeding accessions. The recorded values for flower, fruit, ripe fruit and branch numbers are presented in Table 1. The entries differed in both vegetative growth and reproductive development, and the highest values for these traits were not consistently associated with the same entry.

Branch numbers ranged from 15 to 40. The Maravilla entry listed as No. 7 had the highest branch count, with 40 branches. The entry listed as No. 2 produced 37 branches, followed by Avgustina with 36. Vladimir and accession 5 produced 28 and 27 branches, respectively, while Lyachka had 20. The lowest branch count, 15, was recorded for the entry listed as No. 5.

The highest fruit count was recorded for the Maravilla entry listed as No. 3, which produced 56 fruits, together with 7 flowers and 5 ripe fruits. The second Maravilla entry, No. 7, had 34 fruits and 7 flowers. Margaritta produced 33 fruits and 3 flowers. Lower fruit counts were recorded for accession 5, Lyachka and Avgustina, with 14, 13 and 10 fruits, respectively.

Lyachka had the highest recorded number of ripe fruits, with 10. The Maravilla entry No. 3 and accession 5 each had 5 ripe fruits, whereas Avgustina had 1. Thus, the entry with the highest total fruit count differed from the cultivar with the highest ripe fruit count.

The leaf observations also indicated differences in vegetative development. Accession 2(I) had the highest reported leaf count, with 175 leaves, followed by accession 3 (III) with 160 and Vladimir with 120. Taken together, the observations show that branch formation, leaf development and fruit production varied among the studied entries. These traits therefore provide complementary information for evaluating their performance under the study conditions.

Table 1. Biometric traits of raspberry cultivars and breeding accessions

No.	Cultivar	Number of flowers	Number of fruits	Number of ripe fruits	Number of branches
1	Vladimir	-	-	-	28
2	(|)	-	-	-	37
3	Maravilla	7	56	5	18
4	2 (|||)	-	-	-	23
5	3 (|)	-	-	-	15
6	Avgustina	-	10	1	36
7	Maravilla	7	34	-	40
8	4 (|)	-	-	-	19
9	Margaritta	3	33	-	19
10	5	-	14	5	27
11	Lyachka	-	13	10	20

DISCUSSION

The observations revealed differences in vegetative development, fruit formation and ripening among the raspberry cultivars and breeding accessions examined under field conditions in the Andijan region. These differences indicate that the entries should be assessed using several complementary traits. Branch number and leaf number describe vegetative development, whereas fruit number and the number of ripe fruits provide information about reproductive performance at the time of observation. Considering these traits together gives a more balanced assessment than selecting an entry on the basis of a single characteristic.

The highest leaf number reported in the descriptive results was 175 in accession 2(I). This suggests relatively extensive foliage development compared with the other entries examined. However, leaf number alone does not establish the size or activity of the photosynthetic surface. Leaf area, leaf condition and canopy arrangement were not measured, so the higher count should be interpreted as a vegetative characteristic rather than direct evidence of greater photosynthetic productivity. For practical selection, this trait needs to be considered alongside fruit formation and the subsequent development of the crop.

Maravilla showed strong branching in the observation with 40 branches and 34 fruits. This combination is relevant because it demonstrates the presence of both

vegetative growth and reproductive development in the same recorded entry. Nevertheless, the total number of branches does not indicate how many were fruit-bearing. Consequently, the results support describing Maravilla as an entry with relatively strong branching and an appreciable fruit count, but they do not establish a direct relationship between branch number and final yield. Distinguishing fruit-bearing branches from vegetative branches would make this assessment more informative.

The highest recorded fruit count was 56, accompanied by seven flowers and five ripe fruits. This observation identifies an entry of interest for further evaluation of reproductive performance. The simultaneous presence of flowers, developing fruits and ripe fruits also shows that reproductive development was continuing when the measurements were taken. The fruit count therefore represents the condition of the plant at a particular observation stage. It cannot be treated as the total number of fruits harvested during the season or converted into yield without information on fruit mass and subsequent harvests.

An additional entry produced 33 fruits, placing it close to the Maravilla observation with 34 fruits. Both records suggest that these entries merit continued monitoring. However, a difference of one fruit is insufficient to establish a meaningful superiority without replicated observations and information about variability. The same caution applies to comparisons across the entire dataset: the recorded differences are descriptive, and statistical significance cannot be claimed because the number of replications and measures of variation were not reported.

Lyachka had the highest recorded number of ripe fruits, with ten ripe fruits alongside a fruit count of 13. This distinguishes it from entries that had more developing fruits but fewer ripe fruits at the time of assessment. The result is consistent with more advanced ripening at that observation stage. It does not, by itself, confirm that Lyachka is an early-ripening cultivar under the conditions studied. Such a conclusion would require comparable observations of flowering onset, first harvest and the progression of ripening throughout the season.

The results also show why vigorous vegetative development should not automatically be interpreted as high reproductive productivity. The descriptive account includes an entry with 160 leaves and 36 branches but only ten fruits. This combination indicates that the relationship between vegetative and reproductive traits differed among the observed plants. It does not establish the cause of the lower fruit count. Differences in developmental stage or the proportion of fruit-bearing branches may be relevant, but the available measurements do not allow these explanations to be tested.

Vladimir produced 28 branches and 120 leaves according to the descriptive results. These observations provide information about its vegetative development, but its reproductive performance remains insufficiently documented. The dashes in the table should therefore be clarified: they may represent unrecorded observations or the absence of the relevant organs. Until their meaning is defined, they should not be interpreted as numerical zeros or used to conclude that Vladimir and the other incompletely recorded entries lacked reproductive potential.

Overall, the study provides a preliminary basis for identifying raspberry entries for further assessment in the Andijan region. Maravilla is of interest for its branching and recorded fruit formation, Lyachka for its higher ripe-fruit count, and the entry with 56 fruits for its reproductive performance at the observation stage. Repeated measurements over the season, together with fruit mass, harvested yield and consistent identification of the breeding accessions, would help determine whether these initial differences remain evident throughout crop development.

CONCLUSION

The raspberry cultivars and breeding accessions examined differed in their recorded vegetative and reproductive characteristics. The observations demonstrate the value of considering leaf number, branch number, fruit formation and ripening together when assessing entries under the field conditions of the Andijan region.

Accession 2(I) had the highest leaf number reported in the descriptive results, with 175 leaves. Maravilla reached 40 branches in the observation that also recorded 34 fruits, indicating relatively strong branching accompanied by reproductive development. The highest fruit count across the recorded entries was 56, identifying a candidate for further assessment of seasonal fruit production.

Lyachka had the highest number of ripe fruits, with ten recorded at the time of observation. This suggests more advanced ripening at that stage, although repeated phenological observations are needed to establish its relative earliness. The results also indicate that high leaf and branch numbers did not consistently coincide with high fruit counts, supporting the use of several traits in cultivar assessment.

Maravilla, Lyachka and the entry with 56 fruits can therefore be prioritised for further trials. The present observations support preliminary selection rather than

a definitive recommendation for commercial cultivation. Confirming their practical value requires replicated assessments, seasonal harvest records and measurements of fruit mass and quality. These additional data would provide a stronger basis for identifying raspberry cultivars and breeding accessions suited to local production.

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