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## The influence of harvesting frequencies on green pod and dry seed productions of Cowpea [Vigna unguculata L. Walp] Ramshorn cultivar obtained from three varying seed production companies.

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#### Abstract

An attempt was made to evaluate the variation in green pod and dry seed production of Ramshorn Cowpea cultivar produced by three varying seed companies as influenced by harvesting frequencies. Therefore, green pods were either continuously harvested around the growing season, harvested four, six times, eight times and continuous dry pod harvest. The highest green pod yield ( $2.041 \mathrm{~kg} . \mathrm{m}^{-2}$ ) were obtained from continuous green pod harvesting treatment, gradual reduction in green pod yields were confined with gradual reductions in harvesting frequencies. Contrary results were found with dry seed yield where gradual yield reductions were accompanied with gradual increases in green pod harvesting frequencies. Consequently, the highest seed yield $\left(0.29859 \mathrm{~kg} . \mathrm{m}^{-2}\right)$ was observed in continuous dry pod harvesting treatment. The best Ramshorn producing seed company was the Italian since it gave the highest green pod and dry seed yields (1.42997 and $0.12713 \mathrm{~kg} \cdot \mathrm{~m}^{-2}$, respectively). The highest green pod and yield ( $2.12203 \mathrm{~kg} . \mathrm{m}^{-2}$ ) was obtained from Genex source of continuously green pod harvested interaction. The paramount dry seed yield ( $0.34236 \mathrm{~kg} . \mathrm{m}^{-2}$ ) was concomitant with Genex source of continuous dry pod harvest.


## الخلاصة

اجريت محاولة لقيم التباين في انتناج القرنات الخضراء والجافه لصنف اللوبيا رامشورن بين شركات جنكس والايطالية ومودستو المنتجه لهذا الصنف المحصود كقرنات خضراء خلال فترة النمو او اربعة او شتة مرات او ثمان مرات حصدات كقرنات خضر اء والباقي كقرنات جافه بالاضافه الى معاملة الحصاد المستمر كقرنات جافه. اعلى حاصل للقرنات الخضراء 2.041كغم للمتر المربع حصل عليه من معاملة الحصاد المستمر للقرنات الخضراء وحصل انخافاض تنريجي متماشيا مع انخفاض فترات الحصاد للقرنات الخضر اء على العكس من ذلك حصل انخفاض تدريجي في حاصل البذور الجاف متماثيا مع زيادة الحصدات للقرنات الخضراء حيث كان اعلى حاصل للبذور الجافه 0.29859 كغم للمتر المربع كان مر افقا للحصـاد المستمر للقرنات الجافه. كان افضل انتاج لحاصل القرنات الخضراء 1.42997 كغم للمتر المربع وحاصل ابذور الجاف 0.12713كغ للمتر المربع لصنف رامشورن المنتج من الشركه الايطاليه . افضل حاصل حصل عليه من مصدر جنكس المحصود كقرنات خضر اء بشكل مستمر 2.12203 كغم للمتر المربع و كبذور جافه لنفس الثركة كحصاد مستمر للقرنات الجافه 0.34236 كغم

للمتر المربع.
Key words: Cowpea, Green pod, Dry seed, Variations in seed production sourcesCorresponding Author: Dr. Caser G. Abdel, caser.abdel@yahoo.com

## Introduction

In cowpea, the final seed yield is dependent upon the number of pods per plant, number of grains per pod and the extent to which grains are filled. In the present study, the reduction in seed yield under water stress was associated with dramatic decrease in all these yield components. The

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significant reduction in number of harvested pods per plant under water stress may be attributed to the abscission of the reproductive structures. Whereas the reduction in number of seeds per pod and seed size under water stress treatments may be attributed to the limitation of dry matter partitioning to the reproductive sink or even seed formation factors (Ahmed and Suliman, 2010). Turk and Hall (1980) attributed the reduction in seed yield under drought to the secondary detrimental effects of drought avoidance on $\mathrm{CO}_{2}$ assimilation. Ravindraet al. (1990) attributed the loss in seed yield to low fruiting efficiency and lack of filling time for pods. Continuous removal of immature pods sustain continuous leaves and inflorescence productions. However, leaving pods on plants to mature resulted in reduced pod production (Abdel, 2011). The objective of this study was to find out the variation of Ramshorn cowpea cultivar among three seed producing companies namely Italian, Genex and Modesto.

## Materials and Methods

This experiment was conducted at the Research Field, Horticulture Department, Agriculture and Forestry College, Mosul University, Mosul (Latitude $36^{\circ}$, 20"; Longitude $44^{\circ}$, $58^{\prime \prime}$; Altitude 230 m ). The objective of this investigation was to evaluate the responses of Ramshorn cowpea plants raised from seeds purchased from Italian, Modesto and Genex Seed Companies to three varying irrigation levels.

A Split Plot within Factorial Randomized Complete Block Design (Split Split F-RCBD) was chosen for this trail, where the main plot was irrigation levels (A) which was represented by continuous green pod harvest $\left(a_{1}\right)$, four times green pods harvest $\left(a_{2}\right)$, six times green pods harvest, eight times green pods harvest ( $a_{3}$ ) and no green pods harvest only dry pods were harvested ( $a_{4}$ ).The sub main plot was three sources (B) of Ramshorn seeds which was represented by seeds obtained from Italian Seed Company ( $b_{1}$ ), Modesto Seed Company ( $b_{2}$ ) and Genex Seed Company ( $b_{3}$ ). Thus, 12 treatments were included in this trail; a treatment was replicated three times and one replicate was represented by 4 furrows each of $1 \times 0.85 \mathrm{~m}$, planted on both sides with a plant intra space of 5 cm .

Field soil (table, 1) was plowed twice on April 8, 2006, dissected according to the proposed design then one gypsum block was settled at a depths of 30 cm from each furrow ridge to truck the soil moisture fluctuations brought up by re-watering (Abdel, 2006a). Meteorological data was recorded in Al-Rashidia Meteorological Center, Mosul City (table, 2). Ramshorn seeds that were purchased from Italian, Modesto and Genex companies were tested before sowing in the permanent field. Their germination percentages and rates were, respectively, ( $94 \% ; 6.87$ seeds. $\mathrm{d}^{-1}$ ), $(82 \% ; 7.08$ seeds. $\mathrm{d}^{-1}$ ) and ( $87 \% ; 7.61$ seeds. $\mathrm{d}^{-1}$ ). Furrows were watered previous sowing, next day on April $17^{\text {th }}$, seeds were sown at a 5 cm soil depth. Thinning was made on May $17^{\text {th }}$, leaving 5 cm between plants. Plants were fertilized three times by Diamen Phosphate (DAP) at rate of $10 \mathrm{~g} \cdot \mathrm{~m}^{-2}$ on May $10^{\text {th }}$, May $23^{\text {rd }}$, and June $21^{\text {st }}$. In addition to that

Irrigation dates were determined by the calibration equation that obtained from practical measurement of current resistance OHM versus soil available water capacity (AWC depletion $\%=$ $1.6382 \times$ OHM - 32.0127. Pod number, pod length, seed per pod, aborted seeds per pod, aborted ovules per pod, pod fresh weight, dry seed yield, green pod yields, root length, plant fresh weigh were recorded. Samples of root, stem, leaves, and pods were weighed then oven-dried at $65^{\circ} \mathrm{C}$ for 72 hrs. Then samples were re-weighed to calculate root, leaves, stems, pods and plant dry weight and dry matter percentages. Finally this experiment was terminated on October 25.

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| Table (1). Physical analysis for trans located silty loam soil beyond 30 cm depth and <br> clayey underneath native field soil |  |  |
| :--- | :--- | :--- |
| Soil separations $\left(\mathrm{g} . \mathrm{kg}^{-1}\right)$ | Translocated soil | native soil |
| Clay particles | 564 | 139 |
| Silt particles | 313 | 564 |
| Sand particles | 123 | 297 |
| Soil bulk density $\left(\mathrm{g} . \mathrm{cm}^{-3}\right)$ | 1.6 | 1.55 |
| Soil field capacity $(\%)$ | 21.8 | 20 |
| Soil wilting point $(\%)$ | 12.05 | 11 |

Table (2):Meteorological data (Rashida Meteorological Center)

| Parameters | May | June | July | August | Sept. | Oct. |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| MaxT $^{0} \mathrm{C}$ | 32 | 41 | 42.1 | 45 | 38.2 | 30.6 |
| Min T ${ }^{0} \mathrm{C}$ | 17.4 | 22.6 | 25.7 | 27.3 | 18.1 | 16.6 |
| R.H. $\%$ | 49 | 30 | 30 | 29 | 35 | 52 |

## Results and Discussion

## 1. Vegetative Growth

## The influence of harvest frequencies:

The obtained results (Table, 3) revealed that continuous harvest of green pod was the most potent treatment; it gave the highest vegetative growth traits. It substantially exceeded eight harvests in terms of leaf number per plant ( $5.818 \%$ ), leaf area index ( $10.49 \%$ ) and root fresh weight $(10.628 \%)$. Additionally, this treatment also exceeded these of dry pod harvest, four and six harvest treatments in all detected parameters.

The next effective treatment was eight harvest frequencies of green pods; it surpassed that of six harvests in plant length $(11.21 \%)$, plant fresh weight ( $7.78 \%$ ), plant dry weight $(16.82 \%)$, leaf number per plant $(14.93 \%)$, leaf area $(18.69 \%)$ and leaf area index ( $31.66 \%$ ). Moreover, it showed superiority over four harvestsin plant length ( $6.71 \%$ ), plant fresh weight ( $13.78 \%$ ), plant dry weight ( $29.28 \%$ ), leaf number per plant ( $34.61 \%$ ), leaf area ( $42.22 \%$ ), leaf area index ( $77.1 \%$ ) and root fresh weight ( $11.74 \%$ ). Eight harvest treatment was also paramount over dry pod harvest treatment in plant length ( $30.33 \%$ ), plant height ( $12.3 \%$ ), plant fresh weight ( $24.9 \%$ ), plant dry weight ( $56.89 \%$ ), leaf number per plant ( $36.47 \%$ ), leaf area ( $46.1 \%$ ), leaf area index ( $118.99 \%$ ) and root fresh weight ( $21.32 \%$ ).

Finally, dry pod harvest was the worst treatment as it manifested the lowest vegetative traits, as compared to other treatments. From these results, it can be deduced the apparent influence of harvest types on growth stature due to the repartition of assimilate between leave, shoot and pod generations after each harvest which reconstitute photosynthetic translocations. Since cowpea plants at flowering, setting and pod swelling stages are synchronized with shoot and leave generations where a high completion among vegetative and reproductive organs. However, during juvenility such competitions are absent, and thus pod removal may shift the completion type to the juvenility. Subsequently, Continuous pod removal treatment gave the best vegetative growth parameters as compared to other treatments, particularly no green pod harvest treatment where pods were left on plants and harvested at dry mature stage (Abdel, 2011).

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## Growth variations raised by seed sources

Theobtained results (3) exhibited the superiority of Italian source of Ramshorn cowpea cultivar over Genex company seed source of the mentioned cultivar in plant length ( $9.1 \%$ ), plant fresh weight ( $3.96 \%$ ), leaf number per plant ( $6.7 \%$ ), leaf area index ( $13.79 \%$ ) and root fresh weight (11.78\%).Moreover, Italian source also exceeded Modesto company seed source in plant length $(17.68 \%)$, plant height ( $8 \%$ ), plant fresh weight $(7.11 \%)$, plant dry weight $(7.99 \%)$, leaf number per plant ( $8.6 \%$ ), leaf area index ( $17.82 \%$ ) and root fresh weight ( $20.85 \%$ ).The obvious variations among seed producing sources might be attributed to the techniques that had been adopted by these producing companies which resulted in varying capabilities in genome expressing. Lines and cultivar differences are clear in plant texa and such differences were reported by (Abdel and Alslem, 2010)

## Harvest frequenciesand seed source interaction

Italian source plant of continuous green pod harvest was the paramount interaction treatment as it revealed the highest values of plant height ( 106.95 cm ), plant length (69.03), leaf number per plant (49.9), leaf area ( $25.2 \mathrm{~cm}^{2}$ ), leaf area index ( 2.51 ), plant fresh weight ( $2786.8 \mathrm{~g} \cdot \mathrm{~m}^{-2}$ ), plant dry weight $\left(682.3 \mathrm{~g} . \mathrm{m}^{-2}\right)$ and root fresh weight $(21.5 \mathrm{~g})$. The differences in the responses of varying seed sources to harvesting frequencies might be attributed to the varying capabilities of these plants in $\mathrm{CO}_{2}$ fixation, photosynthesis and assimilate production (Abdelbagiet al., 2000).

Table (3) The effects of harvesting frequencies on growth of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | Ph | Pl | Pl fwt | Pldwt | R fwt | L/P | La | Lai |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvestin g types | Hgp | 92.04a | 64.12a | 2650.4a | 654. 2 a | 18.3a | 46a | 24.6a | 2.14a |
|  | Hds | 67.42d | 54.97d | 2076.5d | 409. 1c | 13.7c | 31.9d | 16.7c | 0.9 f |
|  | $\begin{aligned} & \mathrm{H} 4 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | 73.46c | $\underset{d}{57.85 \mathrm{c}}$ | 2279. c | 496.5b | 14.8c | 32.3d | 17.1c | 1.09d |
|  | $\begin{aligned} & \mathrm{H} 6 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | 79.02b | $\begin{gathered} 59.12 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 2406. 6b | 549.4b | 16.2b | 37. 8c | 20. 5b | 1.41c |
|  | $\begin{aligned} & \mathrm{H} 8 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | 87.88a | $\begin{gathered} \hline 61.73 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 2593.8a | 641.9a | 16.6b | 43.5b | 24.3a | 1.94b |
| Seeds Source | Italian | 86.71a | 61.94a | 2488a | 572.6a | 17.5a | 40.2a | 21a | 1.64a |
|  | Modest <br> o | 73.7c | 57.33b | 2322.9c | 530.3b | 14.5b | 37b | 20.6a | 1.4b |
|  | Genex | 79.5b | $\begin{gathered} \hline 59.41 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 2393.2b | $\begin{gathered} 547.8 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 15.6b | 37.7b | 20.8a | 1.44b |
| Hgp | Italian | 106.95a | 69.03a | 2786.8a | 682.3a | 21.5a | 49.9a | 25.2a | 2.51a |
|  | Modest <br> o | 82.32bc | $\begin{gathered} 60.8 \mathrm{bc} \\ \mathrm{~d} \end{gathered}$ | 2540.4bc | 635ab | 17.12bc | 43.1bc | 23.7a | 1.861cd |
|  | Genex | 86.9b | 62.6bc | 2623.9b | 645.3a | 16.4bcd | $\begin{gathered} 45.03 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | 24.8a | 2.05bc |
| Hds | Italian | 69.62de | 55.3de | 2116.7 gh | 421de | 13.8cde | 30.7e | 16.6d | 0.836 j |
|  | Modest <br> o | 63.7e | 52.5e | 2012.5h | 386.8e | 11.9 e | 32.6de | 16.3d | 0.863j |
|  | Genex | 69de | $\begin{gathered} 57.13 \mathrm{c} \\ \mathrm{e} \\ \hline \end{gathered}$ | 2100.3 gh | $\begin{gathered} 419.6 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ | 15.3bcde | 32.4de | 17.04d | 0.953hj |
| H4gp+sd | Italian | 73.3cde | 57.9ce | 2369.8de | 523.6c | 15.9bcde | 32.2de | 17.7cd | $\begin{gathered} 1.1395 \mathrm{~g} \\ \mathrm{~h} \\ \hline \end{gathered}$ |
|  | Modest <br> o | 69.45de | 56.4ce | 2172.4 fg | 464cde | 12.5de | 31.3 e | $\begin{gathered} 18.14 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | 1.04hj |
|  | Genex | 77.7bcd | 59.3bd | 2296.74ef | 501.9c | 15.33bcd | 33.40d | 18.2cd | 1.103h |

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|  |  |  |  |  | d | e | e |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| H6gp+sd | Italian | 85.7b | 61.6cd | $\begin{gathered} 2394.03 \mathrm{~cd} \\ \mathrm{e} \end{gathered}$ | $\begin{gathered} 551.4 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 17.8abc | 41.23c | 21.2b | 1.544e |
|  | Modest o | $\begin{gathered} 73.53 \mathrm{~cd} \\ \mathrm{e} \end{gathered}$ | $\begin{gathered} 57.07 \mathrm{c} \\ \mathrm{e} \end{gathered}$ | 2402.5cde | $\begin{gathered} 545.2 b \\ c \end{gathered}$ | 15.2bcde | 36.07d | 20.6b | 1.364 ef |
|  | Genex | 77.9 bcd | $\begin{gathered} 58.8 \mathrm{~cd} \\ \mathrm{e} \end{gathered}$ | 2423.2cde | $\begin{gathered} 551.7 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 15.5bcde | 36.20d | 19.7bc | 1.311 fg |
| H8gp+sd | Italian | 98.02a | $\begin{gathered} 65.95 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2773a | 684.7a | 18.43ab | $\begin{gathered} 46.93 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 24.6a | 2.1721 b |
|  | Modest <br> o | $\begin{gathered} 79.42 \mathrm{bc} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 59.95 b \\ d \end{gathered}$ | 2486.5 bcd | $\begin{gathered} 620.2 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 15.64 \mathrm{bcd} \\ \mathrm{e} \end{gathered}$ | 42.07 c | 24.06a | $\begin{gathered} 1.8384 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | 86.2b | 59.3bd | 2521.9 bcd | $\begin{gathered} 620.7 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 15.60 \mathrm{bcd} \\ \mathrm{e} \end{gathered}$ | 41.43c | 24.3a | 1.7974d |

*Hgp=Harvesting green pod ; Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; $\mathrm{H} 6 \mathrm{~g} p+\mathrm{sd}=$ Harvesting green pods six tims and the rest were left for dry seed; H8gp+sd= Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{P} \mathrm{h}=$ plant hight $(\mathrm{cm}) ; \mathrm{Pl}=$ plant length; Pl fwt = plant fresh weight $(\mathrm{g}) ; \mathrm{Pl}$ dwt $=$ plant dry weight $\left(\mathrm{g} \cdot \mathrm{m}^{-2}\right) ; \mathrm{R}$ fwt $=$ root fresh weight $\left(\mathrm{g} \cdot \mathrm{m}^{-2}\right) ; \mathrm{L} / \mathrm{p}=$ leaf number per plant; $\mathrm{La}=$ leaf area $\left(\mathrm{cm}^{-2}\right) ; \mathrm{Lai}=$ leaf area index $. \mathrm{ae}=\mathrm{abcde}$.

## 2. Flowering

## The influence of harvest frequencies

The highest final flower numberper plant was confined to cowpea plants harvested six times (table, 4). Since this treatment significantly bypassed four times green pod harvest at the $7^{\text {th }}$ and $8^{\text {th }}$ by 38.78 and $22.73 \%$, respectively, besides its superiority over dry pod harvest at $4^{\text {th }}, 5^{\text {th }}, 7^{\text {th }}$ and $8^{\text {th }}$ harvests by $41.5,52.74,100.2$ and $19.71 \%$, respectively. However, the lowest value at harvest $8^{\text {th }}$ was confined to six harvest treatment. Dry pods harvest was the worst treatment in flower generations, as it gave the lowest flower number per plant by ( 72.82 flower per plant). These results suggested that pod removal showed plant efficacy to generate more flowers which may be due to substitute for the lost pods to sustain further progeny through producing seeds from the newly generated flowers (Abdel, 2006).

## Seed resources

The best seed source was Genex company (Table, 4) as it profoundly exceeded that of Italian at $1^{\text {st }}$ and $7^{\text {th }}$ and gross flower number by $55.06,34.48$ and $8.36 \%$, respectively, and over Modesto source at $4^{\text {th }}, 5^{\text {th }}$ and $6^{\text {th }}$ and gross flower number per plant by $36.05,26,32.57$ and $15.29 \%$, respectively. Ahmed et al. (1993a) confirmed that certain cultivars and lines such CB5 completely ceased their flower generation at $33^{\circ} \mathrm{C}$ day and $30^{\circ} \mathrm{C}$ night. They attributed their results to flower bud damage, whereas heat resistance cultivars such as L7964 showed perfuse flower production without fruit setting and no bud damage which was referred to anther damage. However, they mentioned a high heat resistant lines for instance L518.

## Harvest frequencies and seed sources interaction

Continuous harvest of Genex appeared to be the paramount dual treatment as it gave the highest number of flower per plant ( 93.43 flower.Plant ${ }^{-1}$ ) and it substantially exceeded that of Modesto of dry pods harvest, four green pods harvest, Italian dry pods harvest. The worst dual treatment was Modesto dry pods harvest (65. 43flower.Plant ${ }^{-1}$ ). No doubt pod removal had an impact on cowpea plants which differ among seed sources grown under prevailing environment (table, 2). Variation might be attributed to plant status acquired from pod removal and to the capability of these plants to behave under high temperature. Heat stress during vegetative growth and earlier reproductive phase of cowpea grown under long day which possesses a clear role on inflorescence initiation, particularly at the $5^{\text {th }}$ node (Faisal et al., 1993). They found that flower initiations were halted at $30^{\circ} \mathrm{C}$ night temperatures, however, initiations were improved at $20^{\circ} \mathrm{C}$. Heat

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pulses were not perceived the high night temperature but plant can be perceived heat at certain bud development phase that adversely influence bud development.

Table (4) The effects of harvesting frequencies on flower number per plant at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | $\begin{array}{r} \hline \text { FNPH } \\ 1 \end{array}$ | $\begin{array}{r} \hline \text { FNPH } \\ 2 \end{array}$ | $\begin{array}{r} \hline \text { FNPH } \\ 3 \end{array}$ | $\begin{array}{r} \text { FNPH } \\ \hline \end{array}$ | $\begin{array}{r} \hline \text { FNPH } \\ 5 \\ \hline \end{array}$ | $\begin{array}{r} \hline \text { FNPH } \\ 6 \end{array}$ | $\begin{array}{r} \hline \text { FNP } \\ \text { H7 } \\ \hline \end{array}$ | $\begin{array}{r} \hline \text { FNPH } \\ 8 \end{array}$ | $\begin{array}{r} \hline \text { FNPH } \\ \hline \end{array}$ | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvestin g types | Hgp | 5.40a | 14a | 11.4 a | 12.34a | 9.23 ab | 5.81ab | 9.20 ab | 11.7a | 6.8ab | 85.84a |
|  | Hds | 5.51a | 15.4a | 12.3a | 9.11 b | 7.11b | 4.92b | 5.9c | 7.7b | 4.98ab | 72.8b |
|  | $\begin{array}{r} \mathrm{H} 4 \mathrm{gp}+\mathrm{s} \\ \mathrm{~d} \end{array}$ | 5.24a | 13.7a | 12.01a | 13.3a | 11.47a | 8.12a | 8.51bc | 5.94c | 4.29b | 82. 6b |
|  | H6gp+s | 5.33a | 14.44a | 13.12a | 12.89a | 10.86a | 5.96ab | 11.81a | 7.29b | 5.47ab | 87.17a |
|  | $\begin{array}{r} \text { H8gp+s } \\ d \end{array}$ | 5.06a | 11.98a | 11.59a | 12.16a | 10.46a | 6.56ab | 10.6ab | 11.19a | 7.56a | 87.13a |
| Seeds <br> Source | Italian | 4.05b | 14.40a | 12.88a | 12.77a | 9.65a | 6.61ab | 7.83b | 8.65a | 5.63a | 82.46b |
|  | Modest <br> 0 | 5.6a | 12.87a | 11.25a | 9.79b | 8.77b | 5.25b | 9.25 A b | 8.48a | 6.24a | 77.5c |
|  | Genex | 6.28a | 14.42a | 12.09a | 13.32a | 11.05a | 6.96a | 10.53a | 9.13a | 5.59a | 89.35a |
| Hgp | Italian | 4.93a | $\begin{array}{r} 14.63 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 13.10a | $\begin{array}{r} 12.93 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 8.50ac | 5.50ac | 7.70ce | $\begin{array}{r} 10.67 a \\ \mathrm{e} \end{array}$ | 5.40bd | 83.37a |
|  | Modest o | 5.13a | $\begin{array}{r} 12.03 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 10.03a | 9.7bc | 8.68ac | 4.8ac | 9.63 ad | 12.3ab | 8.4ab | 80.7bc |
|  | Genex | 6.13a | $\begin{array}{r} 15.33 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 11a | 14.4a | 10.53 a b | $\begin{array}{r} 7.13 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 10.27 \mathrm{a} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 12.03 \mathrm{a} \\ \mathrm{c} \end{array}$ | 6.6bc | 93.43a |
| Hds | Italian | 4.03a | 16.37a | 12.43a | 7.87c | 7.17bc | 3.5c | 4.7 e | 7.9bf | 5.57bd | 69.53 d e |
|  | Modest <br> 0 | 5.33a | 14.7ab | 10.6a | 6.7c | 5.57c | 4.57 bc | 5.5de | 8.07bf | 4.4cd | 65.43 e |
|  | Genex | 7.17a | $\begin{array}{r} 15.03 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 13.73a | $\begin{array}{r} 12.77 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 8.6 ac | 6.7abc | 7.5ce | 7.03df | 4.97bd | 83.5ac |
| H4gp+sd | Italian | 3.7a | $\begin{array}{r} 13.33 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 14.03a | 15.37a | $\begin{array}{r} 11.63 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 8.67a | 8.13be | 6.07ef | 5.07bd | 86ac |
|  | Modest <br> 0 | 5.93a | $\begin{array}{r} 13.33 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 11.23a | 12.6ab | 10.3ab | 6.93 ab c | 7.8ce | 5.9f | 2.8d | $\begin{array}{r} 76.83 \mathrm{c} \\ \mathrm{~d} \\ \hline \end{array}$ |
|  | Genex | 6.1a | 14.4ab | 10.77a | 11.9bc | $\begin{array}{r} 12 \\ .47 \mathrm{a} \end{array}$ | 8.77a | 9.6 ad | 5.87 f | 5bd | $\begin{array}{r} 84.87 \mathrm{a} \\ \mathrm{c} \end{array}$ |
| H6gp+sd | Italian | 3.87a | 15.37a | 13.73a | 13.5ab | $\begin{array}{r} 10.17 \mathrm{a} \\ \mathrm{~b} \end{array}$ | $\begin{array}{r} 6.87 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} \hline 10.43 \mathrm{a} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} \hline \text { 7.7cde } \\ f \end{array}$ | 5.4bd | $\begin{array}{r} 87.03 \mathrm{a} \\ \mathrm{c} \end{array}$ |
|  | Modest o | 6.17a | $\begin{array}{r} 13.77 a \\ b \end{array}$ | 13.1a | $\begin{array}{r} 10.13 \mathrm{~b} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 9.43 \mathrm{ab} \\ \mathrm{c} \end{array}$ | 5.17ac | $\begin{array}{r} 12.33 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 6.5 df | 5.3bd | 81.9ac |
|  | Genex | 5.97a | 14.2ab | 12.5a | 15.03a | 12.97a | 5.83ac | 12.67a | 7.67cf | 5.7bd | 92.57a |
| H8gp+sd | Italian | 3.7a | 12.3ab | 11.1a | 14.17a | 10.8ab | 8.5ab | 8.2be | 10.9ad | 6.7bc | $86.37 \mathrm{a}$ |
|  | Modest | 5.43a | 10.5b | 11.27a | 9.8bc | 9.9 ac | 4.8ac | 11ac | 9.63af | 10.3a | 82.63 a c |
|  | Genex | 6.03a | $\begin{array}{r} 13.12 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 12.4a | 12.5ab | $\begin{array}{r} 10.57 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 6.37ac | 12.6a | 13.03a | 5.67bd | 92.4ab |

*Hgp=Harvesting green pod;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; H8gp+sd= Harvesting green pods eight tims and the rest were left for dry seed ; FNPH $==$ Flower number per plant harvest. $a=a b c d e$.

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## 3. Pod development <br> Harvesting frequencies

Continuous green pod harvesting appeared to be the most potent treatment (tables, 5-11). It gave the highest final pod number per plant and pod length as compared to others. This treatment exceeded dry pods harvest treatment in pod number $53.33 \%$, weight of fresh pods at all harvests by $\infty$, pod dry weight at $1^{\text {st }}$ and $7^{\text {th }}$ harvests by $\infty$ and $69.57 \%$, respectively, seed number per pod at $1^{\text {st }}, 7^{\text {th }}$ harvests and final seed number per pod byo, 116.55 and $11.4 \%$, respectively, pod length at $1^{\text {st }}, 2^{\text {nd }}, 3^{\text {rd }}, 5^{\text {th }}$ and $7^{\text {th }}$ harvests byoo, $8.06,11.9,14.82$ and $122.5 \%$, respectively. Moreover, continuous green pod harvest gave the lowest aborted seeds and ovules per pod. However, it manifested the lowest pod number per plant at $5^{\text {th }}$ and $6^{\text {th }}$ harvests, pod dry weights at $2^{\text {nd }}, 3^{\text {rd }}, 4^{\text {th }}$, $6^{\text {th }}, 8^{\text {th }}$ and $9^{\text {th }}$ harvests and individual pod dry weight and its seed number at $5^{\text {th }}$ harvest.

Dry pod harvests treatment was categorized in the final fifth sequence order, since it revealed the lowest green pod fruiting characteristics. However, it significantly reduced aborted seeds and ovules per pod. It significantly by passed continuous green pod harvest treatment in pod number per plant at $5^{\text {th }}$ harvest by $39.66 \%$, weight of dry pod at $2^{\text {nd }}$ to $5^{\text {th }}$ harvests by $36.85,26.91$, 38.25 and $40.21 \%$, respectively, seed number per pod at $5^{\text {th }}$ harvest by $19.1 \%$. In addition to that, it exhibited substantial reductions in aborted seeds per pod at $1^{\text {st }}, 4^{\text {th }}$, and $7^{\text {th }}$ harvest by $\infty, 41.45$, and $67.23 \%$, respectively, and in the final aborted seeds per pod $25 \%$. It also exhibited huge reduction in aborted ovules per pod at $1^{\text {st }}, 4^{\text {th }}$ and $7^{\text {th }}$ harvests and in the final aborted ovules per pod byo, 50.7 , 102.63 , and $30.29 \%$, respectively. The obtained results confirmed the variations resulted from different harvesting frequencies in all fruiting traits which might be attributed to plant recovery capacities after pod removals which reflected the assimilate utilizing ability for substituting the lost organs to keep seed production for further generations. Seeds and ovules are usually aborted by fertilization failure owing to pollen defects or stigma reception failure for pollen grain (Abdel and Al-Rawi, 2011), or assimilate shortages owing to plant capability to produce assimilate or translocation and partitioning of these assimilate (Ehlers and Hall 1996).

## Seed sources

The obtained results (tables, 5-11) manifested that Ramshorn plants raised from Genex seeds source gave the highest total pod number per plant and seed number per pod besides the lowest aborted ovules and seeds per pod. Genex was significantly exceeded Modesto in terms of pod number per plant at $4^{\text {th }}$ to $7^{\text {th }}$ harvests and total pod number per plant by 51.96, 85.27, 59.7, 68.35 and $27.35 \%$, respectively, green pod fresh weight at $3^{\text {rd }}$ to $7^{\text {th }}$ harvests and total green pod fresh weight by $12.46,14.83,19.5,67.89,36.68$ and $11.78 \%$, respectively, dry pod weight at $3^{\text {rd }}$ to $7^{\text {th }}$ harvests and total dry pod weigh by $18.07,33.87,41.8,79.11,55.54$ and $49.51 \%$, respectively, seeds number per pod at $1^{\text {st }}, 4^{\text {th }}, 5^{\text {th }}$ and $7^{\text {th }}$ harvests by $27.29,29.08,27.59,42.36$, and $18.5 \%$, respectively, pod length at $7^{\text {th }}$ harvest by $34.41 \%$, final mean of pod length by $6.48 \%$. Genex showed significant aborted seeds per pod at $1^{\text {st }}$ to $5^{\text {th }}$ harvest and final abortedseeds per pod by $62.96,65.71,50.24,24.38,29.95$ and $17.67 \%$, respectively, aborted ovule number per pod at $3^{\text {rd }}$ to $5^{\text {th }}$ and final aborted ovules by $31.67,51.38,46.94$ and $18.91 \%$, respectively. Genex source displayed superiority over Italian source in pod number per plant at $1^{\text {st }}$ and $5^{\text {th }}$ harvest by 52.17 and $86.72 \%$, respectively, seeds number per pod at $5^{\text {th }}$ harvest by $2.4 \%$ and gross seeds number per pod by $5.32 \%$. Moreover, Genex source manifested huge reductions in aborted seeds per pod at $2^{\text {nd }}$ and $3^{\text {rd }}$ harvest by 36.57 and $26.57 \%$, respectively, aborted ovules per pod at $4^{\text {th }}$ by $26.6 \%$, as compared to Italian source.

The worst source was Modesto as it gave the lowest pod number per pod, weight of green pod, weight of dry pod and seed number per pod, pod length. Moreover, Modesto source showed the highest aborted seed number per pod besides the highest aborted ovules per pod. This source exceeded Italian in pod number per plant at $1^{\text {st }}$ harvest by $47.83 \%$, besides its lowest aborted seeds per pod at $7^{\text {th }}$ by $33.16 \%$ as compared to Genex. From field observation Genex plants commenced into flowering earlier than other two sources, such earliness may be attributed to capability of these

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plants to convert their vegetative meristems into reproductive ones within short duration owing to its genome expressions. The worse results that accompanied to Modesto source might be due to weakness in assimilate synthesis or their distributions under the ambient high temperature, particularly during July and August (table, 2). Combination influences were found between leaf senescence and heat resistance in cowpea, where heat susceptible cultivars displayed earlier leaves senescence (Abdelbagiet al., 2000).

## Harvest frequencies and sources combinations

Genex plant of continuous green pods appeared to be the most potent interaction treatment (table, 5-11). It gave the highest final pod number per plant and pod number per plant at $1^{\text {st }}$ harvest. However, it showed reduced pod number per plant at $6^{\text {th }}$ and $9^{\text {th }}$ harvests. The worst interaction treatment was Modesto of dry pod (No green pod harvest). Since this dual treatment gave the lowest pod number of pods per plant at $1^{\text {st }}$ and $7^{\text {th }}$ harvest, the lowest gross pod number at the end of the growing season, pod dry weight at $1^{\text {st }}, 6^{\text {th }}$ and $7^{\text {th }}$ harvests, final mean of seeds number per pod at $1^{\text {st }}, 2^{\text {nd }}, 6^{\text {th }}$ and $7^{\text {th }}$ harvests. Significant differences were not detected between Modesto of dry pod harvest and other dual treatments revealed the highest values of aborted seeds per pod at $2^{\text {nd }}, 5^{\text {th }}, 8^{\text {th }}$ and $9^{\text {th }}$ harvest, aborted ovules per pod at $2^{\text {nd }}, 3^{\text {rd }}, 8^{\text {th }}$ and $9^{\text {th }}$ harvests. However, dry pod harvest of Modesto gave the highest pod number per plant at $3^{\text {rd }}$ and $5^{\text {th }}$ harvests, pod dry weight at $2^{\text {nd }}$ to $5^{\text {th }}$ harvests. The variations observed among combination treatments might be due to the capabilities of individual source in expressing their genomes, and therefore there should a gene conversion, deletion, addition and translocations in Ramshorn cultivar among these producing companies which reflected on their field performance, if which otherwise there would be no differences occurred.

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Table (5) The effects of harvesting frequencies on pods number per plant at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | PNP | $\begin{array}{r} \hline \text { PNP } \\ \text { H2 } \end{array}$ | $\begin{array}{r} \hline \text { PNP } \\ \text { H3 } \end{array}$ | $\begin{array}{r} \hline \text { PNP } \\ \text { H4 } \end{array}$ | $\begin{array}{r} \hline \text { PNP } \\ \text { H5 } \end{array}$ | $\begin{array}{r} \hline \text { PNP } \\ \text { H6 } \end{array}$ | $\begin{array}{r} \hline \text { PNP } \\ \text { H7 } \end{array}$ | PNP | $\begin{array}{r} \hline \text { PNP } \\ \text { H9 } \end{array}$ | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | 3.24a | 7.31a | 4.62ab | 3.6a | 1.74b | 0.99b | 3.54a | 4.07a | 1.96a | 31.08a |
|  | Hds | 0c | 2.54c | 5.97a | 4.03a | 2.43a | 1.47b | 0.8c | 1.11b | 1.91a | 20.27c |
|  | $\begin{array}{r} \mathrm{H} 4 \mathrm{gp}+ \\ \mathrm{sd} \end{array}$ | 2.2b | 5.17b | 3.81 b | 3.91a | 0c | 4.41a | 2.2b | 1.94b | 1.12a | 24.77b |
|  | $\begin{array}{r} \text { H6gp+ } \\ \text { sd } \end{array}$ | 2.35b | 5.42b | 3.8 b | 3.9a | $\begin{array}{r} 1.97 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 0.97b | 0c | 4.09a | 2.12a | 24.62b |
|  | $\begin{array}{r} \mathrm{H} 8 \mathrm{gp}+ \\ \mathrm{sd} \\ \hline \end{array}$ | 2.95a | 6.72a | 4.66ab | 3.48a | $\begin{array}{r} 2.12 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{array}$ | 1.22b | 3.66a | 3.27a | 2.69a | 30.76a |
| Seeds <br> Source | Italian | 1.61b | 6.05a | 5.23a | 4.27a | 1.28b | $\begin{array}{r} 1.95 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 1.8 ab | 2.51a | 2.07a | 26.85a |
|  | Modes to | 2.38a | 4.64b | 4.08b | 2.81b | 1.29b | 1.34b | 1.58b | 2.73a | 2.04a | 22.89b |
|  | Genex | 2.45a | $5.61 \mathrm{a}$ b | 4.41ab | 4.27a | 2.39a | 2.14a | 2.66a | 3. 5a | 1.77a | 29.15 a |
| Hgp | Italian | $\begin{array}{r} 2.73 \mathrm{a} \\ \mathrm{bc} \end{array}$ | 8.27a | $\begin{array}{r} 5.57 \mathrm{ab} \\ \mathrm{c} \end{array}$ | 3.9ab | $\begin{array}{r} 1.33 \mathrm{~b} \\ \mathrm{c} \end{array}$ | 0.8b | $\begin{array}{r} 3.23 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | 3.7ab | $\begin{array}{r} 1.6 \mathrm{bcd} \\ \mathrm{e} \end{array}$ | 31.13ab |
|  | Modes to | $\begin{array}{r} 3.7 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $6.2 \mathrm{ab}$ $\mathrm{c}$ | 3.7 bcd | 2.4b | 1.4bc | 0.67b | $\begin{array}{r} 3.17 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | 4 ab | $2.7 \mathrm{abc}$ $\mathrm{d}$ | $27.57 \mathrm{ab}$ |
|  | Genex | 3.93a | $\begin{array}{r} 7.47 \mathrm{a} \\ \mathrm{~b} \end{array}$ | $\begin{array}{r} 4.33 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | 4.5ab | 2.5ab | 1.5b | 4.23 ab | 4.5a | $\begin{array}{r} 1.57 \mathrm{bc} \\ \mathrm{de} \end{array}$ | 34.53a |
| Hds | Italian | 0d | 1.93f | 6.47a | 4.7ab | 1.8b | 1.77b | 0.9de | 0.77c | $\begin{array}{r} 1.7 \mathrm{bcd} \\ \mathrm{e} \end{array}$ | 20.03ef |
|  | Modes to | 0d | 2.27 e f | 5.53 ab c | 3.5 ab | 1.63b | 0.87b | 0 e | 0.9c | $\begin{array}{r} 1.5 \mathrm{bcd} \\ \mathrm{e} \end{array}$ | 16.2 f |
|  | Genex | 0d | $\begin{array}{r} 3.43 \mathrm{~d} \\ \text { ef } \end{array}$ | 5.9ab | 3.9ab | 3.87a | 1.77b | 1.5cde | $\begin{array}{r} 1.67 \mathrm{~b} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 2.53 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | $24.57 \mathrm{~cd}$ |
| $\mathrm{H} 4 \mathrm{gp}+\mathrm{s}$ <br> d | Italian | 1.5cd | $\begin{array}{r} 6.03 \mathrm{a} \\ \mathrm{bc} \end{array}$ | $\begin{array}{r} 4.53 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | $4.57 \mathrm{a}$ b | 0c | 4.47a | $\begin{array}{r} 2.43 \mathrm{bc} \\ \mathrm{~d} \end{array}$ | 1.5c | $\begin{array}{r} 1.37 \mathrm{~cd} \\ \mathrm{e} \end{array}$ | $26.1 \text { bcd }$ |
|  | Modes to | $\begin{array}{r} 2.5 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 4.43 \mathrm{c} \\ \mathrm{de} \end{array}$ | 3.4cd | $3.07 \mathrm{a}$ b | 0c | 3.57a | 1.4cde | $\begin{array}{r} 2.23 \mathrm{a} \\ \mathrm{bc} \end{array}$ | 0.77e | $\begin{array}{r} 21.37 \mathrm{de} \\ \mathrm{f} \end{array}$ |
|  | Genex | $\begin{array}{r} 2.6 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 5.03 \mathrm{~b} \\ \mathrm{~cd} \\ \hline \end{array}$ | 3.5 cd | 4.1ab | 0c | 5.2a | $\begin{array}{r} 2.77 \mathrm{ab} \\ \mathrm{~cd} \\ \hline \end{array}$ | $\begin{array}{r} 2.4 \mathrm{ab} \\ \mathrm{c} \end{array}$ | 1.23de | $\begin{array}{r} 26.83 \mathrm{bc} \\ \mathrm{de} \end{array}$ |
| $\begin{array}{r} \mathrm{H} 6 \mathrm{gp}+\mathrm{s} \\ \mathrm{~d} \end{array}$ | Italian | 1.55c | $6.5 \mathrm{ab}$ c | $\begin{array}{r} 4.67 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | $\begin{array}{r} 4.23 \mathrm{a} \\ \mathrm{~b} \end{array}$ | $\begin{array}{r} 1.43 \mathrm{~b} \\ \mathrm{c} \end{array}$ | 1b | 0 e | 3.7ab | 2.9ab | $25.99 \mathrm{~cd}$ |
|  | Modes to | 3 abc | $\begin{array}{r} 4.5 \mathrm{~cd} \\ \mathrm{e} \end{array}$ | 3.2d | $2.67 a$ <br> b | 1.73b | 0.8b | 0e | 4 ab | $\begin{array}{r} 1.73 \mathrm{bc} \\ \mathrm{de} \\ \hline \end{array}$ | $\begin{array}{r} 21.63 \mathrm{de} \\ \mathrm{f} \\ \hline \end{array}$ |
|  | Genex | $\begin{array}{r} 2.5 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 5.27 \mathrm{~b} \\ \mathrm{~cd} \\ \hline \end{array}$ | 3.53 cd | 4.8a | $\begin{array}{r} 2.73 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 1.1b | 0e | 4.57a | $\begin{array}{r} 1.73 \mathrm{bc} \\ \mathrm{de} \end{array}$ | $26.23 b c$ |
| $\begin{array}{r} \mathrm{H} 8 \mathrm{gp}+\mathrm{s} \\ \mathrm{~d} \end{array}$ | Italian | $\begin{array}{r} 2.27 \mathrm{~b} \\ \mathrm{c} \end{array}$ | 7.5 ab | $\begin{array}{r} 4.9 \mathrm{abc} \\ \mathrm{~d} \end{array}$ | $\begin{array}{r} 3.93 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 1.83b | 1.73b | $\begin{array}{r} 2.83 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | $\begin{array}{r} 3.2 \mathrm{ab} \\ \mathrm{c} \end{array}$ | 2.8 abc | 31abc |
|  | Modes to | $\begin{array}{r} 3.33 \mathrm{a} \\ \mathrm{~b} \end{array}$ | $\begin{array}{r} 5.8 \mathrm{ab} \\ \mathrm{~cd} \\ \hline \end{array}$ | $4.3 \mathrm{abc}$ $\mathrm{d}$ | 2.43 b | 1.7 b | 0.8b | $\begin{array}{r} 3.33 \mathrm{ab} \\ \mathrm{c} \end{array}$ | $\begin{array}{r} 2.5 \mathrm{ab} \\ \mathrm{c} \end{array}$ | 3.5a | $27.7 \mathrm{abc}$ $\mathrm{d}$ |
|  | Genex | $\begin{array}{r} \hline 3.23 \mathrm{a} \\ \mathrm{~b} \end{array}$ | $\begin{array}{r} 6.87 \mathrm{a} \\ \mathrm{bc} \end{array}$ | $\begin{array}{r} 4.77 \mathrm{ab} \\ \mathrm{~cd} \end{array}$ | $4.07 \mathrm{a}$ $\mathrm{b}$ | $\begin{array}{r} 2.83 \mathrm{a} \\ \mathrm{~b} \end{array}$ | 1.13 b | 4.8a | 4.1ab | $\begin{array}{r} 1.77 \mathrm{bc} \\ \mathrm{de} \end{array}$ | 33.57ab |

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Table (6) The effects of harvesting frequencies on individual pod fresh weight (g) at(Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | $\begin{gathered} \text { Mean } \\ \mathrm{s} \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | $\begin{gathered} 6.29 \\ 3 \mathrm{a} \end{gathered}$ | 6.207a | 6.824a | 5.851a | $\begin{gathered} 5.091 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 4.009 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 5.627 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 6.544 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 6.90 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 5.928 \\ a \end{gathered}$ |
|  | Hds | 0b | 0b | 0b | 0b | 0b | 0b | 0b | 0b | 0b | 0b |
|  | $\begin{aligned} & \mathrm{H} 4 \mathrm{gp}+ \\ & \mathrm{sd} \end{aligned}$ | $\begin{gathered} 6.93 \\ 5 \mathrm{a} \end{gathered}$ | 6.158a | 6.178ab | 5.707a | Ob | Ob | 0b | 0b | Ob | $\begin{gathered} 5.745 \\ \mathrm{a} \end{gathered}$ |
|  | $\begin{aligned} & \text { H6gp+ } \\ & \text { sd } \end{aligned}$ | $\begin{gathered} 6 . \\ 367 a \end{gathered}$ | $\begin{gathered} 5 . \\ 836 a \end{gathered}$ | $\begin{gathered} 5 . \\ 642 \mathrm{ab} \end{gathered}$ | 5.429a | 4. 86a | $\begin{gathered} 4 . \\ 891 \mathrm{a} \end{gathered}$ | 0b | 0b | 0b | $\begin{gathered} 5.843 \\ \mathrm{a} \\ \hline \end{gathered}$ |
|  | $\begin{aligned} & \mathrm{H} 8 \mathrm{gp}+ \\ & \text { sd } \end{aligned}$ | $\begin{gathered} 6.59 \\ 5 \mathrm{a} \end{gathered}$ | 5.949a | 5.582b | 5.573a | $\begin{gathered} 4.747 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 4.271 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 6.029 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} \hline 6.129 \\ \mathrm{a} \\ \hline \end{gathered}$ | 0b | $\begin{gathered} 5.808 \\ \mathrm{a} \end{gathered}$ |
| Seeds <br> Source | Italian | $\begin{gathered} 5.52 \\ 2 \mathrm{a} \end{gathered}$ | 6.644a | 7.005a | 6.568a | $\begin{gathered} 4.373 \\ \text { ab } \end{gathered}$ | 4.78a | $\begin{gathered} 4.756 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 6.592 \\ a \end{gathered}$ | $\begin{gathered} 6.98 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 6.338 \\ \mathrm{a} \end{gathered}$ |
|  | Modes to | $\begin{gathered} 5.18 \\ 4 \mathrm{a} \end{gathered}$ | 6.388a | 5.795b | 5.212b | $\begin{gathered} 3.765 \\ b \end{gathered}$ | $\begin{gathered} 3.183 \\ b \end{gathered}$ | $\begin{gathered} 2.868 \\ c \end{gathered}$ | $\begin{gathered} 6.359 \\ \mathrm{a} \end{gathered}$ | 6a | $\begin{gathered} 5.322 \\ c \end{gathered}$ |
|  | Genex | $\begin{gathered} 5.00 \\ 9 \mathrm{a} \end{gathered}$ | 6.358a | 6.517 a | 5.985a | $\begin{gathered} 4.499 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 5.344 \\ \mathrm{a} \\ \hline \end{gathered}$ | 3.92b | $\begin{gathered} 6.189 \\ a \end{gathered}$ | $\begin{gathered} 6.12 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 5.949 \\ b \end{gathered}$ |
| Hgp | Italian | $\begin{gathered} 6.78 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 6.373 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 7.293 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ | 6.42ab | $\begin{gathered} 5.287 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 3.293 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 6.827 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 7.273 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 7.15 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | 6.3a |
|  | Modes to | $\begin{gathered} \hline 6.24 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | 5.98bc | $\begin{gathered} 6.153 \mathrm{~cd} \\ \mathrm{e} \\ \hline \end{gathered}$ | 5.46ab $\mathrm{c}$ | $\begin{gathered} 4.787 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} \hline 3.187 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 5.327 \\ b c \\ \hline \end{gathered}$ | $\begin{gathered} 6.28 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 6.61 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 5.559 \\ \mathrm{ab} \\ \hline \end{gathered}$ |
|  | Genex | $\begin{gathered} 5.85 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 6.267 a \\ b c \\ \hline \end{gathered}$ | $\begin{gathered} 7.027 \mathrm{bc} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 5.673 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 5.2a | $\begin{gathered} 5.547 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 4.727 \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 6.08 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 6.95 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 5.925 \\ \mathrm{ab} \\ \hline \end{gathered}$ |
| Hds | Italian | 0b | 0d | Of | 0d | 0b | 0c | 0d | 0c | 0b | 0c |
|  | Modes <br> to | 0b | 0d | Of | 0d | Ob | 0c | 0d | 0c | 0b | 0c |
|  | Genex | 0b | 0d | Of | 0d | 0b | 0c | 0d | 0c | 0b | 0c |
| $\begin{aligned} & \mathrm{H} 4 \mathrm{gp+s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} \hline 7.06 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 6.453 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 6.86bcd | $\begin{gathered} 6.493 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | Ob | 0c | 0d | 0c | 0b | $\begin{gathered} 6.703 \\ \mathrm{a} \end{gathered}$ |
|  | Modes to | $\begin{gathered} 7.28 \\ \mathrm{a} \\ \hline \end{gathered}$ | 6.06bc | 5.56de | 4.563c | 0b | 0c | 0d | 0c | 0b | $\begin{gathered} 5.862 \\ \mathrm{ab} \\ \hline \end{gathered}$ |
|  | Genex | $\begin{gathered} 6.46 \\ \mathrm{a} \\ \hline \end{gathered}$ | 5.96bc | $\begin{gathered} 6.113 \mathrm{~cd} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 6.033 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | Ob | 0c | 0d | 0c | 0b | $\begin{gathered} 6.141 \\ \mathrm{a} \\ \hline \end{gathered}$ |
| $\begin{aligned} & \mathrm{H} 6 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} \hline 6.65 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 5.987 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 6.213 \mathrm{bc} \\ \mathrm{de} \end{gathered}$ | $\begin{gathered} 5.793 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 4.947 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 4.947 \\ \text { ab } \\ \hline \end{gathered}$ | 0d | 0c | 0b | $\begin{gathered} 5.757 \\ \mathrm{ab} \end{gathered}$ |
|  | Modes to | $\begin{gathered} 5.95 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 6.073 b \\ c \end{gathered}$ | 5.013 e | 4.94bc | 4.48a | $\begin{gathered} 4.14 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 0d | 0c | 0b | $\begin{gathered} 5.099 \\ a b \end{gathered}$ |
|  | Genex | $\begin{gathered} 6.49 \\ 3 \mathrm{a} \end{gathered}$ | 5.447c | 5.7cde | $\begin{gathered} 5.553 a \\ b c \end{gathered}$ | $\begin{gathered} 5.153 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 5.587 \\ a \end{gathered}$ | 0d | 0c | 0b | $\begin{gathered} 5.655 \\ \mathrm{ab} \end{gathered}$ |
| $\begin{aligned} & \mathrm{H} 8 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} 7.10 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 5.933 b \\ c \\ \hline \end{gathered}$ | 5.88cde | $\begin{gathered} 6.087 a \\ b c \\ \hline \end{gathered}$ | 4.9a | $\begin{gathered} 4.654 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 7.64a | 6.6ab | 0b | 6.1ab |
|  | Modes to | $\begin{gathered} 6.44 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 5.913 b \\ c \\ \hline \end{gathered}$ | 4.947e | $\begin{gathered} 5.013 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 4.427 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.8 ab | 4.94c | $\begin{gathered} 5.853 \\ \mathrm{ab} \\ \hline \end{gathered}$ | Ob | $\begin{gathered} 4.236 \\ \mathrm{~b} \\ \hline \end{gathered}$ |
|  | Genex | $\begin{gathered} 6.24 \\ \mathrm{a} \\ \hline \end{gathered}$ | 6 bc | 5.92cde | $\begin{gathered} 5.62 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 4.913 \\ \mathrm{a} \\ \hline \end{gathered}$ | 5.35a | $\begin{gathered} 5.507 \\ b c \end{gathered}$ | $\begin{gathered} 5.933 \\ a b \\ \hline \end{gathered}$ | 0b | $\begin{gathered} 4.905 \\ \mathrm{ab} \\ \hline \end{gathered}$ |

*Hgp=Harvesting green pod;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed; $\mathrm{H}=$ harvest.

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Table (7) The effects of harvesting frequencies on individual pod dry weight (g) plant at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | Means |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | $\begin{gathered} 1.68 \\ 2 \mathrm{a} \end{gathered}$ | 1.71b | 1.743b | $\begin{gathered} 1.404 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.23 \\ 6 \mathrm{~b} \end{gathered}$ | 0.965a | $\begin{gathered} 1.231 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 1.66 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.763 \\ \mathrm{a} \end{gathered}$ | 0.965a |
|  | Hds | 0b | 2.34a | 2.212a | $\begin{gathered} 1.941 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.73 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | 1.107a | $\begin{gathered} 0.785 \\ c \end{gathered}$ | $\begin{gathered} 1.55 \\ \mathrm{a} \end{gathered}$ | 1.56a | 1.107a |
|  | $\begin{aligned} & \mathrm{H} 4 \mathrm{gp}+ \\ & \mathrm{sd}+ \end{aligned}$ | $\begin{gathered} 1.88 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.605 \\ b \end{gathered}$ | 1.673b | $\begin{gathered} 1.412 \\ \mathrm{~b} \end{gathered}$ | 0c | 1.278a | 1.14b | $\begin{gathered} 1.80 \\ 6 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.266 \\ \mathrm{a} \end{gathered}$ | 1.57a |
|  | $\begin{aligned} & \text { H6gp+ } \\ & \text { sd } \\ & \hline \end{aligned}$ | $\begin{gathered} 1.68 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.553 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 1.502b | $\begin{gathered} 1.292 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.15 \\ 7 \mathrm{~b} \\ \hline \end{gathered}$ | 1.132a | 0d | $\begin{gathered} 1.82 \\ 1 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.654 \\ \mathrm{a} \\ \hline \end{gathered}$ | 1.535a |
|  | $\begin{aligned} & \mathrm{H} 8 \mathrm{gp}+ \\ & \mathrm{sd} \end{aligned}$ | $\begin{gathered} 1.76 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.581 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 1.454b | $\begin{gathered} 1.408 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.12 \\ 4 \mathrm{~b} \\ \hline \end{gathered}$ | 0.976a | 1.47a | $\begin{gathered} 1.59 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.843 \\ \mathrm{a} \end{gathered}$ | 0.976a |
| Seeds Source | Italian | $\begin{gathered} 1.50 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.811 \\ \mathrm{a} \end{gathered}$ | 1.904a | $\begin{gathered} 1.697 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.09 \\ 9 \mathrm{a} \end{gathered}$ | 1.203a | $\begin{gathered} 1.243 \\ a \end{gathered}$ | $\begin{gathered} 1.77 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.791 \\ \mathrm{a} \end{gathered}$ | 1.389a |
|  | Modes to | $\begin{gathered} 1.36 \\ \mathrm{a} \\ \hline \end{gathered}$ | 1.73a | 1.489b | $\begin{gathered} 1.246 \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 0.89 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 0.742b | $\begin{gathered} 0.623 \\ c \end{gathered}$ | $\begin{gathered} 1.63 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | 1.5a | 0.923b |
|  | Genex | $\begin{gathered} 1.34 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.732 \\ \mathrm{a} \end{gathered}$ | 1.758a | $\begin{gathered} 1.531 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.16 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | 1.329a | $\begin{gathered} 0.969 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.65 \\ 4 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.561 \\ \mathrm{a} \end{gathered}$ | 1.38a |
| Hgp | Italian | $\begin{gathered} 1.87 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.73 \mathrm{~b} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.903 \mathrm{~b} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.626 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 1.25 \\ 6 \mathrm{~b} \end{gathered}$ | $\begin{aligned} & 0.823 \mathrm{a} \\ & \mathrm{bc} \end{aligned}$ | $\begin{gathered} 1.763 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 1.92 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.853 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 0.823 \mathrm{bc} \\ \text { de } \end{gathered}$ |
|  | Modes <br> to | $\begin{gathered} 1.66 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.67 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | 1.42def | $\begin{gathered} 1.273 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.13 \\ 6 \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 0.716 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 1.116 \\ c \end{gathered}$ | $\begin{gathered} 1.49 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.66 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 0.716cde |
|  | Genex | $\begin{gathered} 1.51 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.72 \mathrm{~b} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.83 \mathrm{bc} \\ \mathrm{de} \end{gathered}$ | $\begin{gathered} 1.313 \\ c d \end{gathered}$ | $\begin{gathered} 1.31 \\ 6 \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.356 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 1.07c | $\begin{gathered} 1.57 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.776 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 1.356 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ |
| Hds | Italian | 0b | $\begin{gathered} 2.406 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.473a | $\begin{gathered} 2.226 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.86 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | 1.623a | $\begin{gathered} 0.973 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 1.33 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.606 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 1.623ab |
|  | Modes to | 0b | $\begin{gathered} 2.24 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 1.993 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 1.616 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 1.33 \\ 6 \mathrm{~b} \\ \hline \end{gathered}$ | 0.49c | 0d | $\begin{gathered} 1.58 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.463 \\ \mathrm{ab} \end{gathered}$ | 0.49e |
|  | Genex | 0b | $\begin{gathered} 2.373 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 2.17ab | $\begin{gathered} 1.98 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.99 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.21 \mathrm{ab} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 1.383 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 1.76 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.61 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.21 \mathrm{abcd} \\ \mathrm{e} \end{gathered}$ |
| $\underset{d}{\mathrm{H} 4 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 1.91 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.73 \mathrm{~b} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.963 \mathrm{~b} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.613 \\ \text { bc } \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 1.35 \mathrm{ab} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 1.446 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 1.86 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.633 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 1.713a |
|  | $\begin{aligned} & \hline \text { Modes } \\ & \text { to } \\ & \hline \end{aligned}$ | $\begin{gathered} 1.92 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.593 \\ \text { cd } \end{gathered}$ | 1.42ef | 1.05d | 0c | $\begin{gathered} 1.013 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 0.936 \\ c \end{gathered}$ | $\begin{gathered} 1.79 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.003 \\ \mathrm{~b} \end{gathered}$ | 1.4abcd |
|  | Genex | $\begin{gathered} 1.81 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.493 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 1.636 \mathrm{c} \\ \text { def } \end{gathered}$ | $\begin{gathered} 1.573 \\ \text { bc } \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 1.473 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.036 \\ c \end{gathered}$ | $\begin{gathered} 1.76 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.163 \\ \mathrm{ab} \end{gathered}$ | 1.598ab |
| $\begin{aligned} & \mathrm{H} 6 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} 1.82 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.593 \\ \text { cd } \end{gathered}$ | $\begin{gathered} 1.643 \mathrm{c} \\ \text { def } \end{gathered}$ | $\begin{gathered} 1.413 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.21 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.126 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 0d | $\begin{gathered} 2.02 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.906 \\ a b \end{gathered}$ | 1.684ab |
|  | Modes to | 1.5a | 1.6cd | 1.313f | 1.08d | $\begin{gathered} \hline 0.99 \\ 3 \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 0.88 \mathrm{ab} \\ \mathrm{c} \end{gathered}$ | 0d | $\begin{gathered} 1.78 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.543 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 1.402 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | $\begin{gathered} 1.72 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.466 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} \substack{1.55 \mathrm{cde} \\ \mathrm{f}} \\ \hline \end{gathered}$ | $\begin{gathered} 1.383 \\ \mathrm{~cd} \\ \hline \end{gathered}$ | $\begin{gathered} 1.27 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 1.39ab | 0d | $\begin{gathered} 1.66 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.513 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 1.521 abc |
| $\begin{aligned} & \mathrm{H} 8 \mathrm{gp+s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} 1.91 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.586 \\ \text { cd } \end{gathered}$ | $\begin{aligned} & 1.536 \mathrm{c} \\ & \text { def } \end{aligned}$ | $\begin{gathered} 1.606 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 1.16 \\ 3 b \end{gathered}$ | $\begin{gathered} 1.103 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 2.03a | $\begin{gathered} 1.70 \\ 6 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.956 \\ a \end{gathered}$ | $\begin{gathered} 1.103 \mathrm{abc} \\ \text { de } \end{gathered}$ |
|  | Modes <br> to | $\begin{gathered} 1.72 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.55 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | 1.223f | $\begin{gathered} 1.213 \\ c d \end{gathered}$ | $\begin{gathered} 0.98 \\ 3 \mathrm{~b} \end{gathered}$ | 0.61bc | 1.02c | $\begin{gathered} 1.52 \\ 0 \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.83 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 0.61 de |
|  | Genex | $\begin{gathered} 1.65 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.606 \\ c d \end{gathered}$ | $\begin{gathered} 1.603 \mathrm{c} \\ \text { def } \end{gathered}$ | $\begin{gathered} 1.406 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 1.22 \\ 6 \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.216 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 1.356 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 1.54 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.743 \\ a b \end{gathered}$ | $\begin{gathered} 1.216 \mathrm{abc} \\ \text { de } \end{gathered}$ |

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Table (8) The effects of harvesting frequencies on seed number per pod at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | Means |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | 8.31ab | $\begin{gathered} 9.13 \\ \mathrm{a} \end{gathered}$ | 9.06a | 9.22a | 7.23bc | 5.49a | 9.16a | $\begin{gathered} 8.14 a \\ b \end{gathered}$ | 8.13a | 8.22a |
|  | Hds | 0.00c | $\begin{gathered} 8.37 \\ \mathrm{a} \end{gathered}$ | 8.88a | 8.80a | 8.73a | 5.40a | 4.23c | 7.09b | 7. 57 a | 7.38b |
|  | $\begin{gathered} \text { H4gp+ } \\ \text { sd } \end{gathered}$ | 7.58 b | $\begin{gathered} 9.22 \\ \mathrm{a} \end{gathered}$ | 8.89a | 8.57a | 0d | 7.34a | 7.61b | $\begin{gathered} 7.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 5.83a | 7.81ab |
|  | $\begin{gathered} \text { H6gp+ } \\ \text { sd } \\ \hline \end{gathered}$ | 8.31ab | $\begin{gathered} 8.34 \\ \mathrm{a} \end{gathered}$ | 8.99a | 8.13a | 6.78c | 6.08a | 0d | $\begin{gathered} 8.72 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 8.11a | 7.93ab |
|  | $\begin{gathered} \text { H8gp+ } \\ \text { sd } \end{gathered}$ | 9 a | $\begin{gathered} 9.02 \\ \mathrm{a} \\ \hline \end{gathered}$ | 8.47a | 8.21a | 7.86b | 5.97a | 9.09a | 8.99a | 8.38a | 8.33a |
| Seeds <br> Source | Italian | 6. 76 a | $\begin{gathered} 8.71 \\ \mathrm{a} \end{gathered}$ | 8.61a | 9.06a | 6.13b | 6.65a | 6.15a | 7.82a | 8.26a | 8.09b |
|  | Modest 0 | 5.79b | $\begin{gathered} 8.59 \\ \mathrm{a} \\ \hline \end{gathered}$ | 8.87a | 7.29b | 5.40c | 6.91a | 4.91b | 8.03a | 7.06b | 7.19c |
|  | Genex | 7.37a | $\begin{gathered} 9.22 \\ \mathrm{a} \end{gathered}$ | 9.1a | 9.41a | 6.89a | $\begin{gathered} 6 . \\ 91 \mathrm{a} \end{gathered}$ | 6.99a | 8.33a | 7.5ab | 8.52a |
| Hgp | Italian | 8.47ad | 8.9a | 9.1ab | 10.07a | 7.37be | $\begin{aligned} & 4.57 \mathrm{a} \\ & \mathrm{~b} \end{aligned}$ | 9.1ab | 8.13a | 9.07a | 8.3ac |
|  | Modest o | 7.18cd | 8.6a | 9 ab | 7.7bd | 6.2de | 4.7 ab | 8.5ab | 7.9a | 7.6ab | 7.49cd |
|  | Genex | 9.3 ab | 9.9a | $\begin{gathered} 9.13 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 9.93 a | $\begin{gathered} \text { 8.43ab } \\ \mathrm{c} \\ \hline \end{gathered}$ | 7.2ab | 9.87a | 8.4a | 7.7Ab | 8.87a |
| Hds | Italian | 0 e | $\begin{gathered} 8.37 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 9.17 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 8.7abc | 8.87ab | 8.3a | 5.27c | 5.8a | $\begin{gathered} 7.77 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 7.78 \mathrm{bc} \\ \mathrm{~d} \\ \hline \end{gathered}$ |
|  | Modest | 0 e | $\begin{gathered} 7.93 \\ \mathrm{a} \\ \hline \end{gathered}$ | 8.2ab | $\begin{gathered} 8.6 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 7.93 \mathrm{ab} \\ \mathrm{~cd} \\ \hline \end{gathered}$ | 2.37b | 0d | 7.23a | $\begin{gathered} 6.83 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 6.14e |
|  | Genex | 0e | 8.8a | $\begin{gathered} 9.26 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 9.1ab | 9.4 a | $\begin{gathered} 5.53 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 7.43 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 8.23a | 8.1a | $\begin{gathered} 8.23 \mathrm{ab} \\ \mathrm{c} \end{gathered}$ |
| H4gp+sd | Italian | $\begin{gathered} 7.93 \mathrm{ab} \\ \mathrm{~cd} \end{gathered}$ | 9.3a | $\begin{gathered} 8.23 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 9.2 ab | Of | 7.33a | $\begin{gathered} 7.83 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 7.47a | 7.4ab | $\begin{gathered} 8.09 \mathrm{ab} \\ \mathrm{c} \end{gathered}$ |
|  | Modest | 6.5 d | $\begin{gathered} 9.47 \\ \mathrm{a} \end{gathered}$ | 8.8ab | 6.87cd | Of | 6.2a | $\begin{gathered} 6.67 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 6.87a | 4.87c | 7.03d |
|  | Genex | $\begin{gathered} \text { 8.3abc } \\ \mathrm{d} \end{gathered}$ | 9.2a | $\begin{gathered} 9.63 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 9.63 ab | Of | 8.5a | $\begin{gathered} 8.33 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 7.77a | $\begin{gathered} 5.23 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 8.33 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ |
| H6gp+sd | Italian | $\begin{gathered} 8.23 \mathrm{ab} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 7.83 \\ \mathrm{a} \\ \hline \end{gathered}$ | 8.6ab | $\begin{gathered} 8.77 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 6.63 \mathrm{~cd} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 5.93 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 0d | 8.77a | 7.9a | $\begin{gathered} 7.83 \mathrm{bc} \\ \mathrm{~d} \\ \hline \end{gathered}$ |
|  | $\begin{gathered} \hline \text { Modest } \\ \mathrm{o} \end{gathered}$ | 7.4bcd | $\begin{gathered} 8.17 \\ \mathrm{a} \\ \hline \end{gathered}$ | 9.83a | 6.7 d | 5.9 f | $\begin{gathered} 5.63 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 0d | 9a | 8.07a | 7.59cd |
|  | Genex | 9.3 ab | $\begin{gathered} 9.03 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 8.53 a \\ b \\ \hline \end{gathered}$ | 8.93ab | $\begin{gathered} \text { 7.8abc } \\ \mathrm{d} \end{gathered}$ | $\begin{gathered} 6.67 a \\ \mathrm{~b} \\ \hline \end{gathered}$ | 0d | 8.4a | 8.37a | $\begin{gathered} 8.37 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ |
| H8gp+sd | Italian | $\begin{gathered} 9.17 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 9.13 \\ \mathrm{a} \\ \hline \end{gathered}$ | 7.93b | $\begin{gathered} 8.57 \mathrm{ab} \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 7.8 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ | 7.1ab | 8.6ab | 8.93a | 9.17a | $\begin{gathered} 8.49 \mathrm{ab} \\ \mathrm{c} \end{gathered}$ |
|  | Modest | $\begin{gathered} 7.87 \mathrm{bc} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 8.77 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 8.53 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 6.63 d | $\begin{gathered} 6.97 \mathrm{~cd} \\ \mathrm{e} \end{gathered}$ | $\begin{gathered} 4.17 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 9.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 9.17a | 7.9a | 7.71 cd |
|  | Genex | 9.97a | $\begin{gathered} 9.17 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 8.93 a \\ b \\ \hline \end{gathered}$ | 9.43 ab | 8.8ab | $\begin{gathered} 6.63 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 9.3 ab | 8.87a | 8.07a | 8.8ab |

[^2]
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Table (9) The effects of harvesting frequencies on pod length ( cm ) at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | means |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harves <br> ting <br> types | Hgp | 16.65a | $\begin{gathered} 17.477 \\ a b \end{gathered}$ | $\begin{gathered} 16.872 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 15.195 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 15.838 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 11.27 \\ 8 a b \end{gathered}$ | $\begin{gathered} 17.92 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.61 \\ a b \end{gathered}$ | $\begin{gathered} 16.53 \\ \mathrm{a} \end{gathered}$ | 16.53a |
|  | Hds | Ob | 16.17c | $\begin{gathered} 15.196 \\ b \end{gathered}$ | 14.37a | $\begin{gathered} 13.794 \\ b \end{gathered}$ | $\begin{gathered} 9.144 \\ b \end{gathered}$ | $\begin{gathered} 8.056 \\ c \end{gathered}$ | $\begin{gathered} 15.06 \\ 1 b \end{gathered}$ | $\begin{gathered} 16.38 \\ 3 a \end{gathered}$ | 16.38a |
|  | $\begin{aligned} & \mathrm{H} 4 \mathrm{gp} \\ & +\mathrm{sd} \end{aligned}$ | $\begin{gathered} 17.111 \\ \mathrm{a} \end{gathered}$ | 16.59c | 17.33a | $\begin{gathered} 15.177 \\ \mathrm{a} \end{gathered}$ | 0c | $\begin{gathered} 13.94 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 15.18 \\ 3 \mathrm{~b} \end{gathered}$ | $\begin{gathered} 16.61 \\ 7 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 12.32 \\ 8 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 15.707 \\ \mathrm{a} \\ \hline \end{gathered}$ |
|  | $\begin{aligned} & \text { H6gp } \\ & + \text { sd } \end{aligned}$ | $\begin{gathered} 16.338 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 17.61 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.544 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 15.238 \\ \mathrm{a} \end{gathered}$ | 15.55a | $\begin{gathered} 14.48 \\ 3 \mathrm{a} \end{gathered}$ | 0d | $\begin{gathered} 17.24 \\ 6 a \end{gathered}$ | $\begin{gathered} 16.61 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.055 \\ \mathrm{a} \end{gathered}$ |
|  | $\begin{aligned} & \text { H8gp } \\ & + \text { sd } \end{aligned}$ | $\begin{gathered} 16.177 \\ \mathrm{a} \end{gathered}$ | 16.7 bc | 16.6a | $\begin{gathered} 14.598 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 14.67 \\ a b \end{gathered}$ | $\begin{gathered} 12.75 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 18.33 \\ 3 \mathrm{a} \end{gathered}$ | $\begin{gathered} 17.24 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 15.96 \\ \mathrm{a} \end{gathered}$ | 15.96a |
| Seeds Source | Italia <br> n | $\begin{gathered} 14.599 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 18.6 \\ a \end{gathered}$ | $\begin{gathered} 17.986 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 16.055 \\ \mathrm{a} \\ \hline \end{gathered}$ | 13.09a | $\begin{gathered} 13.46 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 13.14 \\ 5 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 18.39 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.75 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 7.781 \\ \mathrm{a} \\ \hline \end{gathered}$ |
|  | Mode sto | 12.49b | $\begin{gathered} 15.937 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 15.736 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 14.102 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 11.19b | $\begin{gathered} \hline 10.04 \\ \mathrm{a} \\ \hline \end{gathered}$ | 9.62b | $\begin{gathered} 15.43 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 13.86 \\ b \end{gathered}$ | 14.82c |
|  | $\begin{array}{\|l\|} \hline \text { Gene } \\ \mathrm{x} \end{array}$ | 12.68b | 16.15b | $\begin{gathered} 15.805 \\ \text { b } \end{gathered}$ | $\begin{gathered} 14.596 \\ b \end{gathered}$ | $\begin{gathered} 11.63 \\ b \end{gathered}$ | $\begin{gathered} 13.45 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 12.93 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 15.85 \\ b \end{gathered}$ | $\begin{gathered} 15.07 \\ 8 b \end{gathered}$ | $\begin{gathered} 15.781 \\ \mathrm{~b} \end{gathered}$ |
| Hgp | Italia <br> n | 18.4ab | $\begin{gathered} 19.023 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 18.35 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 16.4a | $\begin{gathered} 17.416 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 10.25 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 19.56 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 18.57 \\ 7 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 18.25 \\ \mathrm{a} \end{gathered}$ | 18.25a |
|  | Mode sto | $\begin{gathered} 15.533 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 16.69 \mathrm{c} \\ \mathrm{de} \end{gathered}$ | $\begin{gathered} 16.333 \\ \text { abcd } \end{gathered}$ | $\begin{gathered} 14.353 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 14.983 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 9.883 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 16.96 \\ 7 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 15.49 \\ 3 \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 15.23 \\ 3 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 15.233 \\ \text { de } \end{gathered}$ |
|  | Gene | $\begin{gathered} 16.016 \\ \text { cd } \\ \hline \end{gathered}$ | $\begin{gathered} 16.72 \mathrm{c} \\ \mathrm{de} \end{gathered}$ | $\begin{gathered} 15.933 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 14.833 \\ \text { abc } \end{gathered}$ | $\begin{gathered} 15.116 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 13.7 a \\ b \end{gathered}$ | $\begin{gathered} 17.23 \\ 3 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 15.87 \\ 3 \mathrm{c} \end{gathered}$ | $\begin{gathered} 16.11 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.116 \\ \text { bcde } \end{gathered}$ |
| Hds | Italia <br> n | 0 e | $\begin{gathered} 18.053 \\ \text { abcd } \end{gathered}$ | $\begin{gathered} 16.383 \\ \text { abcd } \end{gathered}$ | $\begin{gathered} 15.226 \\ \text { abc } \end{gathered}$ | 14.8cd | $\begin{gathered} 13.21 \\ 7 \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 10.28 \\ 3 \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 16.46 \\ 7 \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 17.85 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.85 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ |
|  | Mode sto | 0.00e | $15.193$ <br> e | $\begin{gathered} 14.680 \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 13.840 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 12.183 \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 4 . \\ 33 \mathrm{~b} \end{gathered}$ | 0d | $\begin{gathered} 13.93 \\ 3 \mathrm{c} \end{gathered}$ | $\begin{gathered} 14.76 \\ 7 \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 14.77 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ |
|  | $\begin{array}{\|l\|} \hline \text { Gene } \\ \mathrm{x} \\ \hline \end{array}$ | 0.00e | $\begin{gathered} 15.276 \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 14.527 \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 14.066 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 14.400 \\ \mathrm{~cd} \\ \hline \end{gathered}$ | $\begin{gathered} 9.883 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 13.88 \\ 3 \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 14.78 \\ 3 \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 16.53 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 16.533 \\ \text { abcd } \end{gathered}$ |
| $\begin{aligned} & \mathrm{H} 4 \mathrm{gp}+ \\ & \text { sd } \end{aligned}$ | Italia <br> n | $\begin{gathered} 18.600 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 18.546 \\ \text { abc } \\ \hline \end{gathered}$ | $\begin{gathered} 18.967 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.366 \\ a \end{gathered}$ | 0.00f | $\begin{gathered} 14 . \\ 55 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 15.66 \\ 0 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 18.57 \\ 7 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 16.73 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.842 \\ a b \\ \hline \end{gathered}$ |
|  | Mode sto | $\begin{gathered} 16.250 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 15.606 \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 18.167 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 14.016 \\ c \end{gathered}$ | 0.00f | $\begin{gathered} 12.48 \\ 3 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 13.75 \\ 0 \mathrm{bc} \end{gathered}$ | $\begin{gathered} 15.49 \\ 3 \mathrm{c} \end{gathered}$ | $\begin{gathered} 9 . \\ 393 \mathrm{c} \end{gathered}$ | $\begin{gathered} 14.284 \\ \mathrm{e} \end{gathered}$ |
|  | $\begin{array}{\|l\|} \hline \text { Gene } \\ \mathrm{x} \\ \hline \end{array}$ | $\begin{gathered} 16.483 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 15.610 \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 16.867 \\ \text { abcd } \end{gathered}$ | $\begin{gathered} 15.150 \\ \text { abc } \end{gathered}$ | 0.00 f | $\begin{gathered} 14.80 \\ 0 \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.13 \\ 7 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 15.78 \\ 3 \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 10.86 \\ 7 \mathrm{bc} \end{gathered}$ | $\begin{gathered} 14.995 \\ \text { de } \\ \hline \end{gathered}$ |
| $\begin{aligned} & \text { H6gp+ } \\ & \text { sd } \end{aligned}$ | Italia <br> n | $\begin{gathered} 17.900 \\ \text { abc } \\ \hline \end{gathered}$ | $\begin{gathered} 19.160 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 18.267 \\ \text { abc } \end{gathered}$ | $\begin{gathered} 16.283 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.100 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 14.31 \\ 7 \mathrm{ab} \end{gathered}$ | 0.00d | $\begin{gathered} 19.17 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 18.30 \\ 0 \mathrm{a} \end{gathered}$ | $\begin{gathered} 17.332 \\ \mathrm{abc} \end{gathered}$ |
|  | Mode sto | $\begin{gathered} 15.450 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 16.580 \\ \text { cde } \end{gathered}$ | $\begin{gathered} 15.567 \\ \mathrm{~cd} \\ \hline \end{gathered}$ | $\begin{gathered} 14.266 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 14.916 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 14.21 \\ 7 \mathrm{ab} \end{gathered}$ | 0.00d | $\begin{gathered} 16.11 \\ 7 \mathrm{bc} \end{gathered}$ | $\begin{gathered} 15.28 \\ 3 \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 15.182 \\ \text { de } \end{gathered}$ |
|  | $\begin{array}{\|l\|} \hline \text { Gene } \\ \mathrm{x} \end{array}$ | $\begin{gathered} 15.666 \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 17.110 \\ \text { bcde } \end{gathered}$ | $\begin{gathered} 15.800 \\ \text { bcd } \\ \hline \end{gathered}$ | $15.166$ <br> abc | $\begin{gathered} 14.633 \\ \mathrm{~cd} \\ \hline \end{gathered}$ | $\begin{gathered} 12.91 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | 0.00d | $\begin{gathered} 16.45 \\ 0 \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 16.26 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 15.651 \\ \text { cde } \\ \hline \end{gathered}$ |
| $\begin{aligned} & \text { H8gp+ } \\ & \text { sd } \end{aligned}$ | Italia <br> n | $\begin{gathered} 18.083 \\ \text { abc } \end{gathered}$ | $\begin{gathered} 18.450 \\ \text { abc } \\ \hline \end{gathered}$ | $\begin{gathered} 17.967 \\ \text { abc } \end{gathered}$ | 16ab | $\begin{gathered} 16.133 \\ \text { abc } \end{gathered}$ | $\begin{gathered} 14.98 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 20.21 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 19.17 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.63 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.633 \\ \mathrm{abc} \end{gathered}$ |
|  | Mode sto | $\begin{gathered} 15.216 \\ d \end{gathered}$ | $\begin{gathered} 15.616 \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 15.933 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 14.033 \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 14.866 \\ \text { de } \end{gathered}$ | $\begin{gathered} 9.283 \\ a b \end{gathered}$ | $\begin{gathered} 17.38 \\ 3 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 16.11 \\ 7 \mathrm{bc} \end{gathered}$ | $\begin{gathered} 14.63 \\ 7 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 14.636 \\ \text { de } \end{gathered}$ |
|  | $\begin{aligned} & \text { Gene } \\ & \mathrm{x} \end{aligned}$ | $\begin{gathered} 15.233 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 16.033 \\ \text { de } \end{gathered}$ | $\begin{gathered} 15.900 \\ \text { bcd } \end{gathered}$ | $\begin{gathered} 13.763 \\ c \end{gathered}$ | $\begin{gathered} 14.033 \\ \text { cde } \end{gathered}$ | $\begin{gathered} 13.98 \\ 3 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 17.40 \\ 0 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 16.45 \\ 0 \mathrm{bc} \end{gathered}$ | $\begin{gathered} 15.61 \\ 0 \mathrm{ab} \end{gathered}$ | $\begin{gathered} 15.610 \\ \text { cde } \end{gathered}$ |

*Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed;
H8gp+sd= Harvesting green pods eight tims and the rest were left for dry seed; $\mathrm{H}=$ harvest.

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Table (10) The effects of harvesting frequencies on aborted seed number per pod at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | means |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | 2.47a | $\begin{gathered} 2.51 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.54ab | 2.73 ab | $\begin{gathered} 3.12 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.52 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.01a | $\begin{gathered} 2.32 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.12 \\ \mathrm{a} \end{gathered}$ | 2.6 a |
|  | Hds | 0.00b | 1.89b | 1.99b | 1.93c | 2.52b | 2.01b | 1.77b | $\begin{gathered} 2.14 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.38 \\ \mathrm{a} \end{gathered}$ | 2.08b |
|  | $\begin{aligned} & \mathrm{H} 4 \mathrm{gp}+ \\ & \text { sd } \end{aligned}$ | 1.99a | $\begin{gathered} 2.12 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.04a | 2.60b | 0.00c | $\begin{gathered} 2.52 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.96a | $\begin{gathered} 2.32 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.72 \\ \mathrm{a} \end{gathered}$ | 2.41a |
|  | $\begin{aligned} & \text { H6gp+ } \\ & \text { sd } \end{aligned}$ | 2.08a | 2.73a | 2.77ab | 3.08a | 3.30a | 3.49a | 0.00c | $\begin{gathered} 1.90 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.07 \\ \mathrm{a} \end{gathered}$ | 2.68a |
|  | $\begin{aligned} & \mathrm{H} 8 \mathrm{gp}+ \\ & \text { sd } \end{aligned}$ | 2.37a | $\begin{gathered} 2.48 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.66ab | 2.51 b | 3.69a | $\begin{gathered} 2.91 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.53a | $\begin{gathered} 2.32 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.74 \\ \mathrm{a} \end{gathered}$ | 2.58a |
| Seeds <br> Source | Italian | $\begin{gathered} 1.77 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.39a | 2.62b | 2.27b | 2.37b | 2.80a | 1.73b | $\begin{gathered} 1.79 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.97 \\ \mathrm{a} \end{gathered}$ | 2.34b |
|  | Modest o | 2.20a | 2.90a | 3.11a | 3.01a | 2.95a | 2.52a | 1.90b | $\begin{gathered} 2.35 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.07 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.73a |
|  | Genex | 1.35b | 1.75b | 2.07c | 2.42b | 2.27b | 2.75a | 2.53a | $\begin{gathered} 2.46 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1.98 \\ \mathrm{a} \end{gathered}$ | 2.32b |
| Hgp | Italian | $\begin{gathered} 2.277 \\ a b \end{gathered}$ | $\begin{gathered} 2.57 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 2.30 \mathrm{cde} \\ \mathrm{f} \end{gathered}$ | $\begin{gathered} \text { 2.13cde } \\ \text { f } \end{gathered}$ | $\begin{gathered} 2.87 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 2.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.30 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 1.83 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.03 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.35cde |
|  | Modest <br> o | 2.97a | $\begin{gathered} 3.13 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.33abc | 3.27a | $\begin{gathered} 3.73 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.23 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.60 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.23 \\ \mathrm{a} \end{gathered}$ | 2.99ab |
|  | Genex | $\begin{gathered} 1.67 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 1.83 b \\ c \end{gathered}$ | 2 ef | $\begin{gathered} 2.80 \mathrm{abc} \\ \mathrm{de} \end{gathered}$ | $\begin{gathered} 2.77 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 2.83 a \\ b \\ \hline \end{gathered}$ | 3.50a | $\begin{gathered} 2.53 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.10 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.45abc de |
| Hds | Italian | 0.00c | $\begin{gathered} 1.87 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 1.97 ef | 1.67 f | 2.27c | $\begin{gathered} 2.70 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.10 b \\ c \end{gathered}$ | $\begin{gathered} 1.37 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.23 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.02e |
|  | Modest o | 0.00c | $\begin{gathered} 2.43 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{aligned} & 2.30 \mathrm{cde} \\ & \mathrm{f} \\ & \hline \end{aligned}$ | $\begin{gathered} 2.17 \mathrm{bcd} \\ \text { ef } \end{gathered}$ | $\begin{gathered} 3.30 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 1.17b | 0.00d | $\begin{gathered} 2.43 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.53 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.04 e |
|  | Genex | 0.00c | 1.37c | 1.70 f | 1.97def | 2c | $\begin{gathered} 2.17 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.20 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 2.63 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.37 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.18de |
| H4gp+sd | Italian | $\begin{gathered} 1.93 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.30 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 3.40ab | $\begin{gathered} 2.5 \mathrm{abcd} \\ \text { ef } \end{gathered}$ | 0.00d | $\begin{gathered} 2.30 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.53 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 1.97 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.27 \\ \mathrm{a} \end{gathered}$ | $2.40 \mathrm{bcd}$ <br> e |
|  | Modest o | $\begin{gathered} 2.40 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.60 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 3.37ab | 3.37a | 0.00d | $\begin{gathered} 2.83 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.20 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.37 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.60 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.72 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | 1.53b | 1.47c | $\begin{gathered} 2.4 \mathrm{bcde} \\ \mathrm{f} \end{gathered}$ | 1.93ef | 0.00d | $\begin{gathered} 2.43 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.13 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.62 \\ a \end{gathered}$ | $\begin{gathered} 1.30 \\ \mathrm{a} \end{gathered}$ | 2.10 e |
| H6gp+sd | Italian | $\begin{gathered} 1.67 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.73 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 2.8 \text { abcd } \\ \text { ef } \end{gathered}$ | 3.10abc | $\begin{gathered} 3.33 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.23 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 0.00d | $\begin{gathered} 1.73 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.67 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} \text { 2.53abc } \\ \text { de } \end{gathered}$ |
|  | Modest <br> o | $\begin{gathered} \text { 2.70a } \\ \mathrm{b} \end{gathered}$ | 3.33a | 3.43a | 3.17 ab | $\begin{gathered} 3.60 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.87a | 0.00d | $\begin{gathered} 1.87 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.20 \\ \mathrm{a} \end{gathered}$ | 3.02a |
|  | Genex | $\begin{gathered} 1.87 a \\ b \\ \hline \end{gathered}$ | $\begin{gathered} 2.13 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 2.07 ef | $\begin{gathered} 2.97 \mathrm{abc} \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 2.97 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 3.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 0.00d | $\begin{gathered} 2.10 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 2.33 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.48abc de |
| H8gp+sd | Italian | $\begin{gathered} 2.47 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 2.47 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 2.6 \mathrm{abcd} \\ \text { ef } \end{gathered}$ | 1.97def | $\begin{gathered} 3.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.40 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 1.70c | $\begin{gathered} 2.07 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.63 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.41 \mathrm{bcd} \\ \mathrm{e} \end{gathered}$ |
|  | Modest <br> o | $\begin{gathered} 2.93 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3 ab | $\begin{gathered} 3.13 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ | 3.10abc | 4.10a | $\begin{gathered} 2.37 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.07 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.50 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.80 \\ \mathrm{a} \end{gathered}$ | 2.89abc |
|  | Genex | $\begin{gathered} 1.70 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1.97 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 2.20def | $\begin{gathered} 2.5 \mathrm{abcd} \\ \mathrm{ef} \end{gathered}$ | $\begin{gathered} 3.60 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.97 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.83 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 2.40 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 1.80 \\ \mathrm{a} \end{gathered}$ | $2.44 \mathrm{abc}$ <br> de |

*Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}=$ harvest .

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Table (11) The effects of harvesting frequencies on aborted ovule number per pod at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | $\underset{\mathrm{s}}{\mathrm{mean}}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvestin g types | Hgp | $\begin{gathered} 2.33 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.29 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2 . \\ 52 \mathrm{ab} \end{gathered}$ | 3.21a | $\begin{gathered} 3 . \\ 13 \mathrm{ab} \end{gathered}$ | 2.9a | 3.08a | 2.60a | 2.37a | 2.71a |
|  | Hds | $\begin{gathered} 0.00 \\ \mathrm{~b} \end{gathered}$ | 2.03b | 2.04b | 2.13c | 2.49b | 1.98a | 1.52b | 2.24a | 2.16a | 2.08b |
|  | $\underset{d}{\mathrm{H} 4 \mathrm{gp}+\mathrm{s}}$ | $\begin{gathered} 2.04 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.94a | 2.89a | $\begin{gathered} 2.59 b \\ c \end{gathered}$ | 0.00c | 3 a | 3.53a | 2.24a | 1.92a | 2.65 A |
|  | $\underset{d}{\text { H6gp+s }}$ | $\begin{gathered} 2.54 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.51 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.52 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.97 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.44a | 3.49a | 0.00c | 2.06a | 2.38a | 2.74 A |
|  | $\begin{gathered} \text { H8gp+s } \\ d \end{gathered}$ | $\begin{gathered} 2.41 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2.62 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.99a | $\begin{gathered} 2.83 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.99 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.14a | 3.23a | 2.39a | 1.86a | 2.72a |
| Seeds <br> Source | Italian | $\begin{gathered} 1.85 \\ \mathrm{a} \end{gathered}$ | 2.40a | $\begin{gathered} 2.67 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.76b | 2.39b | 3 a | 1.83 b | 2.16a | 2.12a | 2.53b |
|  | Modest | $\begin{gathered} 1.95 \\ \mathrm{a} \end{gathered}$ | 2.60a | 2.91a | 3.30a | 2.88a | 3.24a | 2.44a | 2.38a | 2.05a | 2.83a |
|  | Genex | $1.79$ | 2.30a | 2.21b | 2.18c | 1.96b | 2.47a | 2.55a | 2.38a | 2.24a | 2.38b |
| Hgp | Italian | $\begin{gathered} 2.77 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.23a | $\begin{gathered} 2.40 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 3.17 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 2.97 \mathrm{a} \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 2.23 a \\ b \\ \hline \end{gathered}$ | $\begin{gathered} \hline 2.33 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ | 2.57a | $\begin{gathered} 1.90 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 2.51 \mathrm{~b} \\ \mathrm{f} \\ \hline \end{gathered}$ |
|  | Modest o | $\begin{gathered} 1.90 \\ \mathrm{a} \end{gathered}$ | 2.73a | $\begin{gathered} 2.83 a \\ b \end{gathered}$ | 3.8a | 3.9ab | 3.93a | $\begin{gathered} 3.23 b \\ \mathrm{e} \end{gathered}$ | 2.5 a | $\begin{gathered} 2.03 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.99 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ |
|  | Genex | $\begin{gathered} 2.33 \\ \mathrm{a} \end{gathered}$ | 1.9a | $\begin{gathered} 2.33 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.67 \mathrm{a} \\ \mathrm{e} \end{gathered}$ | $\begin{gathered} 2.53 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 2.53 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.67 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | 2.73a | 3.17a | $\begin{gathered} 2.65 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ |
| Hds | Italian | 0b | 1.97a | 1.97 b | $\begin{gathered} 2.07 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 2.53 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | 2.7ab | 1.97e | 1.7 a | $\begin{gathered} 1.83 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.09 ef |
|  | Modest <br> 0 | 0b | 2.37a | $\begin{gathered} 2.33 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.53 \mathrm{~b} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 2.77 \mathrm{~b} \\ \mathrm{~d} \end{gathered}$ | 1.43 b | Of | 2.97a | 2.7 ab | $\begin{gathered} 2.14 \mathrm{~d} \\ \mathrm{f} \\ \hline \end{gathered}$ |
|  | Genex | 0b | 1.77a | 1.97b | 1.8 e | 2.17d | 1.8ab | 2.6ce | 2.07a | $\begin{gathered} 1.93 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 1.2 f |
| H4gp+sd | Italian | $\begin{gathered} 1.87 \\ \mathrm{a} \end{gathered}$ | 2.9a | 2.8 ab | $\begin{gathered} 2.47 \mathrm{~b} \\ \mathrm{e} \end{gathered}$ | 0 e | $\begin{gathered} 2.97 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.73 \mathrm{c} \\ \mathrm{e} \end{gathered}$ | 2.5 a | $\begin{gathered} 2.67 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} \text { 2.61a } \\ \mathrm{e} \\ \hline \end{gathered}$ |
|  | Modest | $\begin{gathered} 2.43 \\ \mathrm{a} \\ \hline \end{gathered}$ | 3a | 3.47a | $\begin{gathered} \hline 3.33 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | 0 e | 3.7ab | 4.73a | 2.07a | $\begin{gathered} 1.67 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 3.05a |
|  | Genex | $\begin{gathered} 1.83 \\ \mathrm{a} \end{gathered}$ | 2.93a | 2.4ab | 1.97e | 0 e | $\begin{gathered} 2.33 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.17 \mathrm{~b} \\ \mathrm{e} \end{gathered}$ | 2.17a | 1.43 b | $\begin{gathered} 2.28 \mathrm{~d} \\ \mathrm{f} \\ \hline \end{gathered}$ |
| H6gp+sd | Italian | $\begin{gathered} 2.63 \\ \mathrm{a} \end{gathered}$ | 2.7a | 3 ab | $\begin{aligned} & 3.23 \mathrm{a} \\ & \mathrm{~d} \\ & \hline \end{aligned}$ | $\begin{gathered} 3.33 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | 3.4ab | Of | 1.83a | $\begin{gathered} 2.63 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.85 \mathrm{a} \\ \mathrm{c} \end{gathered}$ |
|  | Modest | $\begin{gathered} 2.87 \\ \mathrm{a} \end{gathered}$ | 2.77a | $\begin{gathered} 2.43 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 3.5ab | 4.07a | 4.14a | Of | 2.07a | 2.1ab | $\begin{gathered} 2.99 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ |
|  | Genex | $\begin{gathered} 2.13 \\ \mathrm{a} \\ \hline \end{gathered}$ | 2.07a | $\begin{gathered} 2.13 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.17 \mathrm{c} \\ \mathrm{e} \end{gathered}$ | $\begin{gathered} 2.93 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 2.93 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | Of | 2.27a | 2.4ab | 2.38 cf |
| H8gp+sd | Italian | 2a | 2.5 a | $\begin{gathered} 3.17 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 2.87 \mathrm{a} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 3.13 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | 3.7ab | $\begin{gathered} 2.13 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ | 2.2a | $\begin{gathered} 1.57 a \\ b \\ \hline \end{gathered}$ | $\begin{gathered} 2.59 \mathrm{a} \\ \mathrm{e} \\ \hline \end{gathered}$ |
|  | Modest o | $\begin{gathered} 2.57 \\ \mathrm{a} \end{gathered}$ | 2.53a | 3.47a | $\begin{gathered} 3.33 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 3.67 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | 3 ab | $\begin{gathered} 4.23 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.3a | $\begin{gathered} 1.73 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.98 a \\ b \\ \hline \end{gathered}$ |
|  | Genex | $\begin{gathered} 2.67 \\ \mathrm{a} \end{gathered}$ | 2.83a | $\begin{gathered} 2.33 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 2.3ce | 2.17d | $\begin{gathered} 2.73 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 3.33 b \\ d \end{gathered}$ | $\begin{gathered} 5.933 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.59 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 2.59 \mathrm{a} \\ \mathrm{e} \end{gathered}$ |

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## 4. Yield

## Harvest frequencies

Continuous green pod removal gave the highest final green pod yield and the highest pod dry weight yield (table, 12-17). However, continuous green pod removal gave the worst dry pod yield (zero), dry seed yield (zero), green pod yield at $5^{\text {th }}$ harvest only, dry matter of green pod at $5^{\text {th }}$ harvest only, dry matter percentage of green pod and weight of 100 seeds at $2^{\text {nd }}$ to $5^{\text {th }}$ harvests and their final means for both, as compared to dry pod harvest treatments.Dry pod harvest treatment was categorized next at the fourth order in the sequence, since it gave the worst green pods yield (zero) among other investigated treatments (table, 12-17). It gave the lowest pod dry weight and 100 seeds weight at $1^{\text {st }}$ harvest (zero). On the other hand it showed the highest final mean of dry pod yield $350.72 \mathrm{~g} . \mathrm{m}^{-2}$ and the highest final mean of dry seeds yield $298.59 \mathrm{~g} . \mathrm{m}^{-2}$. Dry pod harvest treatment highly bypassed continuous green pods harvest treatment in dry pod yield and dry seeds yield by $\infty$, dry matter percentages of pods at $2^{\text {nd }}$ to $5^{\text {th }}$ by $20.3,20.96,14.23$ and $10.5 \%$, respectively, weight of 100 seeds at $2^{\text {nd }}$ to $5^{\text {th }}$ harvests and final dry seeds yield by $28.58,25.51,25.87,33.04$ and $14.26 \%$, respectively. These results suggested that as green pod frequencies increased dry pod and seedsyield were reduced, particularly continuous green pod removal left no chance for dry pods and dry seeds attainments, and thus yields were zero for both. However, growers aimed to produce dry seeds have not to harvest green pods and if they would like to take advantage of green pods green pod removal frequencies should not be exceeded four times for acceptable compromise. In this investigation, green pods yield was considered, since consumers mainly preferred immature and green paled mature cowpea green pods (Abdel and Al-slem, 2010). The controversial balance between green pod and dry seeds yields that accompanied harvest frequencies can be referred to the assimilate partitioning between vegetative and reproductive organs, where under pod removal circumstances the balance is shifted somehow to juvenility which induce plants to be more active in shoots, flower and pods generations. Therefore, plant senescence is delayed and plants are usually produces perfuse pods. In contrast, when pods are left on plants, shoots and pods generation are usually ceased earlier with limited pod number, such phenomenon if prevailed in crops where edible tissues are consumed immature for instance cucumber (Abdel, 2009).

## Seed sources

Italian appeared to be the most potent Ramshorn seed source (tables 12-17). It manifested the highest final mean of green pod yield $\left(1429.97 \mathrm{~g} . \mathrm{m}^{-2}\right)$, final mean of 100 seeds weight $(22.5 \mathrm{~g})$. It highly exceeded Genex in green pod yields at $2^{\text {nd }}$ and $3^{\text {rd }}$ harvests by 16.08 and $16.55 \%$, respectively, weight of 100 seeds at harvests $1^{\text {st }}$ to $5^{\text {th }}$ and $9^{\text {th }}$ harvests and final mean of 100 seeds weight by $13.46,13.86,20.86,18.52,15.34,24.57$ and $14.16 \%$, respectively. Italian source showed superiority over Modesto in green pod yield at $2^{\text {nd }}$ to $4^{\text {th }}$ harvests and final mean of green pod yield by $30.64,28.9,26.4$ and $17.25 \%$, respectively, green pod dry weight at $2^{\text {nd }}$ to $4^{\text {th }}$ harvests and green pod dry weight by $33.69,31.1,34.59$ and $20.15 \%$, respectively, final yield of dry pod $17.92 \%$, final mean of dry seeds yield $18.87 \%$, green pod dry matter percentages at $7^{\text {th }}$ harvest and final green pod dry matter percentage by 25.15 and $6.48 \%$, respectively, weight of 100 seeds at $1^{\text {st }}$ to $7^{\text {th }}$ and $9^{\text {th }}$ harvests and final mean of 100 seeds weight by $13.84,14.92,17.81,13.76,13.16,45.64,43.8,20.92$ and $20.64 \%$, respectively. However, it showed the worst yield of green pod at $1^{\text {st }}$ and $9^{\text {th }}$ harvests.

Modesto was the worst seed source in green pod yield, dry seed yield and green pod dry weight, since it manifested the lowest green pod yield at $2^{\text {nd }}$ to $8^{\text {th }}$ harvests and final mean of green pod yield and weight of green pod dry matter at $2^{\text {nd }}$ to $8^{\text {th }}$ harvests and final mean of green pod dry matter, dry matter percentage of green pod at $2^{\text {nd }}$ to $9^{\text {th }}$ harvests and final mean of green pod dry matter percentages at $2^{\text {nd }}, 4^{\text {th }}$ to $7^{\text {th }}$ harvests and final dry pod yield at $2^{\text {nd }}$ and $4^{\text {th }}$ to $8^{\text {th }}$, final mean

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of dry pod yield, weight of 100 seeds at $1^{\text {st }}, 2^{\text {nd }}, 6^{\text {th }}$ and $7^{\text {th }}$ harvests, and final mean of 100 seeds weight. The superiority of Italian source plant might be due to its huge vegetative growth of perfuse branching as it was apparent in the field which reflected on pod generations. It was found that Ramshorn cowpea cultivars produced by Italian company commenced with vigorous and more uniform seedlings and produced larger plant size as compared to other sources (Abdel and Al-Slem, 2010).

## Harvest frequencies and seed sources combinations

Green pod continuously removed from Genex pants dual treatment (tables 12-17) was the best as it gave the highest green pod yield at $1^{\text {st }}$ harvest, final mean of green pod yield, green pod dry matter weight at $1^{\text {st }}$ and $7^{\text {th }}$ harvests, final mean of green pod dry matter. However, it displayed the lowest green pod yield at $2^{\text {nd }}, 5^{\text {th }}$ and $9^{\text {th }}$ harvests, green pod dry weight at $3^{\text {rd }}, 5^{\text {th }}$ harvests, weight of 100 seeds at $1^{\text {st }}$ to $5^{\text {th }}, 8^{\text {th }}$ and $9^{\text {th }}$ harvests and the final mean of 100 seeds weight.

Genex plants harvested as dry pods treatment was the paramount treatment (tables, 12-17). It displayed the highest pod dry weight yield and seeds dry yield at $1^{\text {st }}$ and $4^{\text {th }}$ harvests, final mean of dry seeds yield, pod dry matter percentage at $5^{\text {th }}$ harvest. However, it showed the lowest of dry pod weight at $3^{\text {rd }}$ and $5^{\text {th }}$ to $8^{\text {th }}$ harvests, dry seeds yield at $5^{\text {th }}$ to $7^{\text {th }}$ harvests, pod dry matter percentage at $1^{\text {st }}$ harvest, final mean of 100 seeds weight and 100 seeds weight at $2^{\text {nd }}$ to $5^{\text {th }}$ harvests. All seed sources that were harvested as continuous green pod harvests manifested very low dry pod yield, yield of dry seeds. In contrast all seed sources which were harvested as dry pods revealed the lowest green pods yields.

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Table (12) The effects of harvesting frequencies on yield of green pod $\left(\mathrm{g} . \mathrm{m}^{-2}\right)$ at (Harvests $\left.1-9\right)$ of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvest ing types | Hgp | $\begin{gathered} 209.17 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 367.49 \\ a \end{gathered}$ | $\begin{gathered} 305.98 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 298.91 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 124.32 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 79.84 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 228.4 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 301.8 \\ 1 \mathrm{a} \end{gathered}$ | $\begin{gathered} 124.72 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 2040.7 \\ 4 \mathrm{a} \end{gathered}$ |
|  | Hds | 0.00b | 0.00b | 0.00b | 0.00b | 0.00c | 0.00b | 0.00b | 0.00b | 0.00b | 0.00d |
|  | $\begin{gathered} \text { H4gp } \\ \text { +sd } \end{gathered}$ | $\begin{gathered} 191.92 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 407.71 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 331.98 \\ a \end{gathered}$ | $\begin{gathered} 329.77 \\ \mathrm{a} \end{gathered}$ | 0.00c | 0.00b | 0.00b | 0.00b | 0.00b | $\begin{gathered} 1261.3 \\ 8 \mathrm{c} \end{gathered}$ |
|  | H6gp | $155.07$ | $410.68$ | $333.29$ | $326.23$ | $\begin{gathered} 144.91 \\ \mathrm{~b} \end{gathered}$ | $91.46$ | 0.00b | 0.00b | 0.00b | $\begin{gathered} 1461.6 \\ 3 \mathrm{~b} \end{gathered}$ |
|  | $\begin{gathered} \text { H8gp } \\ +\mathrm{sd} \end{gathered}$ | $\begin{gathered} 190.94 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 360.22 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 330.78 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 292.21 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 186.59 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 91.85 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 219.1 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 299.2 \\ 5 \mathrm{a} \\ \hline \end{gathered}$ | 0.00b | $\begin{gathered} 1970.9 \\ 6 \mathrm{a} \\ \hline \end{gathered}$ |
| Seeds <br> Source | Italian | $\begin{gathered} 126.28 \\ b \end{gathered}$ | $\begin{gathered} 353.14 \\ a \end{gathered}$ | $\begin{gathered} 296.62 \\ a \end{gathered}$ | 265a | $\begin{gathered} 86.96 a \\ b \end{gathered}$ | $\begin{gathered} 59.02 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 97.88 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 125.3 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 19.751 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 1429 . \\ 97 \mathrm{a} \end{gathered}$ |
|  | Modes to | $\begin{gathered} 159.13 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 270.31 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 230.11 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 209.66 \\ \mathrm{~b} \end{gathered}$ | 76.12b | $\begin{gathered} 42.47 \\ a \end{gathered}$ | $\begin{gathered} 82.51 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 116.4 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 31.854 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 1218.5 \\ 9 \mathrm{~b} \end{gathered}$ |
|  | Genex | $\begin{gathered} 162.84 \\ \quad \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 304.21 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 254.49 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 273.63 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 110.41 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 56.39 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{aligned} & 88 . \\ & \text { 16a } \\ & \hline \end{aligned}$ | $\begin{gathered} 118.9 \\ 1 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 23.226 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 1392.2 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ |
| Hgp | Italian | $\begin{gathered} 188.76 \\ \mathrm{ac} \end{gathered}$ | $\begin{gathered} 410.27 \\ \mathrm{ac} \end{gathered}$ | $\begin{gathered} 340.35 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 317.49 \\ \text { ad } \\ \hline \end{gathered}$ | $\begin{gathered} 116.06 \\ \text { cd } \end{gathered}$ | $\begin{gathered} 71.73 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 249.2 \\ 5 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 322.8 \\ 8 \mathrm{a} \end{gathered}$ | 98.75b | $\begin{gathered} 2115.5 \\ a \end{gathered}$ |
|  | Modes <br> to | 206ab | $\begin{gathered} 323.03 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 278.83 \\ c \end{gathered}$ | $\begin{gathered} 236.11 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 109.97 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 61.03 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 201.1 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 309.2 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 159.27 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 1884.7 \\ \text { bc } \end{gathered}$ |
|  | Genex | $\begin{gathered} 232.75 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 369.16 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 288.78 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 343.14 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 146.92 \\ \mathrm{bd} \\ \hline \end{gathered}$ | $\begin{gathered} 106.7 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 235.0 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 273.3 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 116.13 \\ \text { b } \\ \hline \end{gathered}$ | $\begin{gathered} 2122.0 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ |
| Hds | Italian | 0d | 0d | 0d | 0 e | 0 e | 0b | 0b | 0b | 0c | 0 e |
|  | Modes <br> to | 0d | 0d | 0d | 0e | 0e | 0b | 0b | 0b | 0c | 0 g |
|  | Genex | 0d | 0d | 0d | 0 e | 0 e | 0b | 0b | 0b | 0c | 0 g |
| $\underset{\mathrm{d}}{\mathrm{H} 4 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 156.45 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} \hline 476.76 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 382.24 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 366.23 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 0e | 0b | 0b | 0b | 0c | $\begin{gathered} 1377.8 \\ \mathrm{e} \end{gathered}$ |
|  | Modes to | $\begin{gathered} 224.47 \\ a b \end{gathered}$ | $\begin{gathered} 347.67 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 289.38 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 282.06 \\ \mathrm{ad} \end{gathered}$ | 0e | 0b | 0b | 0b | 0c | 1143.6 f |
|  | Genex | $\begin{gathered} 194.82 \\ a b \end{gathered}$ | $\begin{gathered} 402.7 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 324.23 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 341.01 \\ \mathrm{ac} \end{gathered}$ | 0e | 0b | 0b | 0b | 0c | $\begin{gathered} 1262.8 \\ \text { ef } \end{gathered}$ |
| $\underset{\mathrm{d}}{\mathrm{H} 6 \mathrm{~g}+\mathrm{s}}$ | Italian | $\begin{gathered} 118.97 \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 469.03 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 375.62 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 331.85 \\ \mathrm{ac} \\ \hline \end{gathered}$ | $\begin{gathered} 135.15 \\ \text { bd } \\ \hline \end{gathered}$ | $\begin{gathered} 105.7 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | 0b | 0b | 0c | $\begin{gathered} 1536.4 \\ \mathrm{~d} \\ \hline \end{gathered}$ |
|  | Modes <br> to | $\begin{gathered} 162.83 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 361.34 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 293.17 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 277.45 \\ \text { bd } \end{gathered}$ | $\begin{gathered} 119.88 \\ \text { bd } \\ \hline \end{gathered}$ | 78.4a | 0b | 0b | 0c | $\begin{gathered} 1293.0 \\ 6 \mathrm{ef} \\ \hline \end{gathered}$ |
|  | Genex | $\begin{gathered} 183.41 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 401.67 \\ \mathrm{ac} \\ \hline \end{gathered}$ | $\begin{gathered} 331.07 \\ \mathrm{ac} \end{gathered}$ | 369.4a | $\begin{gathered} 179.69 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 90.19 \\ \mathrm{a} \end{gathered}$ | 0b | 0b | 0c | $\begin{gathered} 1555.4 \\ \mathrm{~d} \end{gathered}$ |
| $\underset{\mathrm{d}}{\mathrm{H} 8 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 167.21 \\ \mathrm{ac} \end{gathered}$ | $\begin{gathered} 413.62 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 384.8a | $\begin{gathered} 309.41 \\ \mathrm{ad} \\ \hline \end{gathered}$ | $\begin{gathered} 183.59 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 117.5 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 240.1 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 303.7 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | 0 c | $\begin{gathered} 2122.0 \\ 3 \mathrm{a} \\ \hline \end{gathered}$ |
|  | Modes <br> to | $\begin{gathered} 202.37 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 319.52 \\ c \end{gathered}$ | $\begin{gathered} 289.19 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 252.65 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 150.76 \\ \mathrm{bd} \\ \hline \end{gathered}$ | $\begin{gathered} 72.92 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 211.4 \\ \text { 1a } \\ \hline \end{gathered}$ | $\begin{gathered} 272.8 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 1777.7 \\ \text { c } \end{gathered}$ |
|  | Genex | $\begin{gathered} 203.24 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 347.52 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 318.35 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 314.58 \\ \text { ad } \\ \hline \end{gathered}$ | $\begin{gathered} 225.43 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 85.04 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 205.7 \\ 9 \mathrm{a} \end{gathered}$ | $\begin{gathered} 321.2 \\ \mathrm{a} \end{gathered}$ | 0c | $\begin{gathered} 2021.1 \\ 3 \mathrm{ab} \end{gathered}$ |

*Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; H8gp + sd= Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}=$ harvest .

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Table (13) The effects of harvesting frequencies on weight of poddry matter ( $\mathrm{g} \cdot \mathrm{m}^{-2}$ ) at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | 52.04a | 84.07a | $\begin{gathered} 70.58 \\ a \end{gathered}$ | 69.17a | $\begin{gathered} 29.47 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 18.07 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 52.42 \\ a \end{gathered}$ | $\begin{gathered} 72.6 \\ 1 \mathrm{a} \end{gathered}$ | $\begin{gathered} 28.8 \\ 1 \mathrm{a} \end{gathered}$ | 477.24a |
|  | Hds | 0b | 0b | 0b | 0b | 0c | 0b | 0b | 0b | 0b | 0 e |
|  | $\begin{gathered} \text { H4gp+ } \\ \text { sd } \end{gathered}$ | 44.52a | 92.39a | $\begin{gathered} 76.11 \\ a \end{gathered}$ | 74.47a | 0c | 0b | 0b | 0b | 0b | 287.49d |
|  | $\begin{gathered} \text { H6gp+ } \\ \text { sd } \\ \hline \end{gathered}$ | 35.53a | 93.71a | $\begin{gathered} 75.82 \\ a \\ \hline \end{gathered}$ | 77.54a | $\begin{gathered} 33.08 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 21.01 \\ \mathrm{a} \\ \hline \end{gathered}$ | 0b | 0b | 0b | 336.69c |
|  | $\begin{gathered} \mathrm{H} 8 \mathrm{gp}+ \\ \mathrm{sd} \end{gathered}$ | 43.26a | 78.4a | $\begin{gathered} 72.61 \\ a \\ \hline \end{gathered}$ | 65.11a | $\begin{gathered} 40.96 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 20.59 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 50.32 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} \hline 68.6 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | 0b | 439.86b |
| Seeds Source | Italian | 29.87b | 78.3a | $\begin{gathered} 66.46 \\ a \end{gathered}$ | 62.3a | $\begin{gathered} 19.55 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 12.75 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 22.23 \\ a \end{gathered}$ | $\begin{gathered} 29.0 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 4.36 \\ b \end{gathered}$ | 324.87a |
|  | Modes to | $\begin{gathered} 36.73 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 58.57b | $\begin{gathered} 50.69 \\ \mathrm{~b} \end{gathered}$ | 46.29b | $\begin{gathered} 16.68 \\ b \end{gathered}$ | 9.55a | $\begin{gathered} 18.38 \\ a \end{gathered}$ | $\begin{gathered} 26.3 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 7.19 \\ \mathrm{a} \end{gathered}$ | 270.39b |
|  | Genex | 38.6a | 72.28a | $\begin{gathered} 59.92 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 63.19a | $\begin{gathered} 25.88 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 13.49 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 21.04 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 29.4 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 5.74 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 329.52a |
| Hgp | Italian | $\begin{gathered} 50.82 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 96.72 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 79.73 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 74.8 \mathrm{ab} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 28.42 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 15.29 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 56.79 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 75.2 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 21.7 \\ 8 \mathrm{c} \end{gathered}$ | 499.65a |
|  | $\begin{gathered} \text { Modes } \\ \text { to } \\ \hline \end{gathered}$ | $\begin{gathered} 48.82 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 66.67c | $\begin{gathered} 61.25 \\ \mathrm{~b} \end{gathered}$ | 52.93c | $\begin{gathered} 26.02 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 14.26 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 42.85 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 73.1 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 35.9 \\ 4 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 421.95 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ |
|  | Genex | 56.46a | $\begin{gathered} 88.84 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 70.76 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 79.79 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 33.98 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 24.64 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 57.61 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 69.3 \\ 4 \mathrm{a} \end{gathered}$ | $\begin{gathered} 28.7 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 510.13a |
| Hds | Italian | 0d | 0d | 0c | 0d | 0c | 0b | 0c | 0b | 0d | 0h |
|  | Modes <br> to | 0d | Od | 0c | 0d | 0c | 0b | 0c | 0b | 0d | 0h |
|  | Genex | 0d | 0d | 0c | 0d | 0c | 0b | 0c | 0b | 0d | 0h |
| $\underset{\mathrm{d}}{\mathrm{H} 4 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 33.65 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 105.64 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 88.19 \\ a \\ \hline \end{gathered}$ | 87.85a | 0c | 0b | 0c | 0b | 0d | $\begin{gathered} 315.34 \mathrm{e} \\ \mathrm{f} \end{gathered}$ |
|  | Modes <br> to | $\begin{gathered} 54.15 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 74.86 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 61.89 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 60.54 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 0c | 0b | 0c | 0b | 0d | 251.43g |
|  | Genex | $\begin{gathered} 45.76 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 96.67 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 78.26 \\ \text { ab } \end{gathered}$ | $\begin{gathered} 75.03 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | 0c | 0b | 0c | 0b | 0d | $\begin{gathered} 295.71 \mathrm{f} \\ \mathrm{~g} \end{gathered}$ |
| $\underset{\mathrm{d}}{\mathrm{H} 6 \mathrm{~g}+\mathrm{s}}$ | Italian | 26.17c | $\begin{gathered} 104.81 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 83.05 \\ \mathrm{ab} \end{gathered}$ | 80.2ab | $\begin{gathered} 30.26 \\ b \end{gathered}$ | $\begin{gathered} 23.53 \\ \mathrm{a} \end{gathered}$ | 0c | 0b | 0d | $\begin{gathered} 348.02 \mathrm{~d} \\ \text { ef } \end{gathered}$ |
|  | Modes to | $\begin{gathered} 37.18 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 81.81 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 65.39 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 64.28 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 25.92 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 17.41 \\ \mathrm{a} \\ \hline \end{gathered}$ | 0c | 0b | 0d | 292fg |
|  | Genex | $\begin{gathered} 43.23 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 94.52 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} \hline 79.01 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 88.15a | $\begin{gathered} 43.07 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 22.07 \\ \mathrm{a} \\ \hline \end{gathered}$ | 0c | 0b | 0d | $\begin{gathered} 370.05 \mathrm{c} \\ \text { de } \end{gathered}$ |
| $\underset{\mathrm{d}}{\mathrm{H8gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 38.71 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 84.33 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 81.34 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 68.65 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 39.09 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 24.94 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 54.35 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 69.9 \\ 2 \mathrm{a} \\ \hline \end{gathered}$ | 0d | $\begin{gathered} 461.33 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ |
|  | Modes to | $\begin{gathered} 43.51 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 69.53 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 64.92 \\ \mathrm{ab} \end{gathered}$ | 53.71c | $\begin{gathered} 31.46 \\ b \end{gathered}$ | $\begin{gathered} 16.08 \\ a \end{gathered}$ | $\begin{gathered} 49.04 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 58.2 \\ 9 \mathrm{a} \end{gathered}$ | 0d | $\begin{gathered} 386.55 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | $\begin{gathered} 47.55 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 81.35 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 71.56 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 72.98 \mathrm{a} \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 52.32 \\ a \end{gathered}$ | $\begin{gathered} 20.74 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 47.56 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 77.6 \\ 3 \mathrm{a} \end{gathered}$ | 0d | $\begin{gathered} 471.71 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ |

*Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $H 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}=$ harvest .

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Table (14) The effects of harvesting frequencies on yield of dry pod for product seeds ( $\mathrm{g} . \mathrm{m}^{-2}$ ) on at ( Harvests 1-9) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | $\begin{gathered} \text { FNP } \\ \text { H1 } \end{gathered}$ | $\begin{gathered} \text { FNP } \\ \text { H2 } \end{gathered}$ | $\begin{gathered} \text { FNPH } \\ 3 \end{gathered}$ | FNPH4 | $\begin{gathered} \text { FNPH } \\ 5 \end{gathered}$ | $\begin{gathered} \text { FNP } \\ \text { H6 } \end{gathered}$ | $\begin{gathered} \text { FNP } \\ \text { H7 } \end{gathered}$ | $\begin{gathered} \hline \text { FNP } \\ \text { H8 } \end{gathered}$ | Totol |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harv <br> estin <br> g types | Hgp | 0b | 0b | 0b | 0b | 0c | 0c | 0d | 0c | 0 e |
|  | Hds | 49.21a | 81.68a | 68.61a | 51.84a | $\begin{gathered} 26.99 \\ \mathrm{~b} \end{gathered}$ | 14.07b | 19.27c | 39.04ab | 350.72a |
|  | H4gp+sd | 0b | 0b | 0b | 0b | $\begin{gathered} 69.49 \\ \mathrm{a} \end{gathered}$ | 42.54a | 41.4b | 27.66b | 181.09b |
|  | H6gp+sd | 0b | 0b | 0b | 0b | 0c | 0c | 72.16a | 43.61 ab | 115.77c |
|  | H8gp+sd | 0b | 0b | 0b | 0b | 0c | 0c | 0d | 57.21a | 57.21 d |
| Seed <br> S <br> Sour <br> ce | Italian | 8.84a | 18.68a | 14.80a | 9.78a | $\begin{gathered} 19.89 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 11.90 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 27.07a | 36.24a | 147.20a |
|  | Modesto | 9.52a | 13.87a | 13.61a | 8.92a | $\begin{gathered} 16.25 \\ \mathrm{a} \end{gathered}$ | 7.20b | 23.19a | 32.29a | 124.83b |
|  | Genex | 11.17a | 16.46a | 12.76a | 12.4a | $\begin{gathered} 21.75 \\ \mathrm{a} \end{gathered}$ | 14.86a | 29.44a | 31.99a | 150.83a |
| Hgp | Italian | 0c | 0c | 0c | 0c | 0c | 0c | Of | Of | 0 i |
|  | Modesto | 0c | 0c | 0c | 0c | 0c | 0c | Of | Of | 0 i |
|  | Genex | 0c | 0c | 0c | 0c | 0c | 0c | Of | Of | 0 i |
| Hds | Italian | $\begin{gathered} 44.183 \\ \mathrm{~b} \end{gathered}$ | 93.4a | 74.01a | 48.89b | $\begin{gathered} 32.27 \\ \mathrm{~b} \end{gathered}$ | 14.17c | 15.2ef | $\begin{gathered} 39.37 \mathrm{bc} \\ \mathrm{de} \end{gathered}$ | 361.5b |
|  | Modesto | $\begin{gathered} 47.58 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 69.36b | $\begin{gathered} 68.03 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 44.61b | 17bc | 0c | 13.35ef | $\begin{gathered} 35.17 \mathrm{~cd} \\ \mathrm{e} \\ \hline \end{gathered}$ | 295.09c |
|  | Genex | 55.85a | $\begin{gathered} 82.28 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 63.79b | 62.01a | $\begin{gathered} 31.72 \\ \mathrm{~b} \end{gathered}$ | 28.03b | 29.27 de | $\begin{gathered} \text { 42.59bc } \\ \text { de } \end{gathered}$ | 395.56a |
| $\begin{gathered} \mathrm{H} 4 \mathrm{gp} \\ +\mathrm{sd} \end{gathered}$ | Italian | 0c | 0c | 0c | 0c | $\begin{gathered} \hline 67.22 \\ \mathrm{a} \\ \hline \end{gathered}$ | 45.34a | 37.31 cd | 30.24de | $\begin{gathered} 180.11 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ |
|  | Modesto | 0c | 0c | 0c | 0c | $\begin{gathered} 64.23 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 35.97 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 35.63cd | 22.59 e | 158.42ef |
|  | Genex | 0c | 0c | 0c | 0c | $\begin{gathered} 77.03 \\ \mathrm{a} \\ \hline \end{gathered}$ | 46.30a | 51.25bc | 30.15de | 204.73d |
| $\begin{gathered} \text { H6gp } \\ + \text { sd } \end{gathered}$ | Italian | 0c | 0c | 0c | 0c | 0c | 0c | 82.83a | $54.16 \mathrm{ab}$ <br> c | 136.99d |
|  | Modesto | 0c | 0c | 0c | 0c | 0c | 0c | 66.98ab | $\begin{gathered} 36.38 \mathrm{bc} \\ \mathrm{de} \end{gathered}$ | 103.37h |
|  | Genex | 0c | 0c | 0c | 0c | 0c | 0c | 66.65ab | $\begin{gathered} \text { 40.29bc } \\ \text { de } \end{gathered}$ | $\begin{gathered} 106.95 \mathrm{~g} \\ \mathrm{~h} \end{gathered}$ |
| $\begin{gathered} \text { H8gp } \\ + \text { sd } \end{gathered}$ | Italian | 0c | 0c | 0c | 0c | 0c | 0c | Of | 57.41 ab | 57.41j |
|  | Modesto | 0c | 0c | 0c | 0c | 0c | 0c | Of | 67.28a | 67.28j |
|  | Genex | 0c | 0c | 0c | 0c | 0c | 0c | Of | $\begin{gathered} \text { 46.93ab } \\ \text { cd } \end{gathered}$ | 46.93j |

*Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}=$ harvest .

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Table (15) The effects of harvesting frequencies on pod dry matter percentage (\%) at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | means |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | $\begin{gathered} 24.0 \\ 5 \mathrm{a} \end{gathered}$ | $\begin{gathered} 22.56 \\ b \end{gathered}$ | $\begin{gathered} 22.85 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 22.91 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 23.13 \\ b \end{gathered}$ | $\begin{gathered} 17.48 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 22.95 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 23.08 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 23.02 \\ \mathrm{a} \end{gathered}$ | 22.45a |
|  | Hds | 0b | $\begin{gathered} 27.14 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 27.64 \\ \mathrm{a} \\ \hline \end{gathered}$ | 26.17a | $\begin{gathered} 25.56 \\ a \end{gathered}$ | $\begin{gathered} 16.62 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 13.87 \\ \mathrm{~b} \end{gathered}$ | 22.7a | $\begin{gathered} 23.56 \\ a \end{gathered}$ | 22.91a |
|  | $\begin{gathered} \mathrm{H} 4 \mathrm{gp}+ \\ \text { sd } \end{gathered}$ | $\begin{gathered} \hline 22.7 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 22.05 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 22.73 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 22.46 \\ b \end{gathered}$ | 0d | $\begin{gathered} 24.06 \\ \text { a } \end{gathered}$ | $\begin{gathered} 25.98 \\ \mathrm{a} \end{gathered}$ | 25.7a | $\begin{gathered} 19.21 \\ \mathrm{a} \\ \hline \end{gathered}$ | 23.12a |
|  | $\begin{gathered} \text { H6gp+ } \\ \text { sd } \end{gathered}$ | $\begin{gathered} 22.8 \\ 5 \mathrm{a} \end{gathered}$ | 22.7 b | $\begin{gathered} 22.76 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 23.77 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 22.68 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 23.09 \\ \mathrm{a} \end{gathered}$ | 0c | $\begin{gathered} 26.19 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 25.81 \\ \mathrm{a} \end{gathered}$ | 23.73a |
|  | $\begin{gathered} \text { H8gp+ } \\ \text { sd } \end{gathered}$ | $\begin{gathered} 22.3 \\ 8 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 21.89 \\ b \\ \hline \end{gathered}$ | $\begin{gathered} 22.71 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 22.14 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 21.56 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 20.03 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 23.28 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 22.96 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 27.12 \\ a \end{gathered}$ | 22.67a |
| Seeds <br> Source | Italian | $\begin{gathered} 18.2 \\ 5 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 22.72 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 23.9a | 24.04a | $\begin{gathered} 18.45 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 21.51 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 17.62 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 23.49 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 24.42 \\ \mathrm{a} \\ \hline \end{gathered}$ | 23.17a |
|  | Modest 0 | $\begin{gathered} 18.2 \\ 2 \mathrm{a} \end{gathered}$ | $\begin{gathered} 22.71 \\ \mathrm{~b} \end{gathered}$ | 23.1a | 22.72a | 17.9a | 16.8a | $\begin{gathered} 14.08 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 24.11 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 23.03 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 21.76 \\ \mathrm{~b} \end{gathered}$ |
|  | Genex | $\begin{gathered} 18.7 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 24.38 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 24.21 \\ \mathrm{a} \end{gathered}$ | 23.71a | 19.4a | $\begin{gathered} 22.46 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 19.95 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 24.78 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 23.78 \\ \mathrm{a} \end{gathered}$ | 23.99a |
| Hgp | Italian | $\begin{gathered} 25.1 \\ 2 \mathrm{a} \end{gathered}$ | 22.5c | $\begin{gathered} 23.08 \\ c \end{gathered}$ | $\begin{gathered} 23.24 a \\ d \end{gathered}$ | $\begin{gathered} 24.03 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 13.94 \\ a b \end{gathered}$ | 23ab | $\begin{gathered} 23.23 \\ a b \end{gathered}$ | $\begin{gathered} 22.53 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 22.27 \\ \text { bd } \end{gathered}$ |
|  | Modest o | $\begin{gathered} 22.9 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 21.52 \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 21.87 \\ c \end{gathered}$ | $\begin{gathered} 22.36 \\ b d \end{gathered}$ | $\begin{gathered} 22.43 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 15.5 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 21.54 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 23.6 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 22.3ac | $\begin{gathered} 21.57 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | $\begin{gathered} 24.0 \\ 8 \mathrm{a} \end{gathered}$ | $\begin{gathered} 23.94 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 23.59 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 23.12 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 22.91 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 22.99 \\ \text { ab } \end{gathered}$ | $\begin{gathered} 24.32 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 22.41 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 24.21 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 23.51 \mathrm{a} \\ \mathrm{c} \end{gathered}$ |
| Hds | Italian | 0b | $\begin{gathered} 26.97 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 28.19 \\ \mathrm{a} \\ \hline \end{gathered}$ | 26.55a | $\begin{gathered} 25.19 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 25.06 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 16.27 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 17.76 \\ b \end{gathered}$ | $\begin{gathered} 23.31 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 23.66 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ |
|  | Modest | 0b | $\begin{gathered} 27.25 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 27.58 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 25.73 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ | $24.42$ <br> ac | 8.04b | 0c | $\begin{gathered} 24.78 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 22.7ac | $\begin{gathered} 20.06 \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | 0b | $\begin{gathered} 27.22 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 27.16 \\ \text { ab } \end{gathered}$ | $\begin{gathered} 26.23 a \\ b \end{gathered}$ | $\begin{gathered} 27.06 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 16.77 \\ a b \end{gathered}$ | $\begin{gathered} 25.35 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 25.56 \\ a b \end{gathered}$ | $\begin{gathered} 24.67 \\ \mathrm{a} \\ \hline \end{gathered}$ | 25a |
| $\underset{\mathrm{d}}{\mathrm{H} 4 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 21.2 \\ 8 \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 21.72 \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 22.87 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 24 . \\ 09 \mathrm{ad} \end{gathered}$ | 0d | $\begin{gathered} 24.27 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 25.17 \\ \mathrm{a} \end{gathered}$ | 26.4a | $\begin{gathered} 25.59 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 23.93 \mathrm{a} \\ \mathrm{c} \end{gathered}$ |
|  | Modest <br> o | $\begin{gathered} 24.0 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 20.41 \\ c \end{gathered}$ | 21.3c | $\begin{gathered} 21.36 \\ \mathrm{~d} \end{gathered}$ | 0b | 23.9a | $\begin{gathered} 25.83 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 25.4 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 16.39 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 22.33 \\ \text { bd } \end{gathered}$ |
|  | Genex | $\begin{gathered} 22.9 \\ 6 \mathrm{a} \end{gathered}$ | $\begin{gathered} 24.02 \\ \mathrm{ac} \end{gathered}$ | $\begin{gathered} 24.02 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 21.91 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | 0b | 24a | $\begin{gathered} 26.94 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 25.3 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 15.64 \\ c \end{gathered}$ | 23.1ac |
| $\underset{d}{\mathrm{H} 6 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} \hline 21.6 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 22.15 \\ c \end{gathered}$ | $\begin{gathered} 22.24 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 24.06 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 22.13 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 22.85 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 26.96 \\ a \end{gathered}$ | $\begin{gathered} 24.16 \\ a b \\ \hline \end{gathered}$ | $\begin{gathered} 23.28 \mathrm{a} \\ \mathrm{c} \end{gathered}$ |
|  | Modest | $\begin{gathered} 23.0 \\ 9 \mathrm{a} \\ \hline \end{gathered}$ | 22.5c | $\begin{gathered} 22.33 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 23.13 \mathrm{a} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 21.88 \\ b c \end{gathered}$ | $\begin{gathered} 21.98 \\ \mathrm{ab} \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 25.04 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 26.47 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} \text { 23.31a } \\ c \end{gathered}$ |
|  | Genex | $\begin{gathered} 23.7 \\ 7 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 23.45 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 23.71 \\ \mathrm{bc} \\ \hline \end{gathered}$ | $\begin{gathered} 24.12 \mathrm{a} \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 24.02 \\ \mathrm{ac} \\ \hline \end{gathered}$ | $\begin{gathered} 24.46 \\ \mathrm{a} \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 26.56 \\ a \\ \hline \end{gathered}$ | $\begin{gathered} 26.79 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 24.61 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ |
| $\underset{\mathrm{d}}{\mathrm{H} 8 \mathrm{gp}+\mathrm{s}}$ | Italian | $\begin{gathered} 23.1 \\ 7 \mathrm{a} \end{gathered}$ | $\begin{gathered} 20.55 \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 23.11 \\ c \end{gathered}$ | $\begin{gathered} 22.24 \\ b d \end{gathered}$ | $\begin{aligned} & \hline 20 . \\ & 91 \mathrm{c} \end{aligned}$ | $\begin{gathered} 21.42 \\ a b \end{gathered}$ | $\begin{gathered} 23.02 \\ a b \end{gathered}$ | $\begin{gathered} 23.09 \\ a b \end{gathered}$ | $\begin{gathered} 26.49 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 22.74 a \\ c \end{gathered}$ |
|  | Modest | $\begin{gathered} 20.9 \\ 5 \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 21.88 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 22.44 \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 21.03 \\ d \end{gathered}$ | $\begin{gathered} 20.75 \\ c \end{gathered}$ | $\begin{gathered} 14.6 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 23.02 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 21.7 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | 27.3a | $\begin{gathered} 21.52 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ |
|  | Genex | $\begin{gathered} 23.0 \\ 4 a \end{gathered}$ | $\begin{gathered} 23.25 \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 22.58 \\ c \end{gathered}$ | $\begin{gathered} 23.16 a \\ d \end{gathered}$ | 23 bc | $\begin{gathered} 24.06 \\ \text { a } \end{gathered}$ | $\begin{gathered} 23.15 \\ a b \end{gathered}$ | $\begin{gathered} 24.08 \\ a b \end{gathered}$ | $\begin{gathered} 27.56 \\ a \end{gathered}$ | $\begin{gathered} 23.76 a \\ c \end{gathered}$ |

[^4]
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Table (16) The effects of harvesting frequencies on yield of dry seeds ( $\mathrm{g} . \mathrm{m}^{-2}$ ) at (Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | Totol |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvestin g types | Hgp | 0b | 0b | 0b | 0b | 0c | 0c | 0d | 0c | 0e |
|  | Hds | 41.94a | 70.79a | $\begin{gathered} 59.66 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 44.70 \\ \mathrm{a} \end{gathered}$ | 22.29b | 12.19b | 15.90c | 32.12ab | 298.59a |
|  | $\underset{d}{\mathrm{H} 4 \mathrm{gp}+\mathrm{s}}$ | 0b | 0b | 0b | 0b | 56.1a | 36.15a | 34.23b | 22.64 b | 149.12b |
|  | $\underset{\mathrm{d}}{\mathrm{H} 6 \mathrm{gp}+\mathrm{s}}$ | 0b | 0b | 0b | 0b | 0c | 0c | 57.8a | 35.68ab | 93.48c |
|  | $\underset{d}{\mathrm{H} 8 \mathrm{gp}+\mathrm{s}}$ | 0b | 0b | 0b | 0b | 0c | 0c | 0d | 47.25a | 47.25d |
| Seeds <br> Source | Italian | 7.65a | 16.19a | $\begin{gathered} 12.37 \\ \mathrm{a} \end{gathered}$ | 8.58a | 15.93a | $\begin{gathered} 10.30 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 21.70a | 29.99a | 122.70a |
|  | Modest o | 7.96a | 11.92a | $\begin{gathered} 11.94 \\ \mathrm{a} \end{gathered}$ | 7.51a | 12.86a | 6.14b | 18.93a | 25.98a | 103.22b |
|  | Genex | 9.56a | 14.37a | $\begin{gathered} 10.89 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 10.73 \\ \mathrm{a} \end{gathered}$ | 18.24a | 12.57a | 24.13a | 26.65a | 127.13a |
| Hgp | Italian | 0c | 0c | 0b | 0c | 0c | 0c | 0 e | 0 e | 0h |
|  | Modest <br> o | 0c | 0c | 0b | 0c | 0c | 0c | 0 e | 0 e | 0h |
|  | Genex | 0c | 0c | 0b | 0c | 0c | 0c | 0 e | 0 e | 0h |
| Hds | Italian | 38.26b | 80.94a | $\begin{gathered} 61.86 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 42.90 \\ \mathrm{~b} \end{gathered}$ | 26.20b | 11.27c | 11.70e | 31.44 bcd | 304.57b |
|  | Modest o | $\begin{gathered} 39.78 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 59.59b | $\begin{gathered} 59.67 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 37.54 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 12.57 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | 0c | 10.66e | 28.85cd | 248.84c |
|  | Genex | 47.79a | $\begin{gathered} 71.84 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 54.45 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 53.64 \\ \mathrm{a} \\ \hline \end{gathered}$ | 27.91b | 25.31b | 25.33d | $\begin{gathered} 36.09 \mathrm{abc} \\ \mathrm{~d} \end{gathered}$ | 342.36a |
| H4gp+sd | Italian | 0c | 0c | 0b | 0c | 53.44a | 40.22a | $\begin{gathered} 31.20 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | 25.1 cd | $\begin{gathered} 149.97 \mathrm{~d} \\ \mathrm{e} \end{gathered}$ |
|  | $\begin{gathered} \text { Modest } \\ 0 \\ \hline \end{gathered}$ | 0c | 0c | 0b | 0c | 51.56a | $\begin{gathered} 30.67 a \\ b \\ \hline \end{gathered}$ | $\begin{gathered} 29.45 \mathrm{c} \\ \mathrm{~d} \\ \hline \end{gathered}$ | 17.89de | $\begin{gathered} 129.57 \mathrm{e} \\ \mathrm{f} \\ \hline \end{gathered}$ |
|  | Genex | 0c | 0c | 0b | 0c | 63.29a | $\begin{gathered} 37.55 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 42.03 b \\ c \end{gathered}$ | 24.93 cd | 167.81d |
| H6gp+sd | Italian | 0c | 0c | 0b | 0c | 0c | 0c | 65.58a | 44.33abc | $\begin{gathered} 109.91 \mathrm{f} \\ \mathrm{~g} \end{gathered}$ |
|  | Modest <br> o | 0c | 0c | 0b | 0c | 0c | 0c | $\begin{gathered} 54.56 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 29.09cd | 83.64 g |
|  | Genex | 0c | 0c | 0b | 0c | 0c | 0c | $\begin{gathered} 53.27 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | 33.61 bcd | 86.88 g |
| H8gp+sd | Italian | 0c | 0c | 0b | 0c | 0c | 0c | 0 e | 49.06ab | 49.06h |
|  | $\begin{gathered} \text { Modest } \\ \mathrm{o} \\ \hline \end{gathered}$ | 0c | 0c | 0b | 0c | 0c | 0c | 0 e | 54.07a | 54.07h |
|  | Genex | 0c | 0c | 0b | 0c | 0c | 0c | 0 e | 38.63 abc | 38.63h |

*Hgp=Harvesting green pod ; Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $H 8 g p+s d=$ Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}=$ harvest

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Table (17) The effects of harvesting frequencies on weight of 100 seeds ( g ) at ( Harvests $1-9$ ) of Ramshorn cowpea cultivar obtained from three varying sources*

| Detected Traits |  | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | means |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Harvesti ng types | Hgp | $\begin{gathered} 19.51 \\ \mathrm{a} \end{gathered}$ | 19.07b | $\begin{gathered} 19.52 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 19.23 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 17.92 \\ \mathrm{c} \end{gathered}$ | 14.6b | $\begin{gathered} 19.92 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 20.01 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 19.44 \\ \mathrm{a} \end{gathered}$ | 18.8c |
|  | Hds | 0b | 24.52a | 24.5a | $\begin{gathered} 24.21 \\ \mathrm{a} \end{gathered}$ | 23.9a | 16.3ab | 13.9c | $\begin{gathered} 20.96 \\ a \end{gathered}$ | $\begin{gathered} 23.52 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 21.48 \\ \mathrm{a} \end{gathered}$ |
|  | $\begin{aligned} & \text { H4gp+ } \\ & \text { sd } \end{aligned}$ | $\begin{gathered} 19.82 \\ a \end{gathered}$ | 19.28b | 19b | $\begin{gathered} 19.51 \\ \mathrm{~b} \end{gathered}$ | 0d | 23.83a | 24.5a | $\begin{gathered} 24.16 \\ a \end{gathered}$ | $\begin{gathered} 19.21 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 21.16 \\ a \end{gathered}$ |
|  | $\begin{aligned} & \text { H6gp+ } \\ & \text { sd } \\ & \hline \end{aligned}$ | $\begin{gathered} 18.66 \\ \mathrm{a} \end{gathered}$ | 19.58b | $\begin{gathered} 19.78 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 19.71 \\ \mathrm{~b} \end{gathered}$ | 19.2b | 18.4ab | 0d | $\begin{gathered} 24.64 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 23.87 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 20.48 \\ a b \end{gathered}$ |
|  | $\begin{aligned} & \text { H8gp+ } \\ & \text { sd } \\ & \hline \end{aligned}$ | $\begin{gathered} 19.56 \\ a \\ \hline \end{gathered}$ | 19.51b | $\begin{gathered} 19.31 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 18.99 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 18.61 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 16.63 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 18.99 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 19.6a | $\begin{gathered} 24.33 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 19.5 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ |
| Seeds <br> Source | Italian | $\begin{gathered} 16.86 \\ \mathrm{a} \end{gathered}$ | 22.26a | $\begin{gathered} 22.89 \\ \mathrm{a} \end{gathered}$ | 22.4a | $\begin{gathered} 17.37 \\ \mathrm{a} \end{gathered}$ | 20.87a | 17.5a | $\begin{gathered} 22.91 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 25.25 \\ \mathrm{a} \end{gathered}$ | 22.5a |
|  | Modes to | $\begin{gathered} 14.81 \\ \mathrm{~b} \end{gathered}$ | 19.37b | $\begin{gathered} 19.43 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 19.69 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 15.35 \\ \mathrm{~b} \end{gathered}$ | 14.33b | $\begin{gathered} 12.17 \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 21.59 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 20.71 \\ b \end{gathered}$ | $\begin{gathered} 18.65 \\ c \end{gathered}$ |
|  | Genex | $\begin{gathered} 14.86 \\ b \end{gathered}$ | 19.55b | $\begin{gathered} 18.94 \\ \mathrm{~b} \end{gathered}$ | 18.9b | $\begin{gathered} 15.06 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 18.66 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 16.71 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 21.12 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 20.27 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 19.71 \\ \mathrm{~b} \end{gathered}$ |
| Hgp | Italian | $\begin{gathered} 20.83 \\ \text { ac } \end{gathered}$ | 20.2cf | $\begin{gathered} 22.27 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 20.77 \\ c d \end{gathered}$ | $\begin{gathered} 18.57 \\ \mathrm{~d} \end{gathered}$ | 12.7 bc | $\begin{gathered} 21.9 \mathrm{a} \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 22.17 \\ \mathrm{ac} \end{gathered}$ | $\begin{gathered} 20.87 \\ \text { ad } \end{gathered}$ | $\begin{gathered} 20.03 \\ \text { ce } \end{gathered}$ |
|  | Modes to | $\begin{gathered} 18.8 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 18.37 \mathrm{e} \\ \mathrm{f} \end{gathered}$ | $\begin{gathered} 19.2 \mathrm{~d} \\ \mathrm{e} \end{gathered}$ | 17.9ef | $\begin{gathered} 17.37 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 12.37 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 18.73 \\ \mathrm{~b} \end{gathered}$ | 19bc | $\begin{gathered} 18.43 \\ \mathrm{~cd} \end{gathered}$ | $\begin{gathered} 17.79 \\ \mathrm{e} \\ \hline \end{gathered}$ |
|  | Genex | $\begin{gathered} 18.9 \mathrm{c} \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 18.63 \mathrm{~d} \\ \mathrm{f} \\ \hline \end{gathered}$ | 17.1e | $\begin{gathered} 19.03 \\ \text { df } \\ \hline \end{gathered}$ | $\begin{gathered} 17.83 \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 18.73 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 19.13 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 18.87 \\ \text { bc } \end{gathered}$ | $\begin{gathered} 19.03 \\ \text { bd } \\ \hline \end{gathered}$ | $\begin{gathered} 18.59 \\ \mathrm{e} \\ \hline \end{gathered}$ |
| Hds | Italian | 0 e | 26.7a | 27.4a | $\begin{gathered} 27.07 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 26.67 \\ a \end{gathered}$ | 25.9a | $\begin{gathered} 18.23 \\ \mathrm{~b} \\ \hline \end{gathered}$ | 17.3c | $\begin{gathered} 25.83 \\ a b \end{gathered}$ | $\begin{gathered} 24.45 \\ \mathrm{a} \\ \hline \end{gathered}$ |
|  | Modes to | 0 e | $\begin{gathered} 22.97 \mathrm{~b} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 23.93 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 22.37 \\ \mathrm{bc} \end{gathered}$ | 22bc | 7.53c | 0c | $\begin{gathered} 23.07 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 23.3 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 18.05 \\ \mathrm{e} \end{gathered}$ |
|  | Genex | 0 e | 23.9b | $\begin{gathered} 22.93 \\ \mathrm{bc} \end{gathered}$ | 23.2b | $\begin{gathered} 23.03 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 15.47 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 23.47 \\ a b \end{gathered}$ | $\begin{gathered} 21.97 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 21.43 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 21.93 \\ \text { bd } \end{gathered}$ |
| $\begin{aligned} & \mathrm{H} 4 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | Italian | 22.2a | $\begin{gathered} 21.37 \mathrm{~b} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 20.8 \mathrm{c} \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 21.87 \\ \mathrm{bc} \end{gathered}$ | 0 e | 26.03a | $\begin{gathered} 26.93 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 26.33 \\ a b \end{gathered}$ | 26.8a | $\begin{gathered} 24.04 \\ a b \end{gathered}$ |
|  | Modes to | $\begin{gathered} 18.93 \\ \text { cd } \end{gathered}$ | $\begin{gathered} 19.03 \mathrm{~d} \\ \text { ef } \\ \hline \end{gathered}$ | 18e | $\begin{gathered} 18.23 \\ \text { ef } \\ \hline \end{gathered}$ | 0e | $\begin{gathered} 22.53 a \\ b \\ \hline \end{gathered}$ | $\begin{gathered} 23.3 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 23.17 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 15.57 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 19.85 \\ \text { de } \end{gathered}$ |
|  | Genex | $\begin{gathered} 18.33 \\ \mathrm{~d} \\ \hline \end{gathered}$ | 17.43f | 18.2e | $\begin{gathered} 18.43 \\ \text { df } \\ \hline \end{gathered}$ | 0 e | $\begin{gathered} 22.93 \mathrm{a} \\ \mathrm{~b} \\ \hline \end{gathered}$ | $\begin{gathered} 23.27 \\ \mathrm{ab} \\ \hline \end{gathered}$ | $\begin{gathered} 22.97 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 15.27 \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 19.6 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ |
| $\begin{aligned} & \mathrm{H} 6 \mathrm{~g} p+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} 19.93 \\ \text { bd } \end{gathered}$ | $\begin{gathered} 21.17 \mathrm{~b} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 21.77 \\ \text { bc } \\ \hline \end{gathered}$ | $\begin{gathered} 21.97 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 21.07 \\ c \\ \hline \end{gathered}$ | $\begin{gathered} 19.73 \mathrm{a} \\ \mathrm{bc} \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 27.17 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 26.43 \\ \mathrm{a} \\ \hline \end{gathered}$ | $\begin{gathered} 22.4 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ |
|  | Modes to | $\begin{gathered} 17.73 \\ \mathrm{~d} \\ \hline \end{gathered}$ | $\begin{gathered} 18.81 \mathrm{~d} \\ \mathrm{f} \\ \hline \end{gathered}$ | $\begin{gathered} 18.9 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ | $\begin{gathered} 18.57 \\ \mathrm{df} \end{gathered}$ | $\begin{gathered} 18.37 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 17.37 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ | 0c | $\begin{gathered} 23.37 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 22.87 \\ \text { ac } \\ \hline \end{gathered}$ | $\begin{gathered} 19.5 \mathrm{~d} \\ \mathrm{e} \\ \hline \end{gathered}$ |
|  | Genex | 18.3d | $\begin{gathered} 18.77 \mathrm{~d} \\ \mathrm{f} \end{gathered}$ | $\begin{gathered} 18.67 \\ \text { de } \end{gathered}$ | $\begin{gathered} 18.6 \mathrm{~d} \\ \mathrm{f} \\ \hline \end{gathered}$ | $\begin{gathered} 18.17 \\ \mathrm{~d} \end{gathered}$ | 18.1ac | 0c | $\begin{gathered} 23.4 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 22.3 \mathrm{a} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 19.54 \\ \text { de } \end{gathered}$ |
| $\begin{aligned} & \mathrm{H} 8 \mathrm{gp}+\mathrm{s} \\ & \mathrm{~d} \end{aligned}$ | Italian | $\begin{gathered} 21.33 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 21.87 \mathrm{~b} \\ \mathrm{c} \\ \hline \end{gathered}$ | $\begin{gathered} 22.23 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 20.33 \\ \text { ce } \end{gathered}$ | $\begin{gathered} 20.53 \\ c \end{gathered}$ | 20 ac | $\begin{gathered} 20.43 \\ \mathrm{ab} \end{gathered}$ | $\begin{gathered} 21.03 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 26.33 \\ \mathrm{a} \end{gathered}$ | $\begin{gathered} 21.57 \\ c d \end{gathered}$ |
|  | Modes to | $\begin{gathered} 18.57 \\ \mathrm{~d} \end{gathered}$ | 17.67f | 17.9e | $\begin{gathered} 17.43 \\ \mathrm{f} \end{gathered}$ | $\begin{gathered} 17.57 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 11.83 b \\ c \end{gathered}$ | $\begin{gathered} 18.83 \\ \mathrm{~b} \end{gathered}$ | $\begin{gathered} 19.37 \\ \mathrm{bc} \end{gathered}$ | $\begin{gathered} 23.37 \\ \text { ac } \end{gathered}$ | $\begin{gathered} 18.06 \\ \mathrm{e} \end{gathered}$ |
|  | Genex | $\begin{gathered} 18.77 \\ \text { cd } \end{gathered}$ | 19df | 17.8e | $\begin{gathered} 19.2 \mathrm{~d} \\ \mathrm{f} \end{gathered}$ | $\begin{gathered} 17.73 \\ \mathrm{~d} \end{gathered}$ | $\begin{gathered} 18.07 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | 17.7b | 18.4c | $\begin{gathered} 23.3 \mathrm{a} \\ \mathrm{c} \end{gathered}$ | $\begin{gathered} 18.89 \\ \mathrm{e} \end{gathered}$ |

[^5] rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; H8gp + sd= Harvesting green pods eight tims and the rest were left for dry seed; $\mathrm{H}=$ harvest .

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## 5. Protein content

## Harvest frequencies

Four harvest green pod treatment displayed the highest protein content (28.65) of green seeds (table, 18). It exceeded continuous harvest by $34.7 \%$. Dry pod harvest came next as it bypassed continuous harvest by $32.68 \%$,followed by six harvest treatment which exceeded continuous harvest by $30.37 \%$. The fourth treatment was eight harvest which exceeded the continuous harvest by $22.7 \mathrm{a} \%$. These results were in accordance with those obtained by Rachie (1979). Dry cowpea seeds are rich in protein and 100 g dry seeds contain 22.8 g protein and fresh green seeds contain 3.3g (Watt and Merrill, 1963). Even cowpea leaves were found to contain 29 to $43 \%$ protein on dry basis (Nielsen et al., 1994). Modesto source appeared to possess the highest protein content for both dry seeds and green matured seeds ( $26.73 \%$ ). However, Genex showed the lowest protein content of seeds $26.07 \%$. Dry pod harvest of Modesto source manifested the highest seed protein content ( $31.06 \%$ ), which was significantly exceeded other sources harvested as continuous green pod harvests, and eight harvests. The worst treatment was Genex plants harvested continuously $19.76 \%$.

Table (18) The effects of harvesting frequencies on protein percentage in green and dry seeds (\%) of Ramshorn cowpea cultivar obtained from three varying sources*

| SeedsSour <br> ce | Hds | Hgp | H4gp+sd | H6gp+sd | H8gp+sd | means |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Italian | 26.96 ac | 21.63 de | 29.8 ab | 27.77 ab | 25.75 bd | 26.38 a |
| Modesto | 31.06 a | 22.43 ce | 27.55 ac | 26.55 ad | 26.07 ad | 26.73 a |
| Genex | 26.64 ad | 19.76 e | 28.6 ab | 28.87 ab | 26.49 ad | 26.07 a |
| means | 28.22 a | 21.27 b | 28.65 a | 27.73 a | 26.1 a |  |

*Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; H8gp+sd= Harvesting green pods eight tims and the rest were left for dry seed

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[^0]:    *Hgp=Harvesting green pod;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed; $\mathrm{PNPH}=$ pods number per plant harvest.

[^1]:    *Hgp=Harvesting green pod;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed; $\mathrm{H}=$ harvest.

[^2]:    *Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}=$ harvest.

[^3]:    *Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $H 8 g p+s d=$ Harvesting green pods eight tims and the rest were left for dry seed ; $\mathrm{H}==$ harvest .

[^4]:    *Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the rest were left for dry seed; H6gp+sd= Harvesting green pods six tims and the rest were left for dry seed; $\mathrm{H} 8 \mathrm{gp}+\mathrm{sd}=\mathrm{H} 4 \mathrm{gp}+\mathrm{sd}=$ Harvesting green pods eight tims and the rest were left for dry seed; $\mathrm{H}=$ harvest .

[^5]:    *Hgp=Harvesting green pod ;Hds=Harvesting dry seeds; H4gp+sd= Harvesting green pods four tims and the

