

## Research Article

# Effect of different seed rates on growth, seed yield and oil content of mustard variety Mehran Raya

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### Abstract

In order to observed the effect of various seed rate on the growth, seed yield and oil content of mustard variety Mehran Raya. This investigation was conducted during the year of 2017. Four treatments were formed including  $S_1 = 2.5 \text{ kg ha}^{-1}$ ,  $S_2 = 3.0 \text{ kg ha}^{-1}$ ,  $S_3 = 3.5 \text{ kg ha}^{-1}$  and  $S_4 = 4.0 \text{ kg ha}^{-1}$  at the Agronomy Section, Agriculture Research Institute, Tandojam. The results showed that growth and seed yield components of mustard were significantly ( $P < 0.05$ ) affected by the different seed rates. The mustard crop seed rate under  $2.5 \text{ kg ha}^{-1}$  ( $S_1$ ) with,  $32.05 \text{ m}^2$  plant population,  $162.55 \text{ cm}$  plant height,  $15.92 \text{ branches plant}^{-1}$ ,  $426.06 \text{ pods plant}^{-1}$ ,  $8.20 \text{ seeds pod}^{-1}$ ,  $21.31 \text{ g seed index}$ ,  $1195 \text{ kg seed yield ha}^{-1}$  and  $39.07\%$  oil content. The mustard crop receiving  $3.0 \text{ kg ha}^{-1}$  ( $S_2$ ) with  $40.11 \text{ m}^2$  plant population,  $151.56 \text{ cm}$  plant height,  $15.16 \text{ branches plant}^{-1}$ ,  $406.00 \text{ pods plant}^{-1}$ ,  $8.00 \text{ seeds pod}^{-1}$ ,  $20.73 \text{ g seed index}$ ,  $1386 \text{ kg seed yield ha}^{-1}$  and  $38.91\%$  oil content. The crop supplied with  $3.5 \text{ kg ha}^{-1}$  ( $S_3$ ) resulted  $45.06 \text{ m}^2$  plant population,  $148.71 \text{ cm}$  plant height,  $14.13 \text{ branches plant}^{-1}$ ,  $339.67 \text{ pods plant}^{-1}$ ,  $6.30 \text{ seeds pod}^{-1}$ ,  $18.21 \text{ g seed index}$ ,  $1290 \text{ kg seed yield ha}^{-1}$  and  $37.00\%$  oil content. The results further showed that the mustard crop given  $4.0 \text{ kg ha}^{-1}$  ( $S_4$ ) in crop performance resulted  $59.93 \text{ m}^2$  plant population,  $137.92 \text{ cm}$  plant height,  $11.07 \text{ branches plant}^{-1}$ ,  $204.67 \text{ pods plant}^{-1}$ ,  $5.90 \text{ seeds pod}^{-1}$ ,  $15.07 \text{ g seed index}$ ,  $1255 \text{ kg seed yield ha}^{-1}$  and  $37.94\%$  oil content. It was concluded that regardless the variation in the values of different growth and seed yield traits of mustard crop, the seed yield was markedly higher ( $1386 \text{ kg ha}^{-1}$ ) under seed rate  $3.0 \text{ kg ha}^{-1}$ .

**Keywords:** Growth; Oil content; Seed rat; Yield

### Introduction

Agriculture sector is a vital component of Pakistan's economy as it provides the raw

materials and helps in poverty alleviation.

This sector contributed 19.8 percent in GDP and it remains by far the largest employer

absorbing 42.3 percent of the country's total labor force. Oilseed yields are grown everywhere throughout the globe for eatable also non-edible purposes. Mustard, (*Brassica juncea* L.) will be customarily developed vital oilseed crop, starts to vital Asia, china Also burma. It need been grown starting with iran on close east to hundreds of years for huge numbers parts of eurasia. Those vital developing nations would Bangladesh, national Africa, China, India, Japan, Nepal, Also Pakistan, and also southern russia north of the caspian ocean [1]. Yield What's more its framing procedure rely on upon genetic, Ecological Furthermore agromania variables and also the collaboration between them [2]. Therefore, there may be a scope with expand those yield level for mustard Eventually Tom's perusing utilizing helter skelter yielding assortment seed Also Eventually Tom's perusing adopting legitimate management polishes for example, seed rate, date for seeding, irrigation, compost provision and different social operations. Ideal seed rate assumes a paramount part for transforming higher yield [3]. Stronghold about ideal plant thickness for every unit zone will be a prerequisite for Hosting expanded seed yield. Those plant thickness camwood a chance to be balanced toward the utilization about separate seed rates Also column dividing. Seed rate Subsequently impact encountered with urban decay because of deindustrialization, innovation developed, government lodgin yield Also yield helping characters from claiming mustard [4, 5]. In this way to observed the effect of seed rat on growth, yield and oil content, present study was performed in 20017.

### Materials and methods

The experiment was conducted at Agronomy Section, Agriculture Research Institute, Tandojam during, 2016-17. Four treatments were formed including  $S_1 = 2.5 \text{ kg ha}^{-1}$ ,  $S_2 = 3.0 \text{ kg ha}^{-1}$ ,  $S_3 = 3.5 \text{ kg ha}^{-1}$  and  $S_4 = 4.0 \text{ kg ha}^{-1}$  at the Agronomy Section, Agriculture

Research Institute, Tandojam with collaboration of department of Agronomy, Sindh Agriculture University, Tandojam. The experiment was laid out in three replicated randomized completely block design (RCBD).

### Observations were recorded

1. Plant population ( $\text{m}^{-2}$ )
2. Plant height (cm)
3. Branches  $\text{plant}^{-1}$
4. Pods  $\text{plant}^{-1}$
5. Seeds  $\text{pod}^{-1}$
6. Seed index (1000 seed weight, g)
7. Seed yield ( $\text{kg ha}^{-1}$ )
8. Oil content (%)

### Statistical analysis

The data were typed on computer and subjected to statically analysis using Statics 8.1 computer software (Statistix 2006).The significant difference among the treatment means and observations were compared L.S.D test where necessary.

### Results

In order to effect of different seed rates on growth, seed yield and oil content of mustard variety Mehran Raya, the experiment was conducted during 2016-17. Four treatments were formed including  $S_1 = 2.5 \text{ kg ha}^{-1}$ ,  $S_2 = 3.0 \text{ kg ha}^{-1}$ ,  $S_3 = 3.5 \text{ kg ha}^{-1}$  and  $S_4 = 4.0 \text{ kg ha}^{-1}$  at the Agronomy Section, Agriculture Research Institute, Tandojam.

### Plant population ( $\text{m}^2$ )

The effect of seed rate levels on plant tallness for mustard assortment Mehran Raya might have been evaluated and the results are presented in (Table 1). The variation among the findings of (Table 1) showed that those plant number from claiming mustard mixture Mehran Raya might have been essentially ( $P < 0.05$ ) impacted by changing seed rates levels. Those most extreme plant number (59.93  $\text{m}^2$ ) might have been noted in plots gained  $4.0 \text{ kg ha}^{-1}$  ( $S_4$ ), accompanied by Normal plant populace about 45.06  $\text{m}^2$  attained to plot provided for  $3.5 \text{ kg ha}^{-1}$  ( $S_3$ ), separately. However, those plant populace

declined extensively to 40. 11 m<sup>2</sup> the point when those mustard crop might have been supplied with 3. 0 kg ha<sup>-1</sup> (S<sub>2</sub>), separately. However, the least plant populace (32. 05 m<sup>2</sup>) might have been noted @ 2. 5 kg ha<sup>-1</sup>

(S<sub>1</sub>). As stated by the exploratory logic, those plots accepting 2. 5 kg ha<sup>-1</sup> (S<sub>1</sub>) might have been a ideal level in this way those plant populace for mustard will be concerned.

**Table 1. Plant population (m<sup>2</sup>) of mustard as affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>32.05 D</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>40.11 C</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>45.06 B</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>59.93 A</b>

### Plant height (cm)

The information regarding plant tallness for mustard assortment Mehran Raya as influenced by different seed rates are presented in (Table 2). The examination of fluctuation in (Table 2) showed huge (P<0. 05) impact for seed rates on the plant tallness from claiming mustard. Those most extreme plant stature (162. 55 cm) might have been noted previously, plots treated with 2. 5 kg ha<sup>-1</sup> (S<sub>1</sub>), accompanied by Normal plant stature from claiming 151. 56 cm attained for

plot provided for 3. 0 kg ha<sup>-1</sup> (S<sub>2</sub>), separately. However, the plant tallness declined impressively should 148. 71 cm at the mustard crop might have been supplied with 3. 5 kg ha<sup>-1</sup> (S<sub>3</sub>), separately. However, those least plant tallness (137. 92 cm) might have been noted @ 4. 0 kg ha<sup>-1</sup> (S<sub>4</sub>). As stated by the experimental logic, the plots accepting 2. 5 kg ha<sup>-1</sup> (S<sub>1</sub>) might have been an ideal level as such those plant tallness about mustard is worried.

**Table 2. Plant height (cm) of mustard as affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>162.55 A</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>151.56 B</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>148.71 C</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>137.92 D</b>

S.E.± = 0.1754

LSD 0.05 = 0.4291

### Branches plant<sup>-1</sup>

Those brings about connection to amount from claiming limbs plant<sup>-1</sup> for mustard assortment Mehran Raya as influenced Eventually Tom's perusing distinctive seed rates are provided for clinched alongside (Table 3). The examination of fluctuation (Table 3) shown that those extensions plant<sup>-1</sup> shifted altogether the point when the crop @ seed rates in differed levels in distinctive sources. The number about extensions plant<sup>-1</sup> for mustard mixture Mehran Raya might have been most astounding (15. 92) over

plots dealt with for seed rate in those rate about 2. 5 kg ha<sup>-1</sup> (S<sub>1</sub>), taken after by 15. 16 Normal number of extensions plant<sup>-1</sup> treated with seed rate @ 3. 0 kg ha<sup>-1</sup> (S<sub>2</sub>), separately. Under decreased seed rate 3. 5 kg ha<sup>-1</sup> (S<sub>3</sub>) brought about more stupendous amount about limbs plant<sup>-1</sup> (14. 13), separately. The least extensions plant<sup>-1</sup> (11. 07) might have been noted The point when mustard crop approached with 4. 0 kg ha<sup>-1</sup> (S<sub>4</sub>). It might have been watched that as those seed rates 2. 5 kg ha<sup>-1</sup> (S<sub>1</sub>) might have been an ideal level

in this way those limbs plant<sup>-1</sup> for mustard may be concerned.

**Table 3. Branches plant<sup>-1</sup> of mustard as affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>15.92 A</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>15.16 B</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>14.13 C</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>11.07 D</b>

S.E.± = 0.0591  
LSD 0.05 = 0.1446

**Pods plant<sup>-1</sup>**

Those effects concerning pods plant<sup>-1</sup> for mustard assortment Mehran Raya as influenced by different seed rates would provide for previously, (Table 4). Those examination of fluctuation (Table 4) shown that those pods plant<sup>-1</sup> differed essentially at those crop might have been approached for seed rates in shifted levels in distinctive sources. The pods plant<sup>-1</sup> of mustard assortment Mehran Raya might have been most elevated (426. 06) in plots approached

for seed rate In those rate from claiming 2. 5 kg ha<sup>-1</sup> (S1), taken after by 426. Normal pods plant<sup>-1</sup> approached with seed rate @ 3. 0 kg ha<sup>-1</sup> (S2), separately. Under decreased seed rate 3. 5 kg ha<sup>-1</sup> (S3) brought about more terrific pods plant-1 (339. 67), separately. The base pods plant-1 (204. 67) might have been noted at mustard crop treated for 4. 0 kg ha<sup>-1</sup> (S4). It might have been watched that as those seed rates 2. 5 kg ha<sup>-1</sup> (S1) might have been an ideal level in this way those pods plant<sup>-1</sup> about mustard may be worried.

**Table 4. Pods plant<sup>-1</sup> of mustard as affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>426.06 A</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>406.00 B</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>339.67 C</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>204.67 D</b>

S.E.± = 1.9387  
LSD 0.05 = 4.7437

**Seeds plant<sup>-1</sup>**

Those brings about connection to seeds pod<sup>-1</sup> about mustard mixture Mehran Raya as influenced Eventually Tom's perusing separate seed rates need aid provided for done (Table 5). Those examination of fluctuation (Table 5) shown that those seed plant<sup>-1</sup> differed essentially at those crop might have been approached with seed rates in differed levels in distinctive wellsprings. The seeds pod<sup>-1</sup> of mustard mixed bag Mehran Raya might have been most elevated (8. 20) clinched alongside plots dealt with for

seed rate toward the rate for 2. 5 kg ha<sup>-1</sup> (S1), emulated by 8. 00 Normal seeds pod<sup>-1</sup> dealt with for seed rate @ 3. 0 kg ha<sup>-1</sup> (S2), separately. Under decreased seed rate 3. 5 kg ha<sup>-1</sup> (S3) brought about more excellent seeds pod<sup>-1</sup> (6. 30), separately. The base seeds pod<sup>-1</sup> (5. 90) might have been noted the point when mustard crop dealt with for 4. 0 kg ha<sup>-1</sup> (S4). It might have been watched that concerning illustration those seed rates 2. 5 kg ha<sup>-1</sup> (S1) might have been an ideal level as such those seeds pod<sup>-1</sup> about mustard is worried.

**Table 5. Seed index (1000-seed wt., g) of mustard as affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>21.31 A</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>20.73 B</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>18.21 C</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>15.07 D</b>

S.E.± = 0.0419

LSD 0.05 = 0.1025

**Seed yield (kg ha<sup>-1</sup>)**

The influence of seed rates levels on the seed yield of mustard variety Mehran Raya was examined and the results are shown in (Table 6). The analysis of variance (Table 6) indicated that the seed yield varied significantly when the crop was at seed rate at varied levels in different sources. The seed yield of mustard variety Mehran Raya was maximum (1386 kg ha<sup>-1</sup>) in plots treated with seed rate at the rate of 3.0 kg ha<sup>-1</sup> (S<sub>2</sub>),

followed by 1290 kg ha<sup>-1</sup> average seed yield treated with seed rate @ 3.5 kg ha<sup>-1</sup> (S<sub>3</sub>), respectively. Under reduced seed rate 4.0 kg ha<sup>-1</sup> (S<sub>4</sub>) resulted in greater seed yield (1255 kg ha<sup>-1</sup>), respectively. The minimum seed yield (1195 kg ha<sup>-1</sup>) was noted when mustard crop treated with 2.5 kg ha<sup>-1</sup> (S<sub>1</sub>). It was observed that as the seed rates 3.0 kg ha<sup>-1</sup> (S<sub>2</sub>) was an optimum level so far the seed yield of mustard is concerned.

**Table 6. Seed yield of mustard affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>1195 D</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>1386 A</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>1290 B</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>1255 C</b>

S.E.± = 0.0810

LSD 0.05 = 0.1982

**Oil content (%)**

Those oil content rate for mustard similarly as influenced Eventually Tom's perusing levels of seed rates need aid recorded done (Table 7). Furthermore its examination of variation similarly as (Table 7). The examination of fluctuation suggested that seed rates levels in distinctive part doses indicated noteworthy (P<0.05) impact ahead oil substance (%). It camwood a chance to be seen starting with the information (Table-8)

that greatest oil content (39.07%) might have been noted over crop getting seed rate @ 2.5 kg ha<sup>-1</sup> (S<sub>1</sub>), trailed Eventually Tom's perusing oil substance about 38.91%, 3.0 kg ha<sup>-1</sup> recorded from those crop provided for 3.0 kg ha<sup>-1</sup> (S<sub>2</sub>), individually. Those oil substance diminished should 37.00% when mustard crop approached for 3.5 kg ha<sup>-1</sup> (S<sub>3</sub>), individually. However, those base oil content (37.94%) might have been gotten clinched alongside under 4.0 kg ha<sup>-1</sup> (S<sub>4</sub>).

**Table 7. Oil content (%) of mustard as affected by seed rates**

Seed rates	Mean
S <sub>1</sub> = 2.5 kg ha <sup>-1</sup>	<b>39.07 A</b>
S <sub>2</sub> = 3.0 kg ha <sup>-1</sup>	<b>37.94 C</b>
S <sub>3</sub> = 3.5 kg ha <sup>-1</sup>	<b>37.00 D</b>
S <sub>4</sub> = 4.0 kg ha <sup>-1</sup>	<b>38.91 B</b>

S.E.± = 0.7243

LSD 0.05 = 1.7723

## Discussion

Crop administration polishes assume the majority imperative part in accomplishing the higher yields. Seed rate will be a standout amongst the real variables that impact the crop benefit [6]. The introduce consider might have been conveyed out to analyze those impact of different seed rates looking into growth, seed yield What's more oil substance from claiming mustard assortment Raya. It might have been finished up that in any case those variety in the qualities from claiming separate development and seed yield qualities from claiming mustard crop, those seed yield might have been markedly higher (1386 kg ha<sup>-1</sup>) when the crop might have been provided for 3.0 kg ha<sup>-1</sup>. These comes about are further affirmed by the individuals. Furthermore [7], who connected four seed rates (4, 5, 6, Furthermore 7 kg ha<sup>-1</sup>) Also inferred that In spite of those denser plots needed taller plants that required fewer parallel limbs Also fewer capsules for every plant, hosting all the more plants Previously, these plots brought about All the more seed yield. The majority of the data acquired infers that expanding plant populace might have been principally impacted Eventually Tom's perusing seed rate and plant populace might have been the primary variable that brought about seed yield with build Also it demonstrated 48 percent of the variety on seed yield. [8] reported that populace thickness additionally essentially influenced to constantly on Growth What's more yield parameters. Plant height, limb number, container number, container length, seed amount for every capsule, seed weight, seed yield and protein content diminished for the expanding plant number for both years, but for seed yield, harvest list Furthermore oil substance. [9] reported that seed weight and other yield qualities were enormously affected by number densities What's more seasons signifying moderate-to-high additions. Huge certain association might

have been discovered between seed yield What's more container weight, container amount Also seed handling effectiveness implying that yield will be An capacity of these parameters and determination In light of these Might further enhance those yield possibility. [10, 11] utilized seed rate about 5.50 kg ha<sup>-1</sup> for sowing mustard crop for 1st May, fifteenth May, 1st June Furthermore fifteenth June and finished up that primary fortnight for June (1st might with fifteenth May) might be accepted as an ideal sowing date What's more assortment S-17 might be utilized to higher seed yield and oil substance for seed rate about 5.50 kg ha<sup>-1</sup>. [12] news person that those seed rate might have been those primary variable to impact the planting thickness and ensuing plant populace. [13] utilized seeding rates (4, 6, 8 and 10 kg ha<sup>-1</sup>) what more has accounted that seed yield might have been essentially influenced Eventually Tom's perusing seeding rates. [14] recommended 6 kg ha<sup>-1</sup> seed rate under drill sowing technique emulated by 8 kg ha<sup>-1</sup> under show sowing technique in mustard. Furthermore seed yield differed essentially in the event about distinctive crop.

## Conclusions

It was concluded that regardless the variation in the values of different growth and seed yield traits of mustard crop, the seed yield was markedly higher (1386 kg ha<sup>-1</sup>) when the crop was given 3.0 kg ha<sup>-1</sup>.

## Authors' contributions

Conceived and designed the experiments: Q Jogi & HK Banglani, Performed the experiments: OMN Kandhr, R Anjum & ZA Kalwar, Analyzed the data: AR Mangi, MH Hullio & NA Abbasi, Contributed materials/analysis/ tools: R Vistro & S Shaikh, Wrote the paper: Q Jogi.

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