Effect of Different Harvest Dates on Yield and Quality of Wheat Cultivars Triticum Aestivum L.

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Abstract

Afield experiment was conducted at the Research station of the college of Agriculture - University of Al- Muthanna, in the Northeast of Al- Muthanna Governorate (9 km from center of the city of Samawa), in the seasons (2018-2019) and (2019-2020), to study the effect of four harvest dates and four varieties of wheat on yield and quality characteristics. The experiment was applied according to split- plots design Using the R.C.B.D with three replications, The results of the analysis showed the Significant effect of harvest dates on all studied traits, as the date of the third harvest increased by giving the highest grain yield of 5.01 and 5.32 t h⁻¹ for the two seasons respectively, while the fourth harvest date was superior by giving the highest percentage of dry gluten in the first season amounted to 11.66%. As for the effect of the cultivars, it was noticed that the Babel cultivar was superior in grain yield of 4.81 and 5.04 t ha⁻¹, for the two seasons respectively, while the Bora cultivar gave the highest average weight of 1000 grains for the second season which amounted to 32.68 g, and the percentage of protein in the grains was 12.83% for the second season, and Ash was 1.90 and 1.85% for the two seasons sequentially, while the interaction of the fourth harvest date with Babel cultivar was superior by giving highest weight of 1000 grains in the first season amounted to 33.41 m, while the interaction of the first harvest date with Bora cultivar in the vital yield first season was 16.6 t h⁻¹.

Keywords: Harvesting date, Varieties, Grain yield.

1. Introduction

The wheat crop is one of the most important cereal crops in the world in terms of the cultivated area, the planted by humans, as it ranks first among the cereal crops in the world and Iraq in terms of cultivated area, production and consumption, as the cultivated area in Iraq in 2020 amounted to about 8574 thousand dunums and a productivity of 6238 thousand tons [1], and its global trade is greater than the trade of other crops combined, as the high rate of crop productivity and the achievement of self- sufficiency of this crop can be reached if the appropriate production environment for the plant is available, represented by the development of new varieties with high production capacity and appropriate to the climatic conditions in Iraq. The process of determining the appropriate harvest date is one of the important processes that serve the development of the crop, in order to preserve the grains from untraveling and falling, due to the their exposure to environmental factors that may cause loss of plant parts and seeds due to their dropping from the flower carrier or through their impact on the quality of the yield as a result of exposure to heat. High when harvested in the summer, so this experiment was carried out with the aim of determining the appropriate harvest date to reduce the loss of quantity and quality of yield for varieties of wheat, The results of [2], indicated that there were significant difference between the harvest dates (Physiological maturity, dead maturity and post-ripening), as the first date was superior by giving the highest average weight of 1000 grains amounting to 46.91 g, while the two dates (dead and post-ripening) gave an average of (42.63 and 40.10) g sequentially.

2. Materials and Methods

Afield experiment was conducted at the Research station of the College of Agriculture –university of Al-Muthanna during the two seasons (2018-2019) and (2019-2020), and the study included two factors: four dates of harvest(dough maturity, physiological maturity, full maturity and post-ripening 20 days after full maturity) and symbolized by the symbol (H1,H2, H3 and H4) respectively, and four varieties (Abu Ghrairb, Nnewya, Babil and Bora),The are symbolized by (V1, V2,V3 and V4) sequence, and the experiment was carried out using (split- plots design) according to randomized complete block design (R.C.B.D) and three replications, the harvest dates included the (Main-plot), and the (Sub-plot) varieties. The experimental land was divided according to the design used into panels with an area of (1x2 =2 m²) that included 5 lines with a length of 2m for each line, has a distance of 20 cm between the lines, and the combinations were distributed randomly within each sector, thus, the total experimental units became (4x4x3= 48 experimental units), and were planted on 30/11/2018 for the first
season and 22/11/2019 for the second season. The use of urea fertilizer (46%N) at a rate of 200 kg ha⁻¹, and in four batches in the stages (branching, elongation, lining and flowering), and triple super phosphate fertilizer (46% P₂O₅) was added at a rate 100 kg ha⁻¹ and at once when planting.

2.1 The studied characteristics

2.1.1 Weight of 1000 grains (gm)

By random from the grain yield of each experimental unit for each treatment.

2.1.2 Grain yield

According to the grain yield from the area of the experimental unit and converted on a basis of (t ha⁻¹).

2.1.3 Biological yield (t ha⁻¹)

It was calculated by weight of the whole harvested plants (grain+ straw) from the experimental unit and converted on the basis of (t ha⁻¹) as mentioned in.

2.1.4 The percentage of protein in the grains (%)

A sample of the grains was taken and the protein content was estimated by Crop scan 2000 Bnir analyses.

2.1.5 Ash percentage (%)

The ash percentage in flour was estimated in the laboratory of the grain manufacturing company- Muthanna branch according to the standard method AACCL method 11.01-39 using the inframatic device supplied by perten Company by taking 15 gm of the flour sample and placing it in the place designated for it in the device.

2.1.6 The percentage of dry gluten (%)

The percentage of dry gluten was estimated by drying the piece of gluten obtained from the estimation of the wet gluten content at a temperature of 105 °C for minutes in a device (Glutork 2020), then the sample was weighed in a sensitive balance and converted to a percentage of through the following equation:

\[
\text{Dry gluten percentage} = \frac{\text{weight of dry gluten}}{\text{weight of flour sample}} \times 100
\]

Table 1. Some physical and chemical properties of field soil before planting.

| Season     | The ready amount is mg kg⁻¹ of soil | PH | EC Ds.m⁻¹ | CEC Cmol +Kg⁻¹ | Soil tissue | Organic matter | Soil separators mg kg⁻¹ of soil |
|------------|-----------------------------------|----|-----------|----------------|-------------|----------------|---------------------------------|
|            | N                                 | P  | K         |                |             |                | sand clay Silt                  |
| First      | 25.8                              | 12 | 181       | 7.22           | 5.98        | Alluvial        | 5.4                            | 236 204 560                      |
| Second     | 23.1                              | 16 | 186       | 7.31           | 5.11        | mixture         | 5.4                            | 238 212 550                      |

The data was analyzed statistically for all the studied traits using the Genstat, and the arithmetic means were compared using the least significant difference (L.S.D) at the 0.05 level.

3. Results and Discussion

3.1 The effect of varieties on yield and quality traits

The results of table (2) showed the significant effect of the varieties used in the study for all the studied traits in both seasons. The results of table (2) showed the superiority of Bable variety was significantly superior to the rest of the varieties by giving the highest average weight of 1000 grains for the first season amounted to 31.17 g, while the rest of the cultivars Bora, Nnewya and Abu Ghrab gave averages of (29.40, 28.77 and 28.19) gm, respectively, while the Borra variety outperformed in the second season, significantly, the highest average for this trait was 32.08 g, while the rest of the cultivars gave Babel, Abu Ghrab and Nnewya with an average (29.97, 29.82 and 29.05)g, respectively. Which provided a greater opportunity for the accumulation of photosynthetic products in grains according to the principle of compensation [3], as well as the influence
The results of table (2) for the first agricultural season showed the superiority of Babel variety, significantly by giving the highest average grain yield amounted to 4.81 t h\(^{-1}\), while the two cultivars Nwewya and Abu Ghrail recorded same between them, an average of 4.44 and 4.31 t h\(^{-1}\) respectively, while Bora cultivar gave the lowest average for these the trait reached 3.93 t h\(^{-1}\), and the Babel variety was significantly superior by giving the highest average grain yield of 5.03 t h\(^{-1}\) in the second season, while the rest of the varieties Bora, Abu Ghrail and Nwewya recorded averages of 4.74, 4.70 and 4.56 t h\(^{-1}\) respectively, and the reason for the superiority of the Babel variety is due to the superiority in the trait of weight of 1000 grains, this result agreed with the results of [4]. The results of the first season, table (2) showed the superiority of Babel variety by giving the highest average the biological yield reached 15.10 t h\(^{-1}\), surpassing that of the two cultivars Nwewya and Abu Ghrail, the difference between them was not significant, as they averaged 14.57 t h\(^{-1}\), while Bora cultivar gave the lowest average for this trait amounting to 14.27 t h\(^{-1}\), and Babel cultivar outperformed in the second season by giving the highest average yield of 15.67 t h\(^{-1}\), followed by the Nwewya cultivar without significant difference with an average of 15.24 t h\(^{-1}\), while the two cultivars Abu Ghrail and Bora gave averages of 14.84 and 14.61 t h\(^{-1}\) respectively, this result agreed with the results of [4,5]. The results of table (2) for the second agricultural season showed the purification of the cultivar Bora by giving the highest percentage of protein amounted to 12.83% while the rest of the cultivars Abu Ghrail, Babel and Nwewya gave an average of (12.43, 12.41 and 12.40) respectively, and this is due to the genetic difference between the cultivars, this result agreed with the results of [6,7], who indicated that the wheat varieties differed among themselves in their protein content. The results of the first agricultural season showed in table (2) that the Bora cultivar was significantly superior to the rest of the cultivars by giving the highest ash percentage of 1.90%, while the Abu Ghrail cultivar gave the lowest ash percentage of 1.78%, and Bora cultivar excelled in the second season by giving the highest ash percentage of 1.85%, this result is in agreement with the results of [3,7,16] who pointed out the different types of wheat among themselves in Ash content.

The results of table (2) for the first agricultural season indicated that there were significant differences between the cultivars in the percentage of dry gluten, whereas, the Abu Ghrail cultivar significantly outperformed the rest of the cultivars by giving the highest average for this amounting to 11.65%, followed by the two cultivars Babel and Bora with an average of (11.25 and 11.15) %, respectively, while the Nwewya cultivar recorded a significant decrease in the average dry gluten, which reached an average of 10.55%. In the second season, Babel cultivar outperformed by giving the highest mean of dry gluten that amounted to 11.23% without significant difference from the two cultivars Abu Ghrail and Bora, which reached 11.14 and 11.09% respectively, while the Nwewya variety gave the lowest average of 10.82%. this result agreed with the results of [8,9], who indicated the different types of wheat in their flour content of dry gluten.

### Table 2. Varieties in the characteristics of yield and quality components for the agricultural seasons 2018-2019 and 2019-2020.

| Varieties   | Weight of 1000 grains (gm) | Grain yield (t ha\(^{-1}\)) | Biological yield (t ha\(^{-1}\)) | protein in the grains (%) | Ash percentage (%) | percentage of dry gluten (%) |
|-------------|---------------------------|-----------------------------|-------------------------------|--------------------------|-------------------|-------------------------------|
| First season 2018-2019 |                           |                             |                               |                          |                   |                               |
| Abu Ghrail  | 28.19                     | 4.31                        | 14.57                         | 12.14                    | 1.78              | 11.65                         |
| Nwewya      | 28.77                     | 4.44                        | 14.75                         | 12.19                    | 1.82              | 10.65                         |
| Babal       | 31.17                     | 4.81                        | 15.10                         | 12.24                    | 1.86              | 11.25                         |
| Bora        | 29.40                     | 3.93                        | 14.27                         | 12.27                    | 1.90              | 11.15                         |
| L.S.D 0.05  | 0.832                     | 0.159                       | 0.186                         | N.S                      | 0.061             | 0.358                         |
| Second season 2019-2020 |                       |                             |                               |                          |                   |                               |
| Abu Ghrail  | 29.82                     | 4.70                        | 14.93                         | 12.43                    | 1.76              | 11.14                         |
| Nwewya      | 29.05                     | 4.66                        | 15.24                         | 12.40                    | 1.76              | 10.82                         |
| Babal       | 29.97                     | 5.03                        | 15.67                         | 12.41                    | 1.72              | 11.23                         |
| Bora        | 32.08                     | 4.74                        | 14.61                         | 12.83                    | 1.85              | 11.09                         |
| L.S.D 0.05  | 1.262                     | 0.151                       | 0.322                         | 0.336                    | 0.062             | 0.189                         |

#### 3.2 Effect of Harvest Dates on Yield and Quality

The results of table (3) showed the significant effect of different harvest dates on all studied traits for both seasons. The results of table (3) showed that the third harvest date was superior by giving the highest average weight of 1000 grains, which amounted to 31.39 and 34.79 g for both seasons, respectively, with no difference with the average date of the fourth harvest, which amounted to 30.16 and 33.49 g for both seasons, respectively, while the first and second dates gave averages. They reached (26.96 and 29.03) g and (21.55 and 31.10) g for both seasons sequentially, which means that the storage capacity of
early harvested grains is incomplete and its role in determining the productivity of the crop, as there may be large amounts of stored carbohydrates motile in crop plants until the end of its life cycle. The results of the first agricultural season showed in table (3) that the date of the third harvest was significantly superior by giving the highest average grain yield of 5.01 t ha\(^{-1}\), while the dates of the fourth and second harvest gave averages of 4.38 and 4.25 t ha\(^{-1}\) respectively, while the date of the first harvest recorded the lowest average for this trait of 3.84 t ha\(^{-1}\). it was also noted that the third harvest date was superior with no difference with the second harvest date, giving the highest average grain yield in the second season of 5.32 and 5.20 t ha\(^{-1}\) respectively, followed by the fourth date with an average of 4.83 t ha\(^{-1}\). While the first date of harvest gave the lowest average of 3.79 t ha\(^{-1}\), the results of the table indicated. (3) for the first agricultural season to the superiority of the first date of the harvest by giving the highest average of the biological yield of 15.76 t ha\(^{-1}\), while the two dates (second and third) gave averages of (15.11 and 14.19) t ha\(^{-1}\) respectively, while the date of the fourth harvest gave the lowest average for this trait amounted to 13.45 t ha\(^{-1}\), in the second season, it was noted that the second harvest date was superior by giving an average vital yield of 16.45 t ha\(^{-1}\), followed by a significant difference in the first date of harvest, which amounted to 15.57 t ha\(^{-1}\), while the third and fourth dates gave an average of 14.73 and 13.61 t ha\(^{-1}\) respectively, the reason for this may be attributed to the fact that the harvest in the other stages (physiological, complete and dead), the plant loses some leaves as a result of its death, especially the lower leaves, which affects the weight of the vegetative part of the plant compared to the mowing in the pasty phase, which the plant still retains all its parts, especially the leaves. The results of table (3) indicated a clear increase the percentage of protein with delaying the date of harvest and for both seasons sequentially, where the delay of the harvest to the stage of dead maturity led to an increase in the percentage of protein for both seasons, which amounted to (13.12 and 13.21)% , while the percentage of protein decreased at harvest in the stage of dough maturity, which amounted to (11.32 and 11.80)% for both seasons, respectively, as the wheat grain contains protein, mineral salts and vitamins. The ratio of starch to protein depends on the amount of moisture, flowering time, temperature during the period of grain formation, and the amount of nitrogen in the soil. The milling technology depends on the differences in the chemical composition of grains and physical properties of flour and its products. The results of table (3) showed that the first date of harvest was significantly superior by giving the highest average of Ash which amounted to 2.28 and 2.06% for both seasons in sequence, followed by the date of the second harvest with an average of 1.93% and 2.03% respectively, while the third and fourth dates gave the lowest average for this trait amounted to (1.59 and 1.56)% for the first season and 1.50 and 1.50% for the second season sequentially. The results of the first season showed in table (3) that the fourth harvest date was significantly superior by giving the highest average of this trait amounted to 11.66% followed by without a difference the second and third dates of harvest with an average of (11.36 and 11.33)% respectively, while the first harvest date gave the lowest mean of gluten that reached 10.35%, in when the date of the second harvest exceeded by giving an average of dry gluten in the second season it reached 11.88%, followed by the date of the third harvest with an average of 11.00 % while the two dates (first and fourth) gave an average of (10.69 and 10.71)% respectively.

Table 3. The effect of harvest dates on yield and quality characteristics for the two agricultural seasons 2018-2019 and 2019-2020.

| Adjectives | Harvest Dates | Weight of 1000 grains (gm) | Grain yield (t ha\(^{-1}\)) | Biological yield (t ha\(^{-1}\)) | Protein in the grains (%) | Ash percentage (%) | percentage of dry gluten (%) |
|------------|---------------|-----------------------------|-----------------------------|-------------------------------|--------------------------|---------------------|-----------------------------|
| First season 2018-2019 | First harvest date | 26.96 | 3.84 | 15.76 | 11.32 | 2.28 | 10.35 |
| | second harvest date | 29.03 | 4.25 | 15.11 | 12.15 | 1.93 | 11.36 |
| | third harvest date | 31.39 | 5.01 | 14.19 | 12.25 | 1.59 | 11.33 |
| | fourth harvest date | 30.16 | 4.38 | 13.45 | 13.12 | 1.56 | 11.66 |
| | L.S.D 0.05 | 1.463 | 0.184 | 0.218 | 0.165 | 0.046 | 0.529 |
| Second season 2019-2020 | First harvest date | 21.55 | 3.79 | 15.57 | 11.80 | 2.06 | 10.69 |
| | second harvest date | 31.10 | 5.20 | 16.44 | 12.60 | 2.03 | 11.88 |
| | third harvest date | 34.79 | 5.32 | 14.73 | 12.45 | 1.50 | 11.00 |
| | fourth harvest date | 33.49 | 4.83 | 13.60 | 13.21 | 1.50 | 10.71 |
| | L.S.D 0.05 | 2.801 | 0.130 | 0.494 | 0.515 | 0.082 | 0.142 |
3.3 Effect of interaction between cultivars and harvest dates on yield and quality traits

The results of table (3) showed the significant effect of the binary interaction between cultivars and harvest dates for all traits in both seasons. The results of the first agricultural season (table 4) indicated the superiority of the interaction of the cultivar Babel with the date of the fourth harvest, by giving the highest average weight of 1000 grains that reached 33.41 g, with no significant of the two combinations (Bura × third harvest date) and (Babel × third harvest date). Which reached 32.56 and 32.37 g respectively, while the combinations (Nwewya × first harvest date), (Abu Graib × second harvest date) and (Abu Graib x first harvest date) gave the lowest average for this trait amounting to 26.0, 26.61 and 26.69 g, respectively. In the second season, the interaction of the variety Nwewya with the date of the high harvest was an average weight of 1000 grains at night 30.25 g with no difference with the number of generations, while the vinegar of the variety Nwewya was given with the first harvest the lowest average weight of 1000 grains reached 19.93 g.

The results of table (4) for the first season indicated that the interaction of Babel cultivar with the date of the third harvest was significant, by giving the highest average grain yield of 5.84 t h⁻¹, while the two combinations (Bora × second harvest date) and (Nwewya × first harvest date) gave the lowest average of 3.52 and 3.63 t h⁻¹ sequentially, while it was noticed that the Abu Ghraid cultivar overlapped with the date of the third harvest in the second season by giving the highest average grain yield of 5.43 t h⁻¹ with no difference with the average number of combinations gave (Abu Ghraid × first harvest date) and (Nwewya × first harvest date) the lowest average for this trait, reaching (3.40 and 3.47) t h⁻¹ respectively. The results of the first season table (4) showed the superiority of the two combinations (Bura × first harvest date) and (Babel x second harvest date) significantly by giving the highest average biological yield amounting to (16.58 and 16.42) t h⁻¹ respectively, while the interaction of Nwewya variety with the fourth harvest date to give the first average of this trait amounted to 12.74 t h⁻¹ while in the second season, the overlap of the Abu Ghraid variety with the date of the second harvest by giving the highest average of the biological yield reached 17.82 t h⁻¹ with no difference with the average of the two combinations (Nwewya × second harvest date) and (Babel × first harvest date), while the interaction of Nwewya cultivar with the date of the fourth harvest gave the lowest average for this trait amounting to 11.95 t h⁻¹.

The results of table (4) for the first season showed that the interaction of Babel variety with the date of the fourth harvest was superior by giving the highest percentage of protein amounted to 13.34% with no difference with the average of the two combinations (Bura × fourth harvest date) and (Abu Ghraid × fourth harvest date), while interference of the variety gave Abu Ghraid with the date of the first harvest, the lowest average for this trait was 10.76%, while in the second season, the interaction of Nwewya variety with the date of the fourth harvest gave the highest average protein amounted to 13.54%, with no difference with the average number of combinations, while the overlap of the two cultivars gave Abu Ghraid and Babel with the date of the first harvest, the lowest average for this trait was (11.26 and 11.48)% respectively. The results of the first season showed in table (4) the superiority of the interaction of the Babel variety with the date of the first harvest by giving the highest percentage of Ash that amounted to 2.51%, while the interaction of the Abu Ghraid variety with the fourth date of harvest gave less. The percentage of this is 1.53% for the first season with no difference with a number of combinations. In the second season, the interaction of Nwewya cultivar with the mode of the second harvest was significant by giving the highest percentage of ash amounted to 2.21%, while the interaction of Nwewya cultivar with the date of the third harvest gave say the average for this trait was 1.43%.

The results of table (4) for the first season showed that the interaction of Abu Ghraid cultivar with the date of the fourth harvest was significant over the rest of the combinations by giving the highest mean of gluten amounted to13.42%, while the two combinations (Bable × first harvest date) and (Nwewya × second harvest date) gave the lowest average for this trait, reaching (9.96 and 10.07)% respectively, while in the second harvest date gave the highest percentage of dry gluten that reached 12.43%, while the combination (Bora × first harvest date) the lowest average for this trait amounted to 10.07%.
Table 4. Gave the effect of the interaction between varieties and harvest dates on yield and quality characteristics for the two agricultural seasons 2018-2019 and 2019-2020.

| Harvest Dates   | Varieties | Weight of 1000 grains (gm) | Grain yield (t ha⁻¹) | Biological yield (t ha⁻¹) | Protein in the grains (%) | Ash percentage (%) | Percentage of dry gluten (%) |
|-----------------|-----------|---------------------------|----------------------|--------------------------|--------------------------|------------------|----------------------------|
|                  | Abu Ghrab | 26.69                     | 3.94                 | 15.68                    | 10.76                    | 2.01             | 10.31                     |
|                  | Nwewya    | 26.40                     | 3.63                 | 15.27                    | 11.47                    | 2.30             | 10.80                     |
|                  | Babal     | 27.46                     | 3.99                 | 15.51                    | 11.44                    | 2.51             | 9.96                      |
|                  | Bora      | 27.29                     | 3.81                 | 16.58                    | 11.60                    | 2.30             | 10.33                     |
|                  | Abu Ghrab | 26.61                     | 3.98                 | 15.18                    | 12.26                    | 2.02             | 11.18                     |
|                  | Nwewya    | 29.00                     | 4.58                 | 15.12                    | 11.97                    | 1.86             | 10.07                     |
|                  | Babal     | 31.44                     | 4.93                 | 16.42                    | 11.94                    | 1.79             | 11.76                     |
|                  | Bora      | 29.06                     | 3.52                 | 13.72                    | 12.43                    | 2.06             | 12.42                     |
|                  | Abu Ghrab | 30.08                     | 5.33                 | 13.42                    | 12.42                    | 1.58             | 11.67                     |
|                  | Nwewya    | 30.56                     | 5.02                 | 15.14                    | 12.45                    | 1.57             | 11.45                     |
|                  | Babal     | 32.37                     | 5.84                 | 15.18                    | 12.23                    | 1.57             | 11.18                     |
|                  | Bora      | 32.56                     | 3.85                 | 13.03                    | 11.91                    | 1.63             | 11.00                     |
|                  | Abu Ghrab | 30.39                     | 4.00                 | 14.01                    | 13.13                    | 1.53             | 13.42                     |
|                  | Nwewya    | 29.13                     | 4.52                 | 12.74                    | 12.85                    | 1.55             | 10.28                     |
|                  | Babal     | 33.41                     | 4.46                 | 13.28                    | 13.34                    | 1.57             | 12.11                     |
|                  | Bora      | 28.70                     | 4.53                 | 13.75                    | 13.15                    | 1.58             | 10.85                     |
|                  |            | 1.914                     | 0.316                | 0.370                    | 0.255                    | 0.112            | 0.765                     |
|                  | Abu Ghrab | 21.30                     | 3.40                 | 15.33                    | 11.26                    | 2.03             | 10.98                     |
|                  | Nwewya    | 19.93                     | 3.47                 | 14.35                    | 11.71                    | 1.90             | 11.10                     |
|                  | Babal     | 20.55                     | 4.49                 | 17.36                    | 11.48                    | 2.15             | 10.62                     |
|                  | Bora      | 24.39                     | 3.78                 | 15.24                    | 12.75                    | 2.17             | 10.07                     |
|                  | Abu Ghrab | 30.01                     | 5.07                 | 17.82                    | 12.97                    | 2.04             | 11.35                     |
|                  | Nwewya    | 29.13                     | 4.52                 | 12.74                    | 12.85                    | 1.55             | 10.28                     |
|                  | Babal     | 33.41                     | 4.46                 | 13.28                    | 13.34                    | 1.57             | 12.11                     |
|                  | Bora      | 28.70                     | 4.53                 | 13.75                    | 13.15                    | 1.58             | 10.85                     |
|                  |            | 1.914                     | 0.316                | 0.370                    | 0.255                    | 0.112            | 0.765                     |
|                  | Abu Ghrab | 30.39                     | 4.00                 | 14.01                    | 13.13                    | 1.53             | 13.42                     |
|                  | Nwewya    | 29.13                     | 4.52                 | 12.74                    | 12.85                    | 1.55             | 10.28                     |
|                  | Babal     | 33.41                     | 4.46                 | 13.28                    | 13.34                    | 1.57             | 12.11                     |
|                  | Bora      | 28.70                     | 4.53                 | 13.75                    | 13.15                    | 1.58             | 10.85                     |
|                  |            | 1.914                     | 0.316                | 0.370                    | 0.255                    | 0.112            | 0.765                     |
|                  | Abu Ghrab | 30.01                     | 5.07                 | 17.82                    | 12.97                    | 2.04             | 11.35                     |
|                  | Nwewya    | 29.13                     | 4.52                 | 12.74                    | 12.85                    | 1.55             | 10.28                     |
|                  | Babal     | 33.41                     | 4.46                 | 13.28                    | 13.34                    | 1.57             | 12.11                     |
|                  | Bora      | 28.70                     | 4.53                 | 13.75                    | 13.15                    | 1.58             | 10.85                     |
|                  |            | 1.914                     | 0.316                | 0.370                    | 0.255                    | 0.112            | 0.765                     |

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