## Available online at <u>www.ijpab.com</u>

DOI: http://dx.doi.org/10.18782/2582-2845.8278

**ISSN: 2582 – 2845** *Ind. J. Pure App. Biosci.* (2020) 8(5), 240-247



Peer-Reviewed, Refereed, Open Access Journal

**Research** Article

# Genetic Variability and Trait Association Analysis in Yield and Yield Components in Bread Wheat (*Triticum aestivum* L.) Genotypes under Rainfed Condition

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# ABSTRACT

One hundred bread wheat (Triticum aestivum L.) were evaluated for genetic variability and yield performance under rainfed condition in two replication using alpha-lattice design. Substantial variations were reported among genotypes with ANOVA for all the fourteen studied traits. Low to moderate range of GCV (1.7-17.1%) and low to high PCV (2.3-23.4%), GAM (3.5-32.6%) and heritability (42.9-79.2%) were reported. At genotypic level GY showed positive and highly significant correlation with DTH, DTA, DTM, NOT, SL, BM, HI, TKW and TNG at genotypic level and with DTM, BM, HI, TKW and TNG at phenotypic level. TKW and TNG showed highest positive and direct effect on GY in path analysis. Genotypes HI1531, HI1581 and C306 were showed highest yield.

Keywords: Wheat, Rainfed, Genetic variability, Correlation, Path analysis.

## **INTRODUCTION**

Global food security for the coming generations is a prime issue across the continents due to rapidly diminishing natural resources and climate change (Behnassi et al., 2018). Wheat (*Triticum aestivum* L.) is one of the most important pillars of global food security. It provides 41% of total calories and 50% of total proteins consumed from cereals globally (Shiferaw et al., 2013). Across the globe, it cultivated on nearly 220 million hectares area with an average 670 million tons of annual production (Ramadas et al., 2019). In near future, wheat demand is expected to be

raise by 60%. At present climatic anomalies are the major threat for crop productions. Climate change has significantly affected the global food security by means of affecting the crop production across the world through many ways among them water stress in one (Shan et al., 2020). Therefore, development of climate resilient crop varieties has become a major objective for plant breeders. Wheat crop is highly sensitive to water availability (Choudhury & Kumar, 1980). Water stress at any point of wheat plant lifecycle significantly reduces grain yield and quality.

Cite this article: Gaur, A., Singh, V., Sheoran, S., Kaushik, D., & Jindal, Y. (2020). Genetic Variability and Trait Association Analysis in Yield and Yield Components in Bread Wheat (*Triticum Aestivum* L.) Genotypes under Rainfed Condition, *Ind. J. Pure App. Biosci.* 8(5), 240-247. doi: http://dx.doi.org/10.18782/2582-2845.8278

In past few years due to climate change incidences of water stress have substantially increased throughout the world with a great impact on wheat production. Therefore, development of drought tolerant wheat varieties is a major goal for both national and international wheat breeding programs.

Pre-breeding which includes evaluation and development of genetic resources, development of selection indices, and estimation of genetic variability is the base of a successful sustainable breeding program. With this reason, here in this study we have studied a set of one hundred bread wheat (*Triticum aestivum* L.) genotypes for their yield performance, genetic variability and trait association under rainfed conditions.

### MATERIALS AND METHODS

Filed experiment: The field experiment was during Rabi conducted 2018-19 at experimental farms of Section of Wheat and Barely Breeding, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University. A total of 100 bread wheat (Triticum aestivum L.) genotypes were field planted in alpha lattice experimental design with two replications in first week of November-2018. Each genotype was sown using dibbling method with following planting specification: seed depth: 10 cm, plant to plant spacing: 10 cm, row to row spacing: 20 cm, plot to plot spacing: 100 cm, block to block spacing: 150 cm. No irrigation was given throughout the life cycle rest agronomic practices were carried out as per recommended package of practices.

Data collection: The following agronomic data were collected on per plant basis: 1) days to heading (DTH) were measured as the number of days until 75% of the plants had fully emerged spikes, 2) days to flowering (DTA) were measured as the number of days until 75% of the plants had fully emerged anthers, 3) days to maturity (DTM) were measured as the number of days until 75% of the plants had reached senescence, 4) grain filling duration (GFD) period between DTA and DTM, 5) productive tiller number (NOT) was measured as the number of tillers that had managed to set seed, 6) plant height (PH) was measured as the height from base of the plant to the point where the spike emerged, 7) peduncle length (PL) was measured from first internode to base of the spike. 8) spike length (SL) was measured from the base of the spike to the tip of the spike, 9) spikelets per spike (SPS) were measured by counting the number of spikelets per spike, 10) biomass (BM) was measured as mass of all above-ground plant parts, 11) grain yield (GY) was measured after harvesting using an electronic balance, 12) harvest index (HI) percentage ration between GY and BM, 13) thousand kernel weight (TKW) was measured by randomly sampling 1000 kernels and weighing them, and 14) Total number of grains per plant (TNG) were measured by counting total number of grains harvested.

# Data analysis:

Analysis of variance for each trait was calculated using restricted maximum likelihood (ReML) method in R environment with following model.

$$Y_{ijk} = \mu + Rep_i + Block_i \times Rep_i + Gen_k + \mathcal{E}_{ijk}$$

Broad sense heritability  $(H^2)$  was calculated as

$$H^2 = \frac{\sigma_g^2}{\sigma_g^2 + \frac{\sigma_e^2}{r}} \times 100$$

where  $\sigma_g^2$ ,  $\sigma_e^2$  and r are genetic variance, residual variance and number of replications, respectively.

genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) was calculated as a percentage ratio between under

ISSN: 2582 – 2845

root of corresponding variance  $(\sigma_{q \text{ or } p}^2)$  and grand mean  $(\overline{X})$ .

Genetic advance and genetic advance over mean were calculated for grand each

Genetic advance (GA) a.

$$GA = k. h^2. \sigma^2$$

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Genetic advance over mean (GAM) b.

$$GAM = \frac{GA}{\overline{X}}$$

Where: k is standardized selection differential at 5% selection intensity (2.06),  $h^2$  is broad sense heritability for the trait,  $\overline{X}$  is population mean for the trait.

Furthermore, categorization of GCV and PCV was done as suggested by Sivasubramanin and Menon (1973) and for heritability and GAM% categorization suggested by Johnson et al. (1955).

Category	GCV and PCV	Heritability	GAM
Low	<10%	<30%	<10%
Moderate	11-20%	31-60%	11-20%
High	>20%	60>	>20%

Phenotypic and genotypic correlation coefficients of all the characters were workedout as per Al-Jibouri et al. (1958) and path coefficient analysis was carried-out as per the method suggested by Dewey and Lu (1959).

# **RESULTS AND DISCUSSION**

In present investigation, ANOVA advocated the existence of substantial genetic variability at significance level p > 0.01 in the study material for all the fourteen studied traits (Table 1). For some traits such as GY, BM and TNG we reported difference among replications. This expected difference among replications was due to uncontrollable errors which generated due to uneven distribution of water stress in the open fields however, effects of these errors on present study were negligible or in acceptable range. The coefficient of variation (CV%) ranged between 1.4% and 18.7% (Table 2). High values (>10%) of CV for the traits NOT, PH, BM, GY, HI and TNG show that these traits are under the influence of environment thus selection based on these traits can be misleading. With this reason traits with low CV could be used with more reliability. Similar results were reported by (Shamuyarira et al., 2019). We reported a wide range for all the studied traits (Table 2). Among the evaluated genotypes, HI1531, HI1581 and C306 were the highest yielder. These genotypes are identified drought tolerant varieties thus the present investigation also supported previous claims and recommendations to use these genotypes for limited water conditions.

Estimation of genetic variance (Table 2) revealed that for all the traits PCV was greater from the corresponding GCV. For DTH, DTA and DTM both GCV, PCV and GAM were low. PH, SPS and TKW were recorded with low GCV and moderate PCV and GAM. Both GCV and PCV were reported moderate for GFD, PL, SL, GY and TNG whereas, for NOT, BM and HI GCV and PCV were moderate and high, respectively. Furthermore, moderate GAM was reported for GFD, PH, SPS, and TKW and high GAM was reported for NOT, PL, SL, BM, GY, HI and TNG. We reported high broad sense heritability  $(H^2)$  for all the traits excluding PH, BM and TNG

environment, management and across the environment as per (Johnson et al., 1955).

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which had moderate level of  $H^2$ . Results from GCV and PCV illustrate that variability in the present study material is largely influenced with environmental factors rather than genetic factors. Furthermore, traits with high heritability and high GAM indicates the high responsiveness to selection and presence of additive effects whereas, for traits with high heritability to moderate heritability and moderate to low GAM indicates the presence of non-additive effects thus multiple selection cycle will be needed for these traits. Our results are in agreement with many previous studies however some contradiction arises due to difference in plant material and climatic conditions during studies (Shamuyarira et al., 2019; Mathew et al., 2018; Mwadzingeni et al., 2016; Jatoi et al., 2012).

Relatedness between studied traits in the present study material was estimated at both genotypic and phenotypic levels. At genotypic level GY showed positive and highly significant correlation with DTH, DTA, DTM. NOT. SL. BM. HI. TKW and TNG at p>0.01 and with PH and SPS at p>0.05. In contrast to this at phenotypic GY showed significantly positive association with DTM, BM, HI, TKW and TNG. Detailed results on correlation studies are presented in Table 3. Correlation studies are affirmative with Qaseem et al. (2019), Malav et al. (2017) and Mia et al. (2017). Furthermore, to partition and estimate the effect of individual trait on GY path coefficient analysis was carried out (Table 4). Results from the path analysis revealed that in the scenario of present investigation, DTH, DTM, TKW and TNG had a higher magnitude of direct effect on GY in positive direction whereas DTA and GFD had it in negative direction. Rest of the traits showed a very low magnitude of direct effect

on GY among which PL, SL and BM had positive effect and NOT, PH, SPS and HI had negative effect. Since, TKW and TNG had largest direct on GY we pursued the indirect effect of other traits on GY via these traits. DTH, DTA, SPS and SL showed negative indirect effect of low magnitudes on GY via TKW whereas rest of the traits imposed positive indirect effects. TKW increases GY by means of weight. Indirect effect of various traits on GY via TKW can be understand by physiological basis of growth and development of wheat kernel. GFD increases with early DTH/DTA and delayed maturity. A longer GFD allows increased accumulation of assimilates in developing grain which lead to increase in the kennel weight. Higher number of NOT and PL are associated with increased green area of plant which allow more assimilation of photosynthates. Additionally, PL stores water soluble carbohydrates which works as reservoirs under water stressed conditions. High HI further indicates the transformation of BM into GY. Unlike TKW. TNG contributes in GY by means of numbers. In present investigation all the traits excluding GFD and PL showed positive indirect effect on GY via TNG. These traits increase TNG by maintain pollen fertility under water stress conditions. Early DTH and DTA are associated with escape mechanism. Increased NOT improves the canopy cover and green area which improve assimilation and carbon mobilization necessary to maintain the pollen fertility. Longer SL assures a greater number of spikelets thus a greater number of grains. These results are in agreement with previous studies of Malav et al. (2017), Gelalcha & Hanchinal (2013), Khan et al. (2005) and many others.

 Table 1: Mean squares analysis of variance involving fourteen phenotypic traits of hundred wheat genotypes evaluated in two replications under rainfed conditions

Source						1	Aean Sun	ı of Squa	ares					
bource	DTH	DTA	DTM	GFD	NOT	РН	PL	SL	SPS	BM	GY	ні	ткw	TNG
Rep	67.28	74.30	26.65	199.80	337.73	2349.99	5.55	3.20	2.00	0.38	488.50	5932.96	0.60	318140.47
Block	30.43	32.62	18.84	16.96	3.35	321.76	33.23	1.10	5.38	39.14	4.62	73.20	20.22	2974.45
Genotype	23.74	25.20	10.54	21.01	4.46	246.46	27.90	3.26	7.35	62.99	5.71	76.10	27.33	3047.03
Error	8.31	10.90	3.10	8.68	1.81	160.77	7.35	0.94	2.34	25.93	1.82	19.82	6.93	1509.06

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Gaur et al.Ind. J. Pure App. Biosci. (2020) 8(5), 240-247ISSN: 2582 - 2845Table 2: Genetic parameters for yield and associated traits in hundred wheat genotypes under rainfed

						con	dition	1						
Statistic	DTH	DTA	DTM	GFD	NOT	РН	PL	SL	SPS	BM	GY	ні	ткw	TNG
	81.79	89.76	117.91	28.11	7.85	94.52	30.19	10.86	19.75	29.06	10.17	35.96	39.43	259.06
Minimum	70.50	78.00	112.00	22.00	4.95	73.95	22.03	7.95	15.00	18.94	5.88	19.92	31.26	169.84
Maximum	90.50	98.00	123.50	37.50	14.13	127.35	44.06	17.85	24.00	48.33	14.93	61.76	48.72	360.78
$\sigma g^2$	11.06	10.25	4.45	8.18	1.81	57.99	13.11	1.27	2.93	16.60	2.28	34.08	12.31	956.78
$\sigma p^2$	18.73	20.27	7.41	16.06	3.36	211.82	19.98	2.13	5.28	46.23	4.17	53.59	19.08	2492.67
σe <sup>2</sup>	7.67	10.02	2.95	7.87	1.55	153.83	6.87	0.86	2.35	29.64	1.89	19.51	6.76	1535.89
$H^{2}(\%)$	74.26	67.15	75.09	67.52	70.03	42.99	79.25	74.63	71.35	52.83	70.65	77.75	78.46	55.47
GCV (%)	4.07	3.57	1.79	10.18	17.15	8.06	11.99	10.36	8.66	14.02	14.84	16.23	8.90	11.94
PCV (%)	5.29	5.02	2.31	14.26	23.37	15.40	14.80	13.43	11.63	23.40	20.08	20.36	11.08	19.27
GA	6.62	6.23	4.21	5.57	2.65	12.89	7.30	2.24	3.38	7.40	2.97	11.73	7.06	57.05
GAM (5%)	8.09	6.94	3.57	19.83	33.71	13.64	24.17	20.64	17.10	25.47	29.23	32.60	17.90	22.02
LSD (5%)	4.83	5.27	3.18	4.60	2.08	16.45	4.85	1.60	2.59	7.90	2.31	8.02	4.59	58.20
CV (%)	3.39	3.53	1.46	9.98	15.87	13.12	8.68	8.54	7.76	18.74	13.53	12.28	6.60	15.13

# Table 3: Genotypic (below diagonal) and phenotypic (above diagonal) correlation coefficients among fourteen characters in hundred genotypes of bread wheat under rainfed condition

	DTH	DTA	DTM	GFD	NOT	PH	PL	SL	SPS	BM	GY	н	ткw	TNG
DTH	1	0.974**	0.449**	- 0.756**	-0.143*	0.111	-0.023	-0.041	-0.042	0.052	0.054	0.004	-0.103	0.119
DTA	0.997**	1	0.476**	0.763**	-0.147*	0.115	0.007	-0.045	-0.048	0.057	0.018	-0.037	-0.138	0.105
DTM	0.521**	0.554**	1	0.190**	-0.044	0.327**	0.325**	-0.01	0.078	0.276**	0.196**	-0.139*	0.082	0.150*
GFD	- 0.787**	- 0.770**	0.112	1	0.144*	0.103	0.241**	0.033	0.111	0.129	0.121	-0.051	0.225**	-0.015
NOT	- 0.344**	- 0.402**	- 0.187**	0.319**	1	-0.037	-0.001	0.005	-0.058	-0.042	0.103	0.157*	0.087	0.058
РН	0.298**	0.400**	0.840**	0.194**	0.089	1	0.474**	-0.025	0.054	0.305**	0.065	- 0.257**	0.105	-0.002
PL	-0.013	0.013	0.507**	0.354**	0.003	1.130**	1	-0.057	0.032	0.276**	0.071	0.225**	0.114	0.001
SL	-0.012	-0.007	0.051	0.05	0.103	0.012	-0.155*	1	0.293**	0.022	0.12	0.073	-0.025	0.140*
SPS	0.215**	0.215**	0.240**	-0.02	-0.127	0.03	0.01	0.419**	1	0.073	0.059	-0.07	-0.079	0.11
BM	0.240**	0.313**	0.703**	0.202**	0.033	0.967**	0.583**	0.127	0.260**	1	0.548**	- 0.557**	0.1	0.513**
GY	0.212**	0.202**	0.450**	0.134	0.251**	0.171*	0.098	0.223**	0.174*	0.340**	1	0.341**	0.350**	0.837**
HI	-0.076	-0.142*	- 0.186**	0.009	0.218**	- 0.577**	0.448**	0.076	-0.109	- 0.501**	0.651**	1	0.231**	0.224**
ткw	-0.073	-0.106	0.238**	0.290**	0.194**	0.172*	0.178*	-0.033	0.195**	0.214**	0.609**	0.403**	1	- 0.204**
	0.308**	0.317**	0.391**	-0.031	0.163*	0.047	-0.026	0.302**	0.409**	0.269**	0.807**	0.519**	0.019	1

Table 4: Genotypic path coefficient analysis showing direct (diagonal and bold) and indirect effects of
different characters on grain yield in 50 genotypes of bread wheat

	DTH	DTA	DTM	GFD	NOT	PH	PL	SL	SPS	BM	н	TKW	TNG	GY <sup>#</sup>
DTH	0.260	-0.559	0.092	0.218	0.005	-0.023	-0.001	0.000	-0.017	0.010	0.005	-0.044	0.267	0.212**
DTA	0.259	-0.561	0.098	0.213	0.006	-0.031	0.001	0.000	-0.017	0.013	0.009	-0.063	0.275	0.202**
DTM	0.136	-0.311	0.177	-0.031	0.003	-0.066	0.039	0.002	-0.019	0.028	0.011	0.142	0.339	0.450**
GFD	-0.205	0.432	0.020	-0.277	-0.005	-0.015	0.027	0.002	0.002	0.008	-0.001	0.173	-0.027	0.134
NOT	-0.090	0.225	-0.033	-0.088	-0.015	-0.007	0.000	0.003	0.010	0.001	-0.013	0.115	0.142	0.251**
PH	0.078	-0.224	0.149	-0.054	-0.001	-0.078	0.087	0.000	-0.002	0.039	0.035	0.102	0.041	0.171*
PL	-0.004	-0.007	0.090	-0.098	0.000	-0.089	0.077	-0.005	-0.001	0.023	0.028	0.106	-0.023	0.098
SL	-0.003	0.004	0.009	-0.014	-0.002	-0.001	-0.012	0.031	-0.033	0.005	-0.005	-0.019	0.262	0.223**
SPS	0.056	-0.120	0.043	0.006	0.002	-0.002	0.001	0.013	-0.078	0.010	0.007	-0.116	0.354	0.174*
BM	0.063	-0.175	0.124	-0.056	-0.001	-0.076	0.045	0.004	-0.020	0.040	0.031	0.127	0.234	0.340**
HI	-0.020	0.080	-0.033	-0.003	-0.003	0.045	-0.035	0.002	0.009	-0.020	-0.062	0.240	0.450	0.341**
TKW	-0.019	0.060	0.042	-0.080	-0.003	-0.013	0.014	-0.001	0.015	0.009	-0.025	0.595	0.017	0.350**
TNG	0.080	-0.178	0.069	0.009	-0.002	-0.004	-0.002	0.010	-0.032	0.011	-0.032	0.011	0.867	0.837**
Residual	l are -0.004	24, *, ** S	ignificant a	t 5 % and 1	1% levels, r	espectively	, # Genetic	correlation	1					

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Intrise100<	Table 5: Trait wise mean performance of bread wheat genotypes used in the present investigation														
IBANUSA	••														TNG
CondC															360.78
															314.18
winterwi															308.40
Halloon15.00<															306.36 335.94
HNI124NUM <td></td> <td>323.57</td>															323.57
Wintles <td></td> <td>291.82</td>															291.82
															283.01
NH1000NH1000NH1000NH1000NH1000NH1000NH1000															283.16
WillingWillingSingIndiaIndiaIndiaSingIndiaSingIndiaSingIndiaSing <t< td=""><td></td><td></td><td>89.50</td><td></td><td>29.50</td><td>8.25</td><td></td><td>31.24</td><td>10.50</td><td>19.00</td><td></td><td>12.39</td><td>44.64</td><td>40.49</td><td>303.39</td></t<>			89.50		29.50	8.25		31.24	10.50	19.00		12.39	44.64	40.49	303.39
WillingWilling1710013	HI1580	81.00	88.00	112.50	24.50	6.40	94.80	31.64	12.27	21.00	30.46	12.36	39.88	40.63	307.91
	WH1080	83.00	90.50	116.50	26.00	7.66	96.45	28.44	11.48	19.00	25.69	12.18	49.19	47.89	253.98
DiskDiskDiskSimonSi															306.73
PK-W1PK-W1PK-W1PK-W1PK-W1PK-W1PK-W2 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>269.27</td></th<>															269.27
DBWRSAM9.501.1007.207															321.42
P.WPictor<															307.22
bluewablue															330.03 313.78
AppmentFilms<															319.69
Indial85.3094.0012.0028.0077.017.0517.0417.0047.2411.7827.8084.2848.2823.1103712774.0081.5011.0011.0012.0012.2012.2412.3412.0026.0417.7045.807.															326.48
IDD1IDD1No. <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>280.49</td></th<>															280.49
INISO         9790         88.00         10700         7707         770 <th70< th="">         770         770         7</th70<>	GW2002-18	82.50	90.00	120.00	30.00	7.70	101.55	31.64	11.33	20.00	32.82	11.79	37.48	38.52	310.75
W1.85882.0090.0010.0011.25025.0025.0025.0015.0015.0015.1015.1515.9797.0091.00W2BM1S705.0095.0095.0015.00															309.56
WBMIS         90.9         90.9         90.9         8.4.3         99.00         8.4.4         9.3.3         20.00         91.2.7         11.3.4         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         11.2.7         13.4.0         13.0.7         13.4.0         13.0.7         13.4.0         13.0.7         13.0.0         13.0.7         13.0.0         13.0.7         13.0.0         13.0.7       <															273.83
IND2000end95.00114.0021.0097.00114.00114.0021.0097.00114.0021.0097.00114.0021.0097.00114.0021.0097.00114.0021.0097.00114.0021.00															309.67
backmanne         52.00         90.00         91.00         91.00         92.00															287.09
HW2         87.00         95.00         115.00         21.00         115.01         21.00         115.01         21.00         115.01         21.00         115.01         21.00         115.01         21.00         113.01         11.01         21.00         21.01         11.01         21.00         20.01         11.01         21.00         29.01         11.01         21.00         29.01         11.01         21.00         29.01         11.01         21.00         29.01         11.01         41.01         21.00         21.01         21.00         23.01         21.00         23.01         21.00         23.01         21.00         23.01         21.01         40.00         43.01      <															258.44
cW17375.0082.00117.0012.5094.5077.2529.6411.7117.0029.0011.1337.0440.0629.WH116475.0085.00117.0023.0027.0013.0027.0023.0027.0023.0027.0013.0440.4238.8928.WH17475.0085.5010.0020.0010.0025.0110.0025.0210.1040.9044.7142.HD47085.5091.0011.0025.007.5584.0028.047.5520.0027.9710.8083.2448.7242.0HD47070.0084.5011.0025.007.5584.0028.0470.0028.7110.9043.7240.8340.8443.7240.8340.8443.7240.8343.8443.7240.8343.8443.7240.8343.8443.7240.8343.8443.7240.8343.8443.8343.8443.7240.8343.8443.8343.8443.8343.8443.8343.8443.8343.8443.8343.8443.8343.8443.8343.8443.8343.8443.8343.84 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>331.45</td></th<>															331.45
IDD1         78.00         88.00         11.20         31.50         25.00         12.00         22.00         12.00         22.00         12.00         22.00         12.00         22.00         12.00         22.00         12.00         22.00         12.00         22.00         22.00         23.00         12.00         22.00         75.0         19.85         43.00         42.00         23.00         2															347.99 280.55
NH1144         78.50         86.60         11.00         20.00         10.51         91.35         10.50         12.00         20.90         11.04         40.42         88.89         28.89           HD7707         85.50         91.50         11.00         26.00         75.5         81.00         23.80         75.8         81.00         23.80         75.8         81.00         23.80         75.8         81.00         23.81         10.01         23.81         16.30         84.84         83.55         24.34         94.55         10.00         24.87         10.30         43.55         24.34         10.35         10.00         23.21         10.80         43.54         83.55         24.34         10.35         10.00         23.01         84.0         23.55         11.50         24.57         10.00         23.01         84.0         23.55         11.50         24.57         11.00         23.01         14.13         43.64         14.35         23.44         8.70         16.00         23.81         14.03         24.00         16.00         23.81         14.03         24.01         14.00         30.01         30.01         30.01         30.01         14.00         30.01         30.01         30.01         14.00 <td></td> <td>280.55</td>															280.55
IDD         7 7000         83.50         120.00         23.00         7.37         19.80         43.20         7.35         19.00         29.70         10.10         83.02         43.02         22           Chury3         84.00         91.50         11.00         25.00         7.53         87.10         23.43         19.00         23.00         23.81         19.03         33.24         43.82         43.82         43.82         43.82         43.82         43.82         43.82         43.82         43.83         19.80         33.81         19.00         23.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.00         33.81         19.01         33.81         19.01         33.81         19.01         33.81         19.01         19.00         33.81         19.01         33.81         19.01         33.81         19.01         33.81         19.01         33.81         19.01         33.81         19.01         19.01         19.01         13.01         10.01         13.01<															284.38
IDM270         § 55.0         91.00         23.00         23.04         7.95         20.00         23.97         10.98         83.24         43.27         22           Changa         81.00         81.00         11.00         25.97         67.05         87.15         22.38         92.38         11.00         24.37         10.98         43.27         41.21         25           ID1167         77.00         84.50         11.00         25.90         13.01         85.05         24.84         10.35         19.00         23.21         10.98         43.21         41.63           ID1059         81.50         83.00         12.00         2.00         14.10         93.45         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         21.00         26.05         21.00         26.05         21.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05         12.00         26.05															228.60
IDD146         7600         83.00         118.00         35.00         87.00         24.33         10.95         12.00         24.57         10.90         45.7         41.21         25.           HD3055         80.50         80.50         12.00         31.50         6.45         93.15         2.648         10.55         19.00         24.52         10.88         40.63         37.57         2.7           HD3055         80.50         87.00         119.00         32.00         44.13         93.45         27.44         87.00         16.00         28.61         10.70         36.75         42.52           DBW44         83.00         91.00         10.200         25.00         8.00         93.00         91.00         30.68         10.62         44.84         45.82         24           HD30         89.00         97.00         12.50         25.00         8.00         33.00         10.80         10.00         30.68         10.50         34.47         45.89         22           DW42150         85.00         93.00         25.00         17.00         28.61         17.00         28.61         10.32         37.57         31.0         41.01         10.00         28.01         10.23															227.30
WH157         77.00         84.50         11.400         20.50         10.304         80.50         20.80         12.50         10.80         23.50         10.80         23.60         12.100         31.50         64.50         23.61         20.60         12.100         23.00         14.13         93.45         27.61         10.00         28.20         10.80         43.67         43.75       <	Chirya-3	84.00	91.50	116.00	25.50	7.65	87.15	22.43	9.45	18.00	24.85	10.95	43.47	43.45	252.30
IDD085         80.00         120.00         31.00         6.45         93.15         29.46         10.05         18.00         28.32         10.88         92.11         37.60         28.2           IDD395         81.50         80.00         112.00         32.00         14.13         93.45         72.61         10.05         21.00         28.61         10.00         36.75         45.49         23.21           DBW66         83.00         91.00         12.50         29.50         5.95         115.20         36.05         12.00         28.82         10.00         36.84         45.04         28.32           DBW66         85.00         91.50         12.50         2.50         8.80         93.00         10.30         34.04         10.80         20.00         36.84         10.84         44.57         22           DBW661.50         95.00         12.50         2.50         8.00         10.03         34.04         10.80         20.00         36.84         10.04         23.03         30.84         10.30         10.32         38.24         30.22         37.75         38.20         27.7           B10366         8.00         9.50         11.50         2.50         5.50         1	HD3146	76.00	83.00	118.00	35.00	8.70	81.90	26.43	10.95	21.00	27.81	10.91	39.75	41.21	263.01
IDD309         N1.50         80.00         121.00         32.00         14.13         93.44         27.63         10.05         21.00         28.24         10.00         28.20         10.00         28.20         10.00         28.20         10.00         28.20         10.00         28.20         10.00         28.20         10.00         28.00         10.00         28.00         10.00         28.00         10.00         30.06         10.00         30.06         10.00         30.06         10.00         30.06         10.00         30.06         10.00         30.06         10.00         30.06         10.00         30.06         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         30.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         20.00         10.00         <															268.73
D14         79.00         87.00         119.00         32.00         84.5         83.55         29.24         87.00         16.00         28.61         10.70         87.57         48.94         23           DBW46         83.00         97.50         122.50         25.00         88.00         93.05         12.00         12.00         28.20         10.68         34.38         40.58         2.4           MU206         85.00         97.50         12.250         25.00         8.00         93.04         10.50         10.00         31.64         10.50         10.00         31.64         10.56         45.56         39.44         2.5         10.00         23.12         10.56         45.56         39.44         2.5         10.00         23.64         10.50         10.00         23.04         10.50         10.00         23.04         10.50         10.02         2.0.5         10.00         2.5.0         10.00         2.5.0         10.00         2.4.1         10.50         2.0.0         2.5.0         10.32         3.4.1         30.2         2.0         14.50         10.00         3.5.0         10.5         10.50         2.0.0         2.5.5         10.50         2.4.1         10.50         2.0.0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>288.43</td></t<>															288.43
DBW64         83.00         91.00         129.00         28.82         10.68         37.06         43.82         24.82           DB30         89.50         97.50         122.00         25.00         88.00         93.00         10.50         19.00         10.66         10.68         10.68         10.68         10.68         10.68         10.68         10.68         10.68         10.68         10.68         10.58         34.47         45.59         22           ID006         85.00         93.00         120.50         27.00         6.64         88.35         20.00         26.36         10.32         38.44         38.24         27.57         31.1           GL6         88.00         93.00         19.50         27.00         10.71         88.05         90.00         17.10         18.00         23.00         26.50         10.32         38.24         27.2           WH1105         83.00         93.00         17.10         28.00         93.51         10.03         38.41         10.26         38.24         22.50           DB315         83.00         93.50         115.50         30.00         6.55         90.60         28.64         10.65         20.00         23.34         1															279.52
IDD         89.0         97.50         122.50         1200         8.80         93.30         30.44         10.80         10.00         30.65         10.62         33.44         40.58         22           XKW3862.1         75.00         82.50         110.00         33.50         7.45         100.33         34.04         10.80         10.80         10.86         10.88         10.32         84.24         34.57         32.12           DPWG1150         86.00         93.00         112.50         27.00         8.70         90.45         20.30         11.45         23.00         28.63         10.32         32.42         32.75         33.10         31.52         32.50         17.00         27.50         10.33         20.00         17.00         27.50         10.33         22.00         17.30         10.32         34.41         39.02         27.50           HD1505         85.00         91.50         12.00         24.50         7.00         10.45         12.00         34.33         10.23         84.13         39.02         27.50           HD3045         83.00         91.50         12.00         6.75         125.25         40.05         14.04         10.14         42.43         35.60															231.70
TAKW282-1         75.00         82.50         116.00         33.50         7.45         100.35         34.04         10.80         20.00         30.68         10.58         34.47         45.59         22           HD3086         85.00         93.00         120.50         27.00         6.64         88.35         10.05         11.45         23.00         13.62         33.24         25.63         39.94         26.63           GL6         85.00         93.00         119.50         26.50         9.00         11.70         18.00         25.50         10.32         38.44         9.92         25.0         10.32         38.41         9.92         24.56         10.32         38.41         9.92         24.56         10.32         38.41         9.92         24.56         10.32         38.41         20.2         24.54         10.32         38.41         20.2         21.11         10.30         85.00         115.50         30.00         6.75         90.60         91.51         18.00         38.83         10.14         42.93         38.72         26           GL11         81.00         85.00         19.00         115.50         25.50         11.63         10.65         18.00         24.20         <															245.52 263.77
IDD306         85.00         94.00         121.50         27.50         6.64         88.35         29.24         10.90         21.10         10.50         45.96         39.49         25.           DPW621-50         86.00         94.00         112.10         26.50         9.00         117.15         38.06         9.00         17.00         27.30         10.32         37.57         38.20         27.7           HI1563         81.00         98.50         116.00         27.50         9.10         96.00         120.40         125.00         17.00         24.50         10.32         48.41         39.92         26           HD3045         83.00         91.50         120.00         28.50         7.90         105.75         39.65         91.50         10.80         34.81         10.20         28.44         12.42         42.44         12.82         12.14         10.40         38.41         12.42         12.42         11.42         12.66         10.14         42.64         38.82         26           GL11         81.00         85.00         115.50         22.50         8.10         28.44         9.90         19.00         12.02         38.46         38.50         2.50         10.14															203.77
DPWC21:50         8:600         94:50         121.50         27.00         8:70         90.45         26.03         11.45         23.00         26.63         10.32         38.24         32.75         31.3           GL6         85.00         93.00         119.50         25.05         91.00         96.00         29.24         11.70         18.00         27.50         10.32         38.44         39.92         23.6           WH1105         83.50         92.50         117.00         28.50         6.90         80.70         24.43         10.32         24.56         10.32         48.41         39.92         23.6           HD3145         83.00         91.50         120.00         28.50         115.50         30.00         6.45         90.60         9.44         10.63         18.83         11.4         24.84         41.24         25.6           GL11         81.00         85.00         115.00         25.50         5.55         94.50         28.84         9.00         19.00         28.64         10.14         42.93         38.75         26.6           DBW155         85.00         93.00         115.50         25.50         7.55         94.50         28.64         10.60 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>264.51</td></t<>															264.51
GL6         85.00         93.00         119.50         26.50         9.00         117.15         38.05         9.00         17.00         27.30         10.32         37.77         88.20         27.7           HI1563         81.00         88.50         116.00         27.50         9.10         96.00         29.24         11.00         18.00         26.50         10.32         38.41         39.92         28           HID304         83.00         91.50         120.00         28.50         7.90         105.75         39.65         91.51         18.00         34.83         10.23         42.48         41.24         25           GL11         81.00         85.50         115.50         30.00         6.45         90.00         26.44         10.05         22.00         35.83         10.14         28.48         43.00         12.33         48.45         2.82         26.6         10.14         42.03         38.75         26.           DBW15         85.00         93.00         115.50         22.50         8.10         82.50         11.04         14.03         20.00         38.41         39.36         42.51         23.           DBW155         85.00         93.00         11.50 <td></td> <td>318.89</td>															318.89
HI163         81.00         88.50         116.00         27.50         91.0         96.00         29.24         11.70         18.00         26.50         10.32         84.41         99.92         26           WH1105         83.00         92.50         117.00         24.50         6.90         80.70         24.43         10.35         22.00         23.74         10.26         30.33         44.50         23           HD319         78.00         85.50         115.50         30.00         6.75         12.52         40.05         9.45         20.00         33.84         10.26         30.33         44.50         23           GW366         82.00         90.00         115.50         25.50         5.95         94.50         28.84         90.01         10.02         33.68         38.50         26           DBW98         79.00         115.50         25.50         8.90         85.00         10.02         33.68         38.50         26           DBW152         85.00         93.00         115.50         25.50         7.55         94.52         21.63         11.40         17.00         28.60         10.80         24.21         19.55         14.04         36.3         39.22															274.51
HD304S         83.00         91.50         120.00         28.50         7.90         105.75         39.65         91.5         18.00         34.83         10.26         30.33         44.50         23.74           HD3139         78.00         85.50         115.50         30.00         6.45         90.60         20.64         10.65         22.00         23.74         10.23         42.48         41.24         25.6           GW366         82.00         99.00         115.50         25.50         5.95         94.50         28.84         9.90         19.00         25.06         10.14         42.83         38.56         26.0           DBW155         85.00         93.00         115.50         25.50         8.10         82.50         23.63         10.65         18.00         24.22         9.66         41.04         42.83         38.50         26.0         10.02         25.05         10.185         29.24         11.70         24.00         34.83         30.69         42.10         34.83         30.69         42.51         23.3           WH126         85.00         93.05         117.00         28.00         94.05         27.63         11.40         11.60         20.00         30.33	HI1563	81.00	88.50		27.50	9.10		29.24	11.70	18.00	26.50	10.32	38.41	39.92	260.04
HD3139         78.00         85.50         115.50         30.00         6.45         90.60         29.64         10.65         22.00         23.74         10.23         42.48         41.24         25.7           GL11         81.00         89.50         119.50         30.00         6.75         125.25         40.05         94.50         20.00         35.83         10.14         42.94         38.87         26.0           DBW98         79.00         87.00         116.50         25.50         5.55         15.55         15.55         15.55         10.185         25.06         10.14         42.93         38.75         26.0           DBW159         85.00         93.50         11.70.0         23.50         7.55         101.85         11.60         24.00         24.11         9.90         40.07         24.41           WH1061         82.50         91.00         117.00         26.00         80.0         98.10         28.04         11.61         20.00         25.75         9.90         40.22         41.11         24           WH423         79.50         88.50         17.00         28.50         10.55         75.5         94.50         20.00         23.0         26.0         3		83.50	92.50	117.00	24.50	6.90	80.70	24.43	10.35	22.00	24.56	10.32	42.02	40.42	259.56
GL11         81.00         89.50         119.50         30.00         6.75         125.25         40.05         9.45         20.00         35.83         10.14         28.64         38.82         26           GW366         82.00         90.00         115.60         25.50         5.95         94.50         28.84         10.43         20.00         23.66         10.14         42.93         38.75         26           DBW98         97.00         87.00         115.50         22.50         8.10         82.50         23.63         10.05         18.00         24.22         9.96         41.04         37.65         26.00         11.05         11.07         28.00         34.19         9.93         29.04         40.87         24.00           WH1106         88.00         98.00         117.00         28.00         10.15         10.80         32.44         10.05         16.00         36.09         9.93         29.04         40.87         22.4         11.14         24.00         35.0         33.81         28.0         20.05         11.65         26.00         80.0         98.0         27.63         40.65         20.00         33.64         38.36         22.0         20.02         33.61         20	HD3045	83.00	91.50	120.00	28.50	7.90	105.75	39.65	9.15	18.00	34.83	10.26	30.33	44.50	230.63
GW366         82.00         90.00         115.50         25.50         5.95         94.50         28.84         9.90         19.00         25.06         10.14         42.93         38.75         26           DBW98         79.00         87.00         116.50         22.50         8.00         86.70         30.84         10.43         20.00         29.62         10.02         33.68         38.50         26           DBW155         85.00         93.50         117.00         23.50         7.55         101.85         29.24         11.78         24.00         34.19         9.93         39.69         42.51         23.3           WH1061         82.50         91.00         117.00         28.60         10.15         108.60         32.84         11.61         20.00         25.75         9.90         40.22         41.11         24           WH423         79.50         88.50         117.00         28.50         10.05         10.86.0         32.44         10.05         16.00         36.19         9.89         27.47         44.65         22           FKW1         82.50         90.50         118.00         25.50         7.90         87.00         27.30         9.60         32.25 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>29.64</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>250.67</td>								29.64							250.67
DBW98         79.00         87.00         116.50         29.50         8.90         86.70         30.84         10.43         20.00         29.62         10.02         33.68         38.50         26           DBW155         85.00         93.00         115.50         22.50         8.10         82.50         23.63         10.65         18.00         24.22         9.96         41.04         37.66         26.           DBW129         85.00         93.50         117.00         25.50         7.55         94.95         27.63         11.40         17.00         26.99         9.93         39.69         42.51         23.           WH1061         82.50         91.00         117.00         25.00         18.00         92.10         28.44         10.05         16.00         36.19         98.92         74.4         44.65         22           FKW1         82.50         90.50         116.50         26.00         6.90         83.70         27.23         9.83         22.00         23.40         9.60         32.74         44.65         22           FKW1         82.50         93.50         118.50         25.50         7.55         91.35         22.40         23.40         9.60															261.21
DBW155         85.00         93.00         115.50         22.50         8.10         82.50         23.63         10.65         18.00         24.22         9.96         41.04         37.66         26.6           DBW129         85.00         93.50         117.00         23.50         7.55         101.85         29.24         11.78         24.00         34.19         9.93         39.69         42.51         23.3           WH126         81.00         88.00         117.00         26.00         8.00         98.10         28.04         11.61         20.00         25.75         9.90         40.22         41.11         24.04           WH123         79.50         88.50         117.00         28.00         10.15         108.60         32.84         10.05         16.00         36.19         9.90         40.22         41.11         24.04           WH23         79.50         88.50         11.50         7.50         83.75         7.53         29.38         12.00         27.30         9.60         35.25         33.81         28.20           CBW38         85.00         92.50         115.00         7.50         11.55         75.5         91.35         27.24         12.35         20															261.32
DBW129         85.00         93.50         117.00         23.50         7.55         101.85         29.24         11.78         24.00         34.19         9.93         29.04         40.87         24.           WH1126         81.00         88.00         119.50         27.75         7.55         94.95         27.63         11.40         17.00         26.99         9.93         39.69         42.51         23.           WH1061         82.50         91.00         117.00         26.00         8.00         98.10         28.04         11.61         20.00         25.75         9.90         40.22         41.11         24.00           WH423         79.50         88.50         117.00         28.50         10.15         108.60         32.84         10.05         16.00         36.19         9.80         27.47         44.65         22           FKW1         82.50         92.50         118.00         25.50         7.90         88.20         13.35         20.00         30.25         9.60         32.25         33.81         23           GW455         70.50         78.00         115.50         37.50         7.55         91.35         29.24         12.53         20.00         30.25<															261.82
WH1126         81.00         88.00         119.50         27.75         7.55         94.95         27.63         11.40         17.00         26.99         9.93         39.69         42.51         23.           WH1061         82.50         91.00         117.00         26.00         80.00         98.10         28.04         11.61         20.00         25.75         9.90         40.22         41.11         24           WH423         79.50         88.50         117.00         28.50         10.15         108.60         32.84         10.05         16.00         36.19         9.89         27.47         44.65         224           CEW38         85.00         92.50         118.00         25.50         7.90         88.20         26.43         13.35         20.00         27.30         9.60         35.25         33.81         28           QW455         70.50         78.00         114.50         27.50         11.55         76.55         91.35         29.24         15.30         23.00         32.22         40.06         24           WH1154         85.00         94.00         118.50         25.00         8.40         93.45         31.64         10.81         10.0         32.54 </td <td></td> <td>263.82 243.11</td>															263.82 243.11
WH1061         82.50         91.00         117.00         26.00         8.00         98.10         28.04         11.61         20.00         25.75         9.90         40.22         41.11         24           WH423         79.50         88.50         117.00         28.50         10.15         108.60         32.84         10.05         16.60         36.19         9.89         27.47         44.65         22           FKW1         82.50         90.50         116.50         26.00         6.90         83.70         27.23         9.83         22.00         29.08         9.64         33.63         39.28         24           CBW38         85.00         92.50         118.50         25.50         7.90         88.20         26.43         13.35         20.00         27.30         9.60         42.97         42.00         23.           GW455         70.50         78.00         115.50         37.50         7.55         91.35         29.24         12.53         20.00         30.25         9.60         32.92         40.00         23.           WH1132         85.00         93.50         118.50         25.00         8.40         93.45         31.64         10.78         18.00															243.11 234.38
WH423         79.50         88.50         117.00         28.50         10.15         108.60         32.84         10.05         16.00         36.19         9.89         27.47         44.65         22           FKW1         82.50         90.50         116.00         26.00         6.90         83.70         27.23         9.83         22.00         29.08         9.64         33.63         39.28         24.           CBW38         85.00         92.50         118.00         25.50         7.90         88.20         26.43         13.55         15.00         23.40         9.60         42.97         42.00         23.3           DL788-2         79.00         87.00         115.50         37.50         7.55         91.35         29.24         12.53         20.00         30.25         9.60         32.92         40.06         24.94           WH1134         85.00         94.00         118.50         25.00         8.40         93.45         31.64         10.88         18.00         32.82         9.42         37.32         38.81         23.0           MKW1132         85.00         92.50         116.00         23.50         7.10         87.45         41.25         10.65         22.															240.83
FKW1         82.50         90.50         116.50         26.00         6.90         83.70         27.23         9.83         22.00         29.08         9.64         33.63         39.28         24.           CBW38         85.00         92.50         118.00         25.50         7.90         88.20         26.43         13.35         20.00         27.30         9.60         35.25         33.81         28.           DL788-2         79.00         87.00         111.55         75.55         91.35         29.24         12.53         20.00         30.25         9.60         32.92         40.00         23.           GW455         70.50         78.00         118.50         25.00         8.40         93.45         31.64         10.88         18.00         24.82         9.42         37.32         38.81         23.           WH132         85.00         93.50         118.50         25.00         8.40         93.45         31.64         10.88         18.00         24.82         9.42         37.32         38.81         23.           MK132         85.00         93.50         116.00         23.50         7.50         165.45         27.63         11.78         21.00         20.51 <td></td> <td>220.62</td>															220.62
CBW38         85.00         92.50         118.00         25.50         7.90         88.20         26.43         13.35         20.00         27.30         9.60         35.25         33.81         28.           D1738-2         79.00         87.00         114.50         27.50         11.55         76.05         32.44         9.75         15.00         23.40         9.60         42.97         42.00         23.           GW455         70.50         78.00         115.50         37.50         7.55         91.35         29.24         12.53         20.00         30.25         9.60         32.92         40.06         24.           WH154         85.00         93.50         118.50         25.00         8.40         93.45         31.64         10.88         18.00         24.82         9.42         37.32         38.81         23           AKAW3717         85.50         94.00         122.50         28.50         7.50         105.45         27.63         11.80         33.25         9.39         28.44         35.37         26.           Hala         77.50         86.50         116.00         23.50         7.50         105.45         27.63         11.78         21.00         20.51<															245.82
GW455         70.50         78.00         115.50         37.50         7.55         91.35         29.24         12.53         20.00         30.25         9.60         32.92         40.06         24.40           WH1154         85.00         94.00         118.00         24.00         6.05         104.85         30.44         10.17         17.00         23.47         9.59         42.20         40.05         23.33           WH1132         85.00         93.50         118.50         25.00         8.40         93.45         31.64         10.88         18.00         23.42         9.42         37.32         38.81         23.33           AKAW3717         85.50         94.00         122.50         28.50         7.10         87.45         41.25         10.65         22.00         28.66         9.18         31.96         31.26         29.30           WH730         84.50         92.50         116.00         23.50         7.50         105.45         27.63         11.78         21.00         20.51         9.08         40.68         44.32         20.0           WH156         86.00         93.00         119.00         26.00         7.85         104.85         31.24         11.03						7.90			13.35			9.60	35.25		284.92
WH1154         85.00         94.00         118.00         24.00         6.05         104.85         30.44         10.17         17.00         23.47         9.59         42.20         40.05         23.33           WH1132         85.00         93.50         118.50         25.00         8.40         93.45         31.64         10.88         18.00         24.82         9.42         37.32         38.81         23.33           AKAW3717         85.50         94.00         122.50         28.50         6.35         106.80         34.84         9.50         18.00         33.25         9.39         28.44         35.37         26.93           Halna         77.50         86.50         115.00         28.50         7.10         87.45         41.25         10.65         22.00         28.66         9.18         31.96         31.26         29.93           WH730         84.50         92.50         116.00         23.50         7.50         9.55         92.40         31.64         10.73         19.00         20.61         9.06         35.86         31.99         28.30           WH1156         86.00         93.00         116.50         27.50         9.55         92.40         31.44		79.00		114.50		11.55	76.05		9.75	15.00		9.60		42.00	232.46
WH1132         85.00         93.50         118.50         25.00         8.40         93.45         31.64         10.88         18.00         24.82         9.42         37.32         38.81         233           AKAW3717         85.50         94.00         122.50         28.50         6.35         106.80         34.84         9.50         18.00         33.25         9.39         28.44         35.37         26.33           Halna         77.50         86.50         115.00         28.50         7.10         87.45         41.25         10.65         22.00         28.66         9.18         31.96         31.26         29.39           WH730         84.50         92.50         116.00         23.50         7.50         105.45         27.63         11.78         21.00         20.51         9.09         44.30         39.46         23.09           WH1156         86.00         93.00         116.50         27.50         9.55         92.40         31.64         10.73         19.00         22.77         9.06         35.86         31.99         28.4           MKAW4627         76.00         83.50         115.00         31.50         8.35         92.25         25.63         9.75															242.11
AKAW3717         85.50         94.00         122.50         28.50         6.35         106.80         34.84         9.50         18.00         33.25         9.39         28.44         35.37         26.7           Halna         77.50         86.50         115.00         28.50         7.10         87.45         41.25         10.65         22.00         28.66         9.18         31.96         31.26         29.9           WH730         84.50         92.50         116.00         23.50         7.50         105.45         27.63         11.78         21.00         20.51         9.09         44.30         39.46         23.9           HD3016         81.00         89.00         116.00         27.50         9.55         92.40         31.64         10.73         19.00         22.77         9.06         35.86         31.99         28.8           WH1156         86.00         93.00         119.00         26.00         7.85         104.85         31.24         11.03         22.00         35.30         8.94         25.75         36.30         24.4           Birsa Gehun         81.50         90.50         114.50         23.50         6.40         88.05         28.04         10.95															238.49
Halna         77.50         86.50         115.00         28.50         7.10         87.45         41.25         10.65         22.00         28.66         9.18         31.96         31.26         29.90           WH730         84.50         92.50         116.00         23.50         7.50         105.45         27.63         11.78         21.00         20.51         9.09         44.30         39.46         23.90           HD3016         81.00         89.00         116.50         27.50         9.55         92.40         31.64         10.73         19.00         22.77         9.08         40.68         44.32         20.90           WH1156         86.00         93.00         119.00         26.00         7.85         104.85         31.24         11.03         22.00         24.76         9.06         35.86         31.99         28.           AKAW4627         76.00         83.50         114.50         24.00         9.00         94.95         30.04         10.73         20.00         29.19         8.94         32.33         32.75         27.75           GW322         84.00         91.00         114.50         23.50         6.40         88.05         28.04         10.95															239.89
WH730         84.50         92.50         116.00         23.50         7.50         105.45         27.63         11.78         21.00         20.51         9.09         44.30         39.46         23.30           HD3016         81.00         89.00         116.50         27.50         9.55         92.40         31.64         10.73         19.00         22.77         9.08         40.68         44.32         20.30           WH1156         86.00         93.00         119.00         26.00         7.85         104.85         31.24         11.03         22.00         24.76         9.06         35.86         31.99         28.3           AKAW4627         76.00         83.50         115.00         31.50         8.35         92.25         25.63         9.75         22.00         35.30         8.94         25.75         36.30         24.4           Birsa Gehun         81.50         90.00         114.50         24.00         9.00         94.95         30.04         10.73         20.00         29.19         8.94         33.23         32.275         27.57           GW322         84.00         91.00         114.50         23.00         88.05         28.44         12.00         16.00															265.47
HD3016         81.00         89.00         116.50         27.50         9.55         92.40         31.64         10.73         19.00         22.77         9.08         40.68         44.32         20.00           WH1156         86.00         93.00         119.00         26.00         7.85         104.85         31.24         11.03         22.00         24.76         9.06         35.86         31.99         28.3           AKAW4627         76.00         83.50         115.00         31.50         8.35         92.25         25.63         9.75         22.00         35.30         8.94         25.75         36.30         24.4           Birsa Gehun         81.50         90.50         114.50         24.00         9.00         94.95         30.04         10.73         20.00         29.19         8.94         23.23         32.75         27.7           GW322         84.00         91.00         114.50         26.00         8.25         100.80         28.04         10.95         18.00         20.75         8.94         42.68         40.14         20.1           HD3118         81.50         89.00         115.00         26.00         6.30         90.00         23.23         9.60															293.00 230.19
WH1156         86.00         93.00         119.00         26.00         7.85         104.85         31.24         11.03         22.00         24.76         9.06         35.86         31.99         28.           AKAW4627         76.00         83.50         115.00         31.50         8.35         92.25         25.63         9.75         22.00         35.30         8.94         25.75         36.30         24.           Birsa Gehun         81.50         90.50         114.50         24.00         9.00         94.95         30.04         10.73         20.00         29.19         8.94         33.23         32.75         27.           GW322         84.00         91.00         114.50         23.50         6.40         88.05         28.04         10.95         18.00         20.75         8.94         42.68         40.14         20.           HD3118         81.50         89.00         116.50         31.00         8.85         89.40         30.04         11.63         20.00         25.75         8.90         35.27         35.55         24.           DBW16         84.50         93.00         119.00         26.00         6.30         90.00         23.23         9.60         1															230.19
AKAW4627         76.00         83.50         115.00         31.50         8.35         92.25         25.63         9.75         22.00         35.30         8.94         25.75         36.30         244           Birsa Gehun         81.50         90.50         114.50         24.00         9.00         94.95         30.04         10.73         20.00         29.19         8.94         33.23         32.75         27.7           GW322         84.00         91.00         114.50         23.50         6.40         88.05         28.04         10.95         18.00         20.75         8.94         42.68         40.14         22.7           HD3118         81.50         89.00         116.50         31.00         8.85         89.40         10.95         18.00         27.75         8.94         42.68         40.14         22.7           HD314         77.50         85.50         116.50         31.00         8.85         89.40         30.04         11.60         20.00         25.75         8.90         35.27         36.55         24.4           DBW16         84.50         93.00         119.00         26.00         6.30         90.00         23.23         9.60         16.00 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>203.23</td></td<>															203.23
Birsa Gehun         81.50         90.50         114.50         24.00         9.00         94.95         30.04         10.73         20.00         29.19         8.94         33.23         32.75         27.           GW322         84.00         91.00         114.50         23.50         6.40         88.05         28.04         10.95         18.00         20.75         8.94         42.68         40.14         220           HD3118         81.50         89.00         115.00         26.00         8.25         100.80         28.44         12.00         16.00         27.99         8.91         31.11         39.21         222           H1544         77.50         85.50         116.50         31.00         8.85         89.40         30.04         11.63         20.00         25.75         8.90         35.27         36.55         24.           DBW16         84.50         93.00         119.00         26.00         6.30         90.00         23.23         9.60         16.00         21.03         8.88         41.93         39.28         222           Bageshwarlocal         86.00         94.50         119.50         25.00         5.95         114.00         36.05         10.13															248.95
HD3118         81.50         89.00         115.00         26.00         8.25         100.80         28.44         12.00         16.00         27.99         8.91         31.11         39.21         222           HI1544         77.50         85.50         116.50         31.00         8.85         89.40         30.04         11.63         20.00         25.75         8.90         35.27         36.55         24           DBW16         84.50         93.00         119.00         26.00         6.30         90.00         23.23         9.60         16.00         21.03         8.88         41.93         39.28         22'           Bageshwarlocal         86.00         94.50         119.50         25.00         5.95         114.00         36.05         101.3         18.00         30.89         8.85         28.53         36.57         24.           HD3043         83.00         95.20         122.00         26.80         6.75         97.05         30.04         11.70         19.00         27.50         8.82         31.34         34.80         25.50           DBW128         85.50         93.50         121.00         27.50         6.75         92.25         31.24         11.78															272.99
H1544         77.50         85.50         116.50         31.00         8.85         89.40         30.04         11.63         20.00         25.75         8.90         35.27         36.55         24           DBW16         84.50         93.00         119.00         26.00         6.30         90.00         23.23         9.60         16.00         21.03         8.88         41.93         39.28         22           Bageshwarlocal         86.00         94.50         119.50         25.00         5.95         114.00         36.05         10.13         18.00         30.89         8.85         28.53         36.57         24           HD3043         83.00         95.20         122.00         26.80         6.75         97.05         30.04         11.70         19.00         27.50         8.82         31.34         34.80         25.50           DBW128         85.50         93.50         121.00         27.50         6.75         92.25         31.24         11.78         22.00         31.59         8.79         27.73         33.56         26           DBW128         85.50         116.00         30.50         6.15         101.25         32.04         10.35         19.00			91.00		23.50	6.40	88.05	28.04	10.95	18.00	20.75	8.94		40.14	220.52
DBW16         84.50         93.00         119.00         26.00         6.30         90.00         23.23         9.60         16.00         21.03         8.88         41.93         39.28         22           Bageshwarlocal         86.00         94.50         119.50         25.00         5.95         114.00         36.05         10.13         18.00         30.89         8.85         28.53         36.57         24.           HD3043         83.00         95.20         122.00         26.80         6.75         97.05         30.04         11.70         19.00         27.50         8.82         31.34         34.80         25.           DBW128         85.50         93.50         121.00         27.50         6.75         92.25         31.24         11.78         22.00         31.59         8.79         27.73         33.56         26           DBW51         77.50         85.50         116.00         30.50         6.15         101.25         32.04         10.35         19.00         34.16         8.66         24.97         40.10         21.13           WH1046         78.50         87.50         113.00         25.50         5.98         81.90         27.63         9.98 <td< td=""><td>HD3118</td><td>81.50</td><td>89.00</td><td>115.00</td><td>26.00</td><td>8.25</td><td>100.80</td><td>28.44</td><td>12.00</td><td>16.00</td><td>27.99</td><td>8.91</td><td>31.11</td><td>39.21</td><td>227.62</td></td<>	HD3118	81.50	89.00	115.00	26.00	8.25	100.80	28.44	12.00	16.00	27.99	8.91	31.11	39.21	227.62
Bageshwarlocal         86.00         94.50         119.50         25.00         5.95         114.00         36.05         10.13         18.00         30.89         8.85         28.53         36.57         24.           HD3043         83.00         95.20         122.00         26.80         6.75         97.05         30.04         11.70         19.00         27.50         8.82         31.34         34.80         25.           DBW128         85.50         93.50         121.00         27.50         6.75         92.25         31.24         11.78         22.00         31.59         8.79         27.73         33.56         26           DBW51         77.50         85.50         116.00         30.50         6.15         101.25         32.04         10.35         19.00         34.16         8.66         24.97         40.10         21.16           WH1046         78.50         87.50         113.00         25.50         5.98         81.90         27.63         9.98         18.00         32.25         8.61         28.13         40.06         21.15           WH1142         83.00         90.50         117.00         26.50         11.00         91.47         27.23         12.30															244.01
H3043         83.00         95.20         122.00         26.80         6.75         97.05         30.04         11.70         19.00         27.50         8.82         31.34         34.80         25.50           DBW128         85.50         93.50         121.00         27.50         6.75         92.25         31.24         11.78         22.00         31.59         8.79         27.73         33.56         26           DBW51         77.50         85.50         116.00         30.50         6.15         101.25         32.04         10.35         19.00         34.16         8.66         24.97         40.10         21.93           WH1046         78.50         87.50         113.00         25.50         5.98         81.90         27.63         9.98         18.00         32.25         8.61         28.13         40.06         21.93           WH142         83.00         90.50         117.00         26.50         11.00         91.47         27.23         12.30         23.00         23.26         8.49         35.83         34.74         24.44															227.92
DBW128         85.50         93.50         121.00         27.50         6.75         92.25         31.24         11.78         22.00         31.59         8.79         27.73         33.56         26           DBW51         77.50         85.50         116.00         30.50         6.15         101.25         32.04         10.35         19.00         34.16         8.66         24.97         40.10         21.93           WH1046         78.50         87.50         113.00         25.50         5.98         81.90         27.63         9.98         18.00         32.25         8.61         28.13         40.06         21.93           WH142         83.00         90.50         117.00         26.50         11.00         91.47         27.23         12.30         23.00         23.26         8.49         35.83         34.74         24.44	*														243.21
DBW51         77.50         85.50         116.00         30.50         6.15         101.25         32.04         10.35         19.00         34.16         8.66         24.97         40.10         214           WH1046         78.50         87.50         113.00         25.50         5.98         81.90         27.63         9.98         18.00         32.25         8.61         28.13         40.06         21:           WH142         83.00         90.50         117.00         26.50         11.00         91.47         27.23         12.30         23.00         23.26         8.49         35.83         34.74         24															253.15
WH1046         78.50         87.50         113.00         25.50         5.98         81.90         27.63         9.98         18.00         32.25         8.61         28.13         40.06         21.33           WH1142         83.00         90.50         117.00         26.50         11.00         91.47         27.23         12.30         23.00         23.26         8.49         35.83         34.74         24.04															261.65
WH1142         83.00         90.50         117.00         26.50         11.00         91.47         27.23         12.30         23.00         23.26         8.49         35.83         34.74         24															218.36
															215.08 240.59
DL1266-5 79.50 87.50 118.00 30.50 6.95 77.85 27.63 13.30 22.00 19.93 8.48 41.95 40.36 21															240.59 211.10

Gaur et	al.		Ir	ıd. J. P.	ure App	. Biosci	(2020)	8(5), 2	240-247	7		ISSN:	ISSN: 2582 – 2845		
Genotype	DTH	DTA	DTM	GFD	NOT	PH	PL	SL	SPS	BM	GY	HI	TKW	TNG	
DBW39	87.50	96.00	118.00	22.00	7.05	82.95	24.03	10.05	20.00	23.88	8.46	36.91	32.71	262.55	
HI1579	89.00	94.50	119.00	24.50	8.65	94.05	26.03	10.17	21.00	22.29	8.46	37.88	40.56	208.23	
GW496	76.00	84.00	118.50	34.50	7.10	81.90	31.24	10.43	18.00	26.99	8.37	30.93	38.83	214.98	
BWL9022	85.50	93.50	117.50	24.00	6.15	93.15	35.24	11.10	23.00	30.46	8.34	26.93	38.29	218.44	
GW451	78.00	85.00	113.00	28.00	8.85	77.55	26.83	9.68	17.00	20.77	8.34	40.37	37.54	227.16	
WL711	84.50	92.50	116.50	24.00	6.65	85.05	28.04	9.68	19.00	30.11	8.28	28.01	40.79	203.40	
HD1981	77.50	86.00	117.00	31.00	10.50	84.30	28.44	11.18	18.00	28.70	7.95	29.15	39.24	202.21	
DBW31	77.00	84.50	119.50	35.00	7.95	90.00	30.84	12.30	23.00	28.55	7.86	27.47	45.30	175.23	
GW273	81.50	88.50	118.00	29.50	9.15	92.70	33.64	11.85	22.00	32.02	7.68	24.05	38.03	203.04	
DBW110	81.00	89.00	113.50	24.50	9.00	88.20	29.24	11.03	17.00	19.71	7.59	38.24	39.08	195.13	
WH1097	85.50	93.00	118.50	25.50	6.15	99.45	30.44	10.73	18.00	33.66	7.59	23.83	33.16	230.53	
AKW1071	85.00	93.00	118.00	25.00	7.55	96.60	28.84	10.20	19.00	18.94	7.56	40.24	35.78	211.03	
WBM1591	82.00	89.50	121.00	31.50	6.20	116.37	36.29	8.55	19.00	26.89	7.56	28.53	32.90	229.50	
GW391	83.50	92.50	119.00	26.50	5.60	89.55	27.23	9.87	21.00	29.37	7.32	24.74	42.41	175.34	
FLW5	83.50	92.25	119.00	26.00	6.15	82.35	29.64	10.07	19.00	27.08	7.10	26.28	31.88	223.93	
WH595	76.50	83.50	114.00	30.50	7.55	79.80	26.83	10.58	18.00	22.20	7.02	31.10	32.65	210.15	
GL27	77.00	85.50	118.00	32.50	5.85	127.35	37.65	9.75	20.00	32.74	6.33	19.92	37.60	169.84	
WH147	78.00	86.50	114.00	27.50	6.85	94.50	28.04	9.90	21.00	21.47	5.88	27.37	32.60	181.24	

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