INTERNATIONAL JOURNAL OF COTTON RESEARCH AND TECHNOLOGY

**Research Manuscript** 

EISSN= 2707-5281

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## Evaluation of high yielding candidate cotton genotypes tested in National Coordinated Varietal Trial at different locations of Sindh and Balochistan

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Author's	Ahmed, S. performed the experiments and wrote the research paper.
Contribution	
Article	*Corresponding email address: <u>sultanbaloch455@gmail.com</u>
History	Received: 05 August 2020, Revised: 30 September 2020, Accepted: 05 October 2020, Published Online: 12 October 2020
	ABSTRACT Digital Object Identifier (DOI): https://doi.org/10.33865/IJCRT.002.01.0348

The research was conducted during the two consecutive years 2018 and 2019; twenty eight (28) advance cotton strains were tested in national coordinated varietal trials (NCVT) at seven locations of Sindh and Balochistan. The results revealed highly significant difference among the varieties during both the years. On the basis of two years average performance only two candidate strains GH-Uhad and NIAB-135 showed their stability in yield performance during both the years. Therefore, it is recommended that top two high yielding varieties (*GH-Uhad and NIAB-135*) with stability in performance must be approved by the provincial seed council of Sindh and Balochistan to revive the cotton production of the provinces as well as national economy and not to waste/garbage this high yielding stuff and also suggested to cotton breeders utilization in hybridization/breeding program to evolve high yield variety.

Key word: Seed cotton yield, advance strains, locations, environmental.

**NTRODUCTION** Cotton (Gossypium hirsutum L.) is an important cash crop and plays a key role as compared to all other crops (Ahmad et al., 2007). Pakistan is 4th largest cotton producer in the world after China, USA and India (GOP, 2018). Cotton is a major crop of Pakistan after wheat; it occupies the largest area in Pakistan compared to other crops. It earns the country's largest export revenues. In addition to the lint, the seed of cotton for oil and meal accounts for 80 percent of the national production of oilseed. Cotton and cotton related products contribute 10% to gross domestic product (GDP) and 55% to the foreign exchange earnings of the country. Koutu and Shastry (2004) reported that cotton is judged by genotypes to its interaction with environment for yield and quality performance. Singh et al. (2002) reported that evaluation and development of high yielding crop varieties are major aim of agricultural scientists to fulfil crop requirements to become self-sufficient.

In Pakistan, cotton was cultivated on an area of 2700 thousand hectares (approx. 6672 thousand acres) during the year 2017-18 with the production of 11.95 million bales, whereas, the lint yield in Pakistan for the same year was 752 kg/ha (approx. 305 kg acre). In Punjab, almost 100% Bt cotton with Mon53 event and Cry1Ac gene was sown on an area of 2053 thousand hectares (approx. 5073 thousand acres) which produced 8.78 million bales with lint yield of 669 kg/ha during the year 2017-18 (GOP, 2018). Five year's (2013-14 to 2017-18) data regarding cotton area, production and lint yield for Pakistan, Punjab and Sindh are depicted in Table-1. Most of components of economic characters are indicative of the yield potential or the integrated cotton quality and are under the control of genes of various magnitudes and influences of the environments. Stable cotton varieties with high yield potential are of paramount importance among the large number of varieties recommended for cultivation for a particular zone (Kairon et al., 2000; Koutu and Shastry, 2004).

In the recent years, the release of high yielding, heat and leaf curl virus disease resistant Bt cotton varieties with pre-fixed fiber quality standards by the government of Punjab has accelerated momentum to fulfil the requirements of growers, textile industry and other stake holders. In this context, Pakistan Central Cotton Committee (PCCC) is playing pivotal role by conducting the National Coordinated Varietal Trials (NCVT) on the candidate cotton varieties bred by public and private sector breeders. The two years NCVT is mandatory for variety approval process. Every year, NCVT is conducted at almost 17 locations of the Pakistan to test their adaptability and yield potential. If a variety excels the standard varieties in yield for consecutive two years in NCVT, that variety is forwarded in the Expert Sub Committee of the headed by Director General Agriculture Research Sindh (in case of Sindh province) for further process. The variety which qualifies the pre-fixed fiber properties standards is then recommended to Sindh Seed Council for approval and commercial cultivation in the Sindh. Distinctiveness, Uniformity and Stability (DUS) studies are also conducted by the Federal Seed Certification and Registration Department (FSC&RD) for two years of the candidate varieties simultaneously which are included in NCVT. These trials/studies (NCVT, Spot examination and DUS) are mandatory for a variety to complete the variety approval process. Considering the above approval process for cotton varieties, the two years (2017 and 2018) data were extracted from the NCVT results distributed by Director Research, PCCC for evaluation of yield and fiber properties of candidate varieties and to see which varieties could qualify and fit in the variety approval process done by the Sindh Seed Council.

BJECTIVES: The objective of this research to select best suitable high yielding genotypes according to stability in both the provinces. The idea of study to identify an outstanding candidate strain to hold a place for commercial variety in future to boost up cotton production and national economy.

ATERIALS AND METHODS: The study was carried out to screen out the most appropriate high yielding varieties at seven locations of Sindh and Balochistan provinces.

Every year Pakistan Central Cotton Committee (PCCC) conducts National Coordinated Varietal Trials throughout Pakistan with the objectives to test the yield performance and adaptability of cotton candidate varieties developed by public and private sector cotton breeders. The 28 candidates Bt cotton strains from public and private sectors duly coded by the Director Research PCCC were tested at research centers in Sindh (CCRI, Sakrand; CRS Ghotki, CRS Mirpurkhas, and ARI Tandojam) and three centers at Balochistan (CRS Sibi, CRS Lasbela@Uthal and ARI-Khuzdar) against one standard/check variety CIM-602 during the years 2018-19 and 2019-20. The coded varieties seed provided by the Director Research, PCCC was sown on bed and furrow at all the seven locations. The plot size however, varied location-wise with the choice of the scientists or availability of land at the station who was deputed for conducting NCVT by the station in-charge. The trials were arranged in randomized complete block design with three replications at each location.

The experiment was conducted with randomized complete block design with three replications. The plot size was maintained 30'x10. The seed was planted on ridges with plant to plant and row to row distance was maintained at 30 cm and 75 cm respectively. The agronomic practices viz. weedicide, irrigation, thinning and inter-culturing were done uniform accordingly in all the replications. The fertilizer and plant protection measures were applied as per need whenever required. The 5 plants were tagged from each replication to record the data. The data were statistically analyzed after Gomez and Gomez (1984) calculating C.V. % and CD values at 5 Table 1: Cotton area of Pakistan. Punjab and Sindh with production

% and 1% probability levels to differentiate the varieties included in the trials. Each year after compilation of data, the yield results were sent back to Director Research PCCC with same variety codes. On the basis of yield and fiber properties results, the better performing varieties could then be released as commercial variety for the general cultivation in the province of Sindh and Balochistan.

**ESULTS AND DISCUSSION:** Twenty eight candidate cotton varieties were tested during two consecutively years 2018 and 2019 at seven locations of Sindh and Balochistan Provinces in national coordinated varietal trials (NCVT). The research was conducted to evaluate cotton candidate varieties against commercial standard/check variety CIM-602 for seed cotton yield and environmental adaptability. The samples of these varieties were sent to four biotechnological laboratories for biochemical tests also. Table 1 shows the sources of the 28 + 1 standards cotton candidate varieties sown for two years in the Sindh and Balochistan during 2018 and 2019, cotton seasons at public sector research institutions. Table-1 indicated the cotton area, production and yield of Pakistan, Punjab and Sindh for last five years (2013-14 to 2017-18) which serves as ready reference for the readers to judge the ups and downs in cotton crop in last half decade. Table 2 demonstrates the yield performance and also results of statistical analysis (CD at 1 and 5% level of probability including CV%) of the candidate varieties during 2017, whereas, table 3 revealed the yield and statistical analysis results for 2018 cotton season against the two check varieties. The two years average yield performance of candidate varieties was calculated and is presented in table 4.

Table 1: Cotton area of Pakistan, Punjab and Sindh with production and yield for last five years (2013-14 to 2017-18).

Year-Wise	2013-14	2014-15	2015-16	2016-17	2017-18				
PAKISTAN									
Area (000 hectares)	2805.65	2958.30	2901.98	2488.97	2700.27				
Production (000 million bales)	12768.88	13959.58	9917.41	10671.00	11945.60				
Yield (kg/ha)	774	802	581	729	752				
		PUNJAB							
Area (000 hectares)	2199.02	2322.85	2242.72	1815.34	2052.93				
Production (000 million bales)	9145.00	10277.00	6343.00	6978.00	8077.00				
Yield (kg/ha)	707	752	481	653	669				
SINDH									
Area (000 hectares)	567.98	596.21	621.25	636.65	611.68				
Production (000 million bales)	3523.42	3572.54	3475.60	3596.88	3775.76				
Yield (kg/ha)	1055	1019	951	960	1049				
Production (000 million bales) Yield (kg/ha)	3523.42 1055	3572.54 1019	3475.60 951	3596.88 960	3775.76 1049				

Source: Cotistics August 2018 Bulletin published by Pakistan Central Cotton Committee, Multan.

The mean performance of varieties during first year 2018 (table-2) revealed highly significant seed cotton yield differences among the genotypes, on an average of all locations, top ten varieties were found CIM-878, Rohi-1, VH-383, VH-189, FH-AM cotton 2017, CRIS-671, NIAB-135, VH-402, GH-Uhad and Cyto-511 which produced maximum seed cotton yield (kg ha<sup>-1</sup>) with 3213, 3149, 3139, 3078, 3075, 3042, 3007, 2912, and 2908 respectively, as compared with remaining cotton candidate varieties as well as standard check CIM-602. Similar findings also reported by Khan et al. (2007) and Khan et al. (2008) who evaluated advance cotton genotypes in multiple environment and reported high vielding strains comparison with standard varieties. Sial et al. (2014) check yield performance of cotton genotypes and reported high yielding cotton varieties for commercial cultivation. Regarding the second year experiment results during 2019 (table 3) was surprised that the varieties

which performed better during first year, that could not show their superiority in second year, because of their adoptability or due to influence of environmental conditions. On an average of second year top ten high yield varieties were; NIAB-1011, Rustam-11, GH-Uhad, FH-Super Cotton 2017, RH-670, NIAB-135, CIM-789, FH-AM Cotton 2017, Tassco-112, Tahafuz-12 (C-II) which given higher seed cotton yield 2945, 2908, 2857, 2682, 2643, 2588, 2562, 2534, 2509 and 2501 as compared with other candidate strains and also from standard check variety CIM-602. The present findings are according with Yasin et al. (2019) who also documented high yield cotton variety comparison with standard check. Ehsan et al. (2008) evaluated advance strains and reported high yield cotton genotype on the basis of yield performance. Jatt et al. (2007) assessed performance of cotton genotypes and high yield varieties recommended for commercial cultivation.

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 Table 2: Seed cotton yield (kg/ha) of 28 cotton candidate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2018-19.

 Sindh
 Balochistan

Sakataku ampur kuas         Gutuku         Jakucatu         Labeta         Sakataku         Jakucatu         Labeta         Jaku         Zaska         Zeh         Zaska         Zeh         Zaska         Zeh         Zeh <thzeh< th="">         Zeh         Zeh         Zeh</thzeh<>	S. No	.Genotypes	Colmand	JII Minany Khoo		Tandalam	<u>Da</u> Vhuadaa	Balochistan		– Average	
I         Issoc 11.2         I 1.49         + 4.40         10.88         3.2.41         5.2.11         2.7.16         2.5.12           3         Rohi-1         2.5.61         2.440         4447         1841         40.69         4308         2.2.13         5.1.14           5         Byc-111         2.933         2.1.53         3.479         1857         4428         3.710         2.3.23         2.835           6         Byc-20         1.651         2.870         2.2.52         1194         3.829         4.069         2.641           7         Rustam-11         1.998         1.435         4.994         1.674         3.710         2.890         2.845           9         IK-NIBGE-1.3         2.142         2.009         4.644         2.191         3.590         2.513         3.007         2.464           10         NLAB-101.1         2.489         3.999         1.632         3.949         3.710         2.496         3.991         3.231         2.241         2.266         2.912           11         NLAB-101.1         2.489         2.601         9.44         3.292         2.331         2.241         2.266         2.912           11         VH-49	4		Sakrand	Mirpur Knas	GNOTKI	Tandojam	Knuzdar	Lasbela	SIDI	05/5	
2         IAAUDE-12 (L-H)         1221         3157         4091         1256         3349         2512         27081         2022           4         Tr.King (C-H)         2764         2296         2747         2045         4306         2335         2479           6         Eye-111         2393         2153         3479         1857         4428         3710         2234         2680           6         Eye-20         1651         2870         2252         1194         3820         2672         2879           8         IC-2424         1364         2009         6612         1930         3590         2762         2879           10         NAB-135         2668         3157         3090         1978         3949         3710         2844         3007           11         NAB-1011         2489         2296         3253         2347         3072         2976         3131           12         VII-183         3143         2296         3253         3449         3231         2466         2744           13         VII-183         3134         2160         849         3231         2206         24912           14	1	Tassco-112	1735	1148	4305	1688	3231	3231	2616	2565	
3         Roh-1         2561         2440         4487         1841         4069         4308         2335         3149           5         Fye-111         2393         2153         3479         1857         4428         3710         2234         2893           6         Eye-20         1651         2870         2252         1194         3829         4069         2447         2647           7         Rustam-11         1998         1435         4964         1674         3710         3590         2813         3069         2885           10         NIAB-1011         2449         2206         3253         2547         3351         3111         2449         3007           11         NIAB-1011         2449         2206         3253         1632         4964         3449         2266         3131           12         VH-333         3143         2206         3935         1696         3120         2827         2496         2741           14         VH-402         2513         2153         4319         1936         3949         3231         2266         2912           15         FH-15         1149         2440	2	Tahafuz-12 (C-II)	1221	3157	4091	1256	3349	2512	2768	2622	
4         Tr.King (C-II)         2764         2296         2747         2045         4305         2272         2393         2153           6         Fye-20         1651         2870         2252         1194         3829         4069         2647         2645           7         Rustam-11         1998         1435         4984         1674         3710         2252         2870           8         IC1-2424         1364         2009         3612         1930         3590         2872         2920         2614           10         NIAB-135         2666         3157         3090         1978         3949         3711         2494         3007           12         VII-189         3135         2777         3668         1632         3947         3707         2956         3139           14         VH-402         2513         2153         4319         1936         3949         321         2266         2912           15         SIJ1.33         1149         2440         2601         944         3871         3710         3710         2726         2440           16         RH-470         2502         2440         3779	3	Rohi-1	2561	2440	4487	1841	4069	4308	2335	3149	
5         Eyr-11         2393         2153         3479         1857         4428         3710         2234         2893           6         Eyr-20         1651         2870         2252         1194         3829         4069         2762         2879           8         ICI-2424         1364         2009         4664         2191         3590         2813         3069         2885           9         INMAE-1011         2489         2266         3253         2547         3351         3111         2485         2790           12         VH-383         3434         2266         3999         I632         9467         3707         2956         313           13         VH-189         3135         2777         3668         I632         4066         3349         2267         3078           14         VH-402         2213         2133         4319         1936         3949         3231         2246         2411         2267           16         RH-670         2202         2244         3571         3818         3710         3710         2710         2486         2741           17         GH+0had         1552 <t< td=""><td>4</td><td>TJ-King (C-II)</td><td>2764</td><td>2296</td><td>2747</td><td>2045</td><td>4305</td><td>2272</td><td>2398</td><td>2690</td></t<>	4	TJ-King (C-II)	2764	2296	2747	2045	4305	2272	2398	2690	
6         Fig. 20         1651         2870         2252         1194         3829         4069         2647         2645           8         IC1-2424         1364         2009         3612         1930         3590         2872         2220         2614           10         NIAB-133         2142         2009         4614         2191         3590         2872         2920         2614           10         NIAB-133         2142         2009         4614         2191         3590         2513         3007         1384           11         NIAB-135         2668         3157         3090         1632         3947         3707         2956         3139           13         VH-189         3135         2727         3668         1632         4066         3349         2266         2216         2912           15         SLH-33         1149         2440         2611         944         3231         2286         2912           16         RH-35         2101         1675         2463         3949         3231         2286         2912           17         GH-MacOton 2017         1675         2440         3775         1633 <td>5</td> <td>Eye-111</td> <td>2393</td> <td>2153</td> <td>3479</td> <td>1857</td> <td>4428</td> <td>3710</td> <td>2234</td> <td>2893</td>	5	Eye-111	2393	2153	3479	1857	4428	3710	2234	2893	
7         Rustam-11         1998         1435         4984         1674         3710         3590         2762         2879           9         IK-NBGE-13         2142         2009         3612         1930         5500         2872         2902         2614           9         IK-NBGE-13         2142         2009         4664         2191         3590         2873         3069         2885           10         NIAB-1011         2489         2296         3293         2547         3351         3111         2485         2790           12         VI-383         3434         2296         3999         1632         4964         3629         2633         2241         2266           15         SLI-33         1149         2153         4319         1936         3949         3231         2266         2912           16         Rit-670         22012         22440         3779         1488         4308         2949         3075           17         GH-Ohad         2513         2153         4319         1363         3109         3540         2756         2754           18         FH-Super Cotton 2017         1448         1866	6	Eye-20	1651	2870	2252	1194	3829	4069	2647	2645	
8         IC.+24-4         1364         2009         3612         1930         3590         2513         2080         2614           10         NIAB-135         2668         3157         3000         1978         3949         3710         2494         3007           12         VIH-303         3434         2296         3253         2547         3351         3111         2485         2790           12         VIH-303         3434         2296         3253         2547         3351         3111         2485         2790           13         VIH-199         3135         2727         3660         1632         3949         3231         2286         2912           15         SIL-133         1149         2440         2601         994         3829         2633         2244         2266         2912           15         FI-450         2202         2204         3379         3181         3710         2992         2840           19         FI-Super Cotton 2017         1675         2440         3577         1588         4069         3311         2817         2867           20         FIH-AB Cotton 2017         1675         2094	7	Rustam-11	1998	1435	4984	1674	3710	3590	2762	2879	
9 IR-NIBCE-13 2142 2009 4684 2191 3590 2513 3069 2885 11 NIAB-1011 2469 2296 3990 1632 3949 3710 2494 3007 12 VIH-383 3444 2206 3999 1632 3947 3707 2956 3139 13 VIH-189 3135 2727 3668 1632 4066 3349 2967 3078 14 VIH-02 2513 2153 4319 1936 3949 3231 2286 2912 15 SLH-33 1149 2440 2601 944 3829 2633 2241 2268 16 RI-670 2202 2296 3935 1698 3710 2872 2496 2744 17 GH-Uhad 2513 2153 4319 1936 3949 3231 2286 2912 18 FIH-155 1424 1579 3287 3181 3710 3710 2992 2840 19 FIH-Super Cotton 2017 1675 2440 3749 1478 3590 3590 3590 2756 2754 19 FIH-Super Cotton 2017 1675 2400 3747 1588 4069 3351 2217 2867 22 MNIH-1035 1675 2009 2275 1633 4069 4069 3351 2817 2867 23 GRIS-671 2665 3588 3346 1534 3949 3590 2641 3042 24 GRIS-673 2860 3014 1817 1659 3231 3231 2758 2653 25 Gyto-511 2665 3588 3346 1534 3949 3590 2641 3042 24 GRIS-673 2860 3014 1817 1659 3231 3231 2758 2653 25 Gyto-511 2665 3588 3142 1731 3949 3899 2664 2908 26 GIM-789 1603 1435 3966 1507 2633 3949 2671 2541 27 GIM-602 (Std) 2615 2368 3111 2110 3949 38949 2812 3213 28 GIM-303 694 2142 4449 3763 11426 3949 3949 2812 3213 28 GIM-303 694 2142 2449 3763 11426 3949 3949 2812 3213 28 GIM-303 694 2142 2448 1731 3949 4069 2917 2671 29 GIM-602 (Std) 2615 2368 3111 2110 3619* 3141 2753 2817 CD 5% 1634** 1978** 2354** 1663** 2768** 410.2** 180.7** CD 1% 218 1** 295.3** 31426 3949 3949 2812 3213 28 GIM-303 694 2019 3845 1211 3949 4069 2917 2671 29 CIM-602 (Std) 2615 2368 3111 210 3619* 3140 275* 2817 CD 5% 1634** 1978** 2354** 1663** 2768** 410.2** 180.7** CD 1% 218 1** 295.3** 1513 2310 2252 2797 38 Rohi-1 1925 2601 1467 1691 2961 2896 2335 2297 5 Eye-111 1927 2601 1467 1691 2961 2896 2335 2297 5 Eye-111 1927 2601 1467 1691 2961 2896 2336 2407 10 NIAB-135 2561 2730 1185 336 2145* 3708 3106 2110 2509 38 Rohi-1 1925 2601 1467 1691 2961 2896 2335 2297 5 Eye-111 1947 2661 1938 1831 2832 2792 3386 2467 19 FI-MR0Kh-13 1960 22571 1485 1674 2571 2523 2289 2468 2098 18 NIM6Kh-13 1960 2371 1465 2464 2791 2555 2390 3117 2324 20 NIH-1025 2431 1155	8	ICI-2424	1364	2009	3612	1930	3590	2872	2920	2614	
10         NIAB-135         2668         3157         3090         1978         3949         370.         2494         3007           12         VH-383         3434         2296         3253         2547         351.         3111         2445         2790           12         VH-383         3434         2296         3999         1632         3947         3707         2956         3139           14         VH-402         2513         2153         4319         1936         3949         3231         2266         2912           15         SH-570         2202         2296         3935         1698         3710         2972         2446         2744           16         RH-570         2247         3181         3710         3710         2992         2440           17         GH-McOtton 2017         1675         2440         377         1588         4069         3012         2817         2867           20         RNH-1035         1675         2090         2275         1633         4069         2614         3045           21         MH-123         2860         3141         111         1659         3231         3231	9	IR-NIBGE-13	2142	2009	4684	2191	3590	2513	3069	2885	
11         NIAB-1011         2499         2296         3253         2547         3351         311         2485         2796           13         VII-189         3135         2727         3668         1632         4066         3249         2967         3078           14         VII-102         2513         2153         4319         1936         3949         3231         2286         2912           15         SI.H-33         1149         2440         2601         994         3829         2233         2246         2912           16         RI-670         2202         2296         3935         1698         3710         2927         2496         2744           17         GH-Uhdad         2513         2153         4319         1936         3949         3231         2286         2912           18         FH-350         1424         1579         3287         3181         3710         3910         2950         2840         3075           21         BH-232         2226         2440         3451         1643         3949         3590         2576         2563           23         CRIS-673         2660         3014	10	NIAB-135	2668	3157	3090	1978	3949	3710	2494	3007	
12         VH-383         3434         2296         3999         1632         3947         3707         2956         3139           14         VH-402         2513         2153         4319         1936         3949         3231         2286         2912           15         SLH-33         1149         2440         2601         984         3829         2633         2241         2268           16         RH-670         2202         2296         3935         1698         3710         2872         2480         2912           17         GH-Unad         2513         2153         4319         1936         3949         3231         2286         2912           18         FH-155         1424         1579         3287         3181         3710         3710         292         2840           19         FH-Super Cotton 2017         1675         2440         3577         1588         4069         3351         2817         2863           23         CRIS-671         2645         3588         346         1534         3949         3500         2641         3042           24         CRIS-673         2860         3014         1817 </td <td>11</td> <td>NIAB-1011</td> <td>2489</td> <td>2296</td> <td>3253</td> <td>2547</td> <td>3351</td> <td>3111</td> <td>2485</td> <td>2790</td>	11	NIAB-1011	2489	2296	3253	2547	3351	3111	2485	2790	
13         VH-189         3135         2727         3668         1632         4066         3349         2967         3078           14         VH-402         2513         2153         4319         1936         3949         3231         2286         2912           15         SLH-33         1149         2440         2601         984         3829         2633         2241         2268           16         RH-670         2202         2296         3935         1698         3710         2872         2496         2744           17         GH-Uhad         2513         2153         4319         1936         3949         3231         2286         2751           18         H-155         1424         1579         3287         1818         3710         2992         2840           21         HH-23         2226         2440         3577         1588         4069         3510         2617         2632           23         CRIS-671         2645         3588         3346         1534         3949         3829         2664         2908           25         Cyto-511         2262         2440         3462         1731 <t< td=""><td>12</td><td>VH-383</td><td>3434</td><td>2296</td><td>3999</td><td>1632</td><td>3947</td><td>3707</td><td>2956</td><td>3139</td></t<>	12	VH-383	3434	2296	3999	1632	3947	3707	2956	3139	
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	14	VH-402	2513	2153	4319	1936	3949	3231	2286	2912	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	15	SLH-33	1149	2440	2601	984	3829	2633	2241	2268	
10         10         10         2513         2133         4319         1936         3949         3231         2286         2111           18         FH-155         1424         1579         3287         3181         3710         2992         2440           18         FH-155         1424         1579         3287         3181         3710         2992         2440           21         FH-Super Cotton 2017         1448         1866         4823         1940         4188         4069         3351         2817         2867           21         RH-233         2226         2440         3577         1588         4069         3659         2641         2042           23         CRIS-671         2645         3588         3346         1534         3949         3590         2641         2042           24         CRIS-673         2860         3014         1817         1659         3231         3233         3949         2611         2313         3231         2758         2651           25         Cyto-511         262         2444         3453         3966         1507         2633         3949         2611         2313         3231 <td>16</td> <td>RH-670</td> <td>2202</td> <td>2296</td> <td>3935</td> <td>1698</td> <td>3710</td> <td>2872</td> <td>2496</td> <td>2200</td>	16	RH-670	2202	2296	3935	1698	3710	2872	2496	2200	
International         2143         2143         2143         2143         1474         1570         3740         3740         2200         2141           19         FH-Super Cotton 2017         1675         2440         3749         1478         3590         3590         2756         2754           20         FH-AM Cotton 2017         1448         1866         4823         1940         4188         4308         2949         3075           21         BH-223         2226         2440         3577         1588         4069         4069         2664         2632           23         CRIS-671         2645         3588         3346         1534         3949         3590         2641         3042           24         CRIS-673         2660         3014         1817         1659         3231         2758         2653           25         Cyto-511         2262         2440         3462         1344         3949         2812         3213         2751         2661           29         CIM-602         (Std.)         2615         2368         3111         2110         3649         3949         2817         2671         2541           20	17	CH-Uhad	2513	2153	4310	1036	3040	2072	2786	2012	
10         111-13	17 10		1424	1570	2207	2101	2710	2710	2200	2912	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	10	FII-135 FII Super Cotton 2017	1424	2440	3207	1470	2500	3710	2752	2040	
20         IFH-AM COUDT 2017         1448         1800         4023         1940         4188         4308         2949         3375           21         BH-223         2226         2440         3577         1588         4069         3051         2817         2867           22         CRIS-671         2645         3588         3346         1534         3949         3590         2641         3042           23         CRIS-673         2860         3014         1817         1659         3231         3231         2231         2267           24         CRIS-673         2860         3014         1817         1659         3231         3231         227         2641         3042           26         CIM-789         1603         1435         3986         1507         2633         3949         2817         2541           27         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2733         2817	19	FH-Super Cotton 2017	1073	2440	3749	14/0	3390	3390	2730	2734	
21       BH-223       222b       2440       3577       1588       4069       351       2817       2607         23       CRIS-671       2645       3588       3346       1534       3949       3500       2641       3042         24       CRIS-673       2860       3014       1817       1659       3231       3231       22758       2653         25       Cyto-511       2262       2440       3482       1731       3949       3829       2664       2908         26       CIM-789       1603       1435       3986       1507       2633       3949       2671       2541         27       CIM-878       2142       4449       3763       1426       3949       3949       2671       2671         29       CIM-602 (Std.)       2615       2368       3111       2110       3619       3141       2758       2145***          CD 5%       163.4**       197.8**       235.4**       186.3**       276.8**       410.2***       180.7**         CD 1%       214.5***         CD 1%       214.5***         CD 1%       214.5***	20	FH-AM LOTTON 2017	1448	1866	4823	1940	4188	4308	2949	3075	
22         MNR+1055         1675         2009         2275         1633         4069         4069         2694         2632           23         CRIS-671         2645         3588         3346         1534         3949         3590         2641         3042           24         CRIS-673         2860         3014         1817         1659         3231         3231         2758         2653           25         Cyto-511         2262         2440         3482         1731         3949         3829         2664         2908           26         CIM-789         1603         1435         3986         1507         2633         3949         2812         3213           28         CIM-303         694         2009         3845         1211         3949         4069         2917         2671           29         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2753         2817            CD 5%         163.4**         197.8**         278.8**         278.8**         410.2***         180.7**            CD 5%         163.4**         197.8**         278.8** <td< td=""><td>21</td><td>BH-223</td><td>2226</td><td>2440</td><td>3577</td><td>1588</td><td>4069</td><td>3351</td><td>2817</td><td>2867</td></td<>	21	BH-223	2226	2440	3577	1588	4069	3351	2817	2867	
23         CKIS-671         2645         3588         3346         1534         3949         3590         2641         3042           4         CRIS-673         2860         3014         1817         1659         3231         3231         2738         2653           25         Cyto-511         2262         2440         3482         1731         3949         3829         2664         2908           26         CIM-789         1603         1435         3986         1507         2633         3949         2617         2541           27         CIM-878         2142         4449         3763         1426         3949         3049         2812         3213           28         CIM-602 (Std.)         2615         2368         3111         2110         3949         4069         2917         2671           2019         CD5%         163.4**         197.8**         235.4**         186.3**         276.8**         410.2**         180.7**            CD 1%         218.1**         295.3**         364.8**         278.8**         405.3**         513.6**         214.5***            Tabs         Steactoton schotadatevarietis tested in NCVT at 7 loc	22	MNH-1035	1675	2009	2275	1633	4069	4069	2694	2632	
24         CNIS-673         2860         3014         1817         1659         3211         3231         2758         2653           25         Cyto-511         2262         2440         3482         1731         3949         3829         2664         2908           26         CIM-789         1603         1435         3986         1507         2633         3949         2611         2541           27         CIM-878         2142         4449         3763         1426         3949         3949         2812         3213           28         CIM-303         604         2009         3845         1211         3949         40619         2917         2671           29         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2753         2817           CD 5%         163.4**         197.8**         235.4**         186.3**         276.8**         410.2**         181.8*            Table 3: Seed cotton yield (kg/ha) of 28 coton candidate varieties tested in NCVT at 7 locations of Sima and Baochistan during 2019-20.         3306         2110         2509	23	CRIS-671	2645	3588	3346	1534	3949	3590	2641	3042	
25         Cyto-511         2262         2440         3482         1731         3949         3829         2664         2908           26         CIM-878         1435         3986         1507         2633         3949         2671         2541           27         CIM-878         2142         4449         3763         1426         3949         3949         2812         3213           28         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2753         2817           CD 5%         163.4**         197.8**         235.4**         186.3**         276.8**         410.2**         180.7**            CD 5%         6.2         11.8         13.5         10.9         16.5         12.2         9.5            Table 3: Seed cotton yield (lg/ha) of 28 cotton candidate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2019-20.         Sind         Sind         Average           1         Tassco-112         214         2601         1467         1691         2961         2896         2535         2297           3         Rohi-1         1925         2601         1467         1691         2961 <td>24</td> <td>CRIS-673</td> <td>2860</td> <td>3014</td> <td>1817</td> <td>1659</td> <td>3231</td> <td>3231</td> <td>2758</td> <td>2653</td>	24	CRIS-673	2860	3014	1817	1659	3231	3231	2758	2653	
26         CIM-789         1603         1435         3986         1507         2633         3949         2671         2541           27         CIM-878         2142         4449         3763         1426         3949         3949         2812         3213           28         CIM-303         694         2009         3845         1211         3949         4069         2917         2671           29         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2753         2817           CD 5%         163.4**         197.8**         235.4**         186.3**         276.8**         410.2**         180.7**            CD 5%         218.1**         295.3**         364.8**         278.8**         405.3**         513.6**         214.5**            Table 3: Seed cotton yield (lsg/ha) of 28 cotton candidate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2019-20.         Sindh              102.2         9.5            2019         2316         3395         3306         2110         2509           2         Tahafuz-1	25	Cyto-511	2262	2440	3482	1731	3949	3829	2664	2908	
27         CIM-878         2142         4449         3763         1426         3949         3949         2812         3213           28         CIM-303         694         2009         3845         1211         3949         4069         2917         2671           29         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2753         2817           CD 5%         163.4**         197.8**         235.4**         186.3**         276.8**         410.2**         180.7**            CD 1%         218.1**         295.3**         364.8**         278.8**         405.3**         513.6**         214.5**            Table 3: Seed cotton yield (kg/ha) of 28 cotton candidate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2019-20.         Starand         Mirpur Khas         Chotki         Tandojam         Khuzdar         Lasbela         Sibi            7         Tassco-112         2114         2690         1630         2316         3395         3306         2110         2509           2         Tahafuz-12 (G-II)         1925         2601         1467         1691         2961         2896         2535	26	CIM-789	1603	1435	3986	1507	2633	3949	2671	2541	
28         CIM-303         694         2009         3845         1211         3949         4069         2917         2671           29         CIM-602 (Std.)         2615         2368         3111         2110         3619         3141         2753         2817           CD 5%         163.4**         197.8**         235.4**         186.3**         276.8**         410.2**         180.7**            CD 1%         218.1**         295.3**         364.8**         278.8**         405.3**         513.6**         214.5**            Table 3: Seed cotton yield (kg/ha) of 28 cotton candiate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2019-20.                  214.5** <td< td=""><td>27</td><td>CIM-878</td><td>2142</td><td>4449</td><td>3763</td><td>1426</td><td>3949</td><td>3949</td><td>2812</td><td>3213</td></td<>	27	CIM-878	2142	4449	3763	1426	3949	3949	2812	3213	
29         CIM-602 (Std.) CD 5%         2615 163.4**         236.8 197.8**         3111 210         210 364.8**         276.8** 276.8**         410.2** 410.2**         180.7** 180.7**            CD 1%         218.1**         295.3**         364.8**         278.8**         405.3**         513.6**         214.5**            Table 3: Seed cotton yield (kg/ha) of 28 cotton candidate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2019-20.         Sindh         Balochistan during 2019-20.           S.No.         Genotypes         Sindh         Chotki         Tandojam         Khuzdar         Lasbela         Sibi            1         Tassco-112         2114         2690         1630         2316         3395         3306         2110         2509           2         Tahafuz-12 (C-II)         2560         2942         2431         1965         2858         2738         2010         2501           3         Rohi-1         1925         2601         1467         1691         2961         2896         2535         2297           4         Tl-King (C-II)         1925         2601         1467         1691         2961         2896         2535         2297           5	28	CIM-303	694	2009	3845	1211	3949	4069	2917	2671	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	29	CIM-602 (Std.)	2615	2368	3111	2110	3619	3141	2753	2817	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		CD 5%	163.4**	197.8**	235.4**	186.3**	276.8**	410.2**	180.7**		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		CD 1%	218.1**	295.3**	364.8**	278.8**	405.3**	513.6**	214.5**		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		CV%	6.2	11.8	13.5	10.9	16.5	12.2	9.5		
S. No.         Genotypes         Sindh         Balochistan         Average           1         Tassco-112         2114         2690         1630         2316         3395         3306         2110         2509           2         Tahafuz-12 (C-II)         2560         2942         2431         1965         2858         2738         2010         2501           3         Rohi-1         1925         2601         1467         1691         2961         2896         2535         2297           4         TJ-King (C-II)         1925         2601         1467         1691         2961         2896         2535         2297           5         Eye-111         1947         2661         1938         1831         2832         2792         3386         2467           7         Rustam-11         2847         2690         2301         1857         3745         3708         3206         2908           8         IC-2424         2119         2691         1698         1536         2808         2732         2641         2204           10         NIAB-135         2561         2930         1568         2646         2791         2565         3057	Table	e 3: Seed cotton vield (kg	/ha) of 28 co	tton candidate	varieties teste	ed in NCVT at 7 lo	ocations of Sind	lh and Baloch	nistan durin	g 2019-20.	
S. No.         Genotypes         Sakrand         Mirpur Khas         Ghotki         Tandojam         Khuzdar         Lasbela         Sibi         Average           1         Tassco-112         2114         2690         1630         2316         3395         3306         2110         2509           2         Tahafuz-12 (C-II)         2560         2942         2431         1965         2858         2738         2010         2501           3         Rohi-1         1925         2601         1467         1691         2961         2896         2535         2297           4         TJ-King (C-II)         1925         2601         1467         1691         2961         2896         2535         2297           5         Eye-111         1947         2661         1938         1831         2832         2792         3386         2464           6         Eye-20         1828         2661         1938         1831         2832         2792         3386         2467           7         Rustam-11         2847         2690         2301         1857         3745         3708         3206         2908           8         ICI-2424         2119	<u> </u>			S	lindh		В	alochistan			
1         Tassco-112         2114         2690         1630         2316         3395         3306         2110         2509           2         Tahafuz-12 (C-II)         2560         2942         2431         1965         2858         2738         2010         2501           3         Rohi-1         1925         2601         1467         1691         2961         2896         2535         2297           4         TJ-King (C-II)         1925         2601         1467         1691         2961         2896         2535         2297           5         Eye-111         1947         2661         1938         1831         2832         2792         3386         2484           6         Eye-20         1828         2661         1938         1831         2832         2792         3386         2467           7         Rustam-11         2847         2690         2301         1857         3745         3708         3206         2908           8         ICI-2424         2119         2691         1698         1536         2808         2732         2289         2268           9         IR-NIBGE-13         1960         2571 <t< th=""><th>S. No</th><th>. Genotypes</th><th>Sakrand</th><th>Mirpur Khas</th><th>Ghotki</th><th>Tandoiam</th><th>Khuzdar</th><th>Lasbela</th><th>Sibi</th><th>Average</th></t<>	S. No	. Genotypes	Sakrand	Mirpur Khas	Ghotki	Tandoiam	Khuzdar	Lasbela	Sibi	Average	
2       Tabafuz-12 (C-II)       2560       2942       2431       1965       2058       2738       2010       2501         3       Rohi-1       1925       2601       1467       1691       2961       2896       2535       2297         4       TJ-King (C-II)       1925       2601       1467       1691       2961       2896       2535       2297         5       Eye-111       1947       2661       1938       1831       2832       2792       3386       2484         6       Eye-20       1828       2661       1938       1831       2832       2792       3386       2467         7       Rustam-11       2847       2690       2301       1857       3745       3708       3206       2908         8       ICI-2424       2119       2691       1698       1536       2808       2732       2289       2268         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2553       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       V	1	Tassco-112	2114	2690	1630	2316	3395	3306	2110	2509	
2       Human H (GH)       1905       2112       1467       1605       2050       2135       2297         3       Rohi-1       1925       2601       1467       1691       2961       2896       2535       2297         5       Eye-111       1947       2661       1938       1831       2832       2792       3386       2484         6       Eye-20       1828       2661       1938       1831       2832       2792       3386       2467         7       Rustam-11       2847       2690       2301       1857       3745       3708       3206       2908         8       ICI-2424       2119       2691       1698       1536       2808       2732       2289       2268         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2523       2641       2204         10       NIAB-135       2561       2930       1568       2646       2791       2565       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       VH-383       1851	2	Tabafuz-12 (C-II)	2560	2942	2431	1965	2858	2738	2010	2501	
3       Rom 1       1925       2601       1467       1691       2901       2896       2535       2297         4       TJ-King (C-II)       1925       2601       1467       1691       2961       2896       2535       2297         5       Eye-111       1947       2661       1938       1831       2832       2792       3386       2484         6       Eye-20       1828       2661       1938       1831       2832       2792       3386       2467         7       Rustam-11       2847       2690       2301       1857       3745       3708       3206       2908         8       ICI-2424       2119       2691       1698       1536       2808       2732       2289       2268         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2523       2641       2204         10       NIAB-135       2561       2930       1568       2646       2791       2565       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       VH-383 <td>2</td> <td>Rohi-1</td> <td>1925</td> <td>2601</td> <td>1467</td> <td>1691</td> <td>2050</td> <td>2896</td> <td>2535</td> <td>2201</td>	2	Rohi-1	1925	2601	1467	1691	2050	2896	2535	2201	
FIPKRIG (C-II)172.52.0011407160712.0112.0102.0352.2375Eye-11119472.661193818312.8322.79233862.4846Eye-2018282.661193818312.8322.79233862.4677Rustam-112.8472.6902.3011.8573.7453.70832.062.9088ICI-24242.1192.6911.6981.5362.8082.7322.2892.2689IR-NIBGE-1319602.5711.4851.6742.5712.5232.6412.20410NIAB-1352.5612.9301.5682.6462.7912.56530572.58811NIAB-10113.1582.8102.1532.1343.7723.7132.8742.94512VH-3831.8512.3321.6772.0272.6752.5903.1172.32413VH-1891.7352.5711.7762.4751.9631.9012.8542.18214VH-4021.5722.4521.1132.1612.3532.3142.1192.01215SLH-331.8502.3911.1552.2002.4782.3972.5722.14916RH-6702.1132.2121.7463.6933.1853.1152.4352.64317GH-Uhad2.7262.6902.0782.312407040372.08	Л	TL-King (C-II)	1925	2601	1467	1601	2961	2070	2535	2297	
3       bye-111       1947       2001       1938       1631       2032       2792       3360       2467         6       Eye-20       1828       2661       1938       1831       2832       2792       3386       2467         7       Rustam-11       2847       2690       2301       1857       3745       3708       3206       2908         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2523       2641       2204         10       NIAB-135       2561       2930       1568       2646       2791       2565       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       VH-383       1851       2332       1677       2027       2675       2590       3117       2324         13       VH-189       1735       2571       1776       2475       1963       1901       2854       2182         14       VH-402       1572       2452       1113       2161       2353       2314       2119       2012         15       SLH-33	т 5	Fyo 111	1047	2661	1020	1071	2901	2070	2326	2497	
0       Eye-20       1620       2601       1930       1631       2632       2792       3360       2467         7       Rustam-11       2847       2690       2301       1857       3745       3708       3206       2908         8       ICI-2424       2119       2691       1698       1536       2808       2732       2289       2268         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2563       3057       2588         10       NIAB-135       2561       2930       1568       2646       2791       2565       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       VH-383       1851       2332       1677       2027       2675       2590       3117       2324         13       VH-189       1735       2571       1776       2475       1963       1901       2854       2182         14       VH-402       1572       2452       1113       2161       2353       2314       2119       2012         15       SL+33	5	Eye-111 Eve 20	1947	2001	1930	1031	2032	2792	2206	2404	
7       Rustam-11       2847       2690       2301       1857       3745       3708       3206       2908         8       ICI-2424       2119       2691       1698       1536       2808       2732       2289       2268         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2523       2641       2204         10       NIAB-135       2561       2930       1568       2646       2791       2565       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       VH-383       1851       2332       1677       2027       2675       2590       3117       2324         13       VH-189       1735       2571       1776       2475       1963       1901       2854       2182         14       VH-402       1572       2452       1113       2161       2353       2314       2119       2012         15       SLH-33       1850       2391       1155       2200       2478       2397       2572       2149         16       RH-670	0	Eye-20 Ductors 11	1020	2001	1930	1051	2032	2792	2200	2407	
8       ICI-2424       2119       2691       1698       1536       2808       2732       2289       2268         9       IR-NIBGE-13       1960       2571       1485       1674       2571       2523       2641       2204         10       NIAB-135       2561       2930       1568       2646       2791       2565       3057       2588         11       NIAB-1011       3158       2810       2153       2134       3772       3713       2874       2945         12       VH-383       1851       2332       1677       2027       2675       2590       3117       2324         13       VH-189       1735       2571       1776       2475       1963       1901       2854       2182         14       VH-402       1572       2452       1113       2161       2353       2314       2119       2012         15       SLH-33       1850       2391       1155       2200       2478       2397       2572       2149         16       RH-670       2113       2212       1746       3693       3185       3115       2435       2643         17       GH-Uhad	/		2847	2690	2301	1857	3/45	3708	3206	2908	
9IR-NIBGE-131960257114851674257125232641220410NIAB-1352561293015682646279125653057258811NIAB-10113158281021532134377237132874294512VH-3831851233216772027267525903117232413VH-1891735257117762475196319012854218214VH-4021572245211132161235323142119201215SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	8	IUI-2424	2119	2691	1698	1536	2808	2/32	2289	2268	
10NIAB-1352561293015682646279125653057258811NIAB-10113158281021532134377237132874294512VH-3831851233216772027267525903117232413VH-1891735257117762475196319012854218214VH-4021572245211132161235323142119201215SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	9	IK-NIBGE-13	1960	25/1	1485	16/4	25/1	2523	2641	2204	
11NIAB-10113158281021532134377237132874294512VH-3831851233216772027267525903117232413VH-1891735257117762475196319012854218214VH-4021572245211132161235323142119201215SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	10	NIAB-135	2561	2930	1568	2646	2791	2565	3057	2588	
12VH-3831851233216772027267525903117232413VH-1891735257117762475196319012854218214VH-4021572245211132161235323142119201215SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	11	NIAB-1011	3158	2810	2153	2134	3772	3713	2874	2945	
13VH-1891735257117762475196319012854218214VH-4021572245211132161235323142119201215SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	12	VH-383	1851	2332	1677	2027	2675	2590	3117	2324	
14VH-4021572245211132161235323142119201215SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	13	VH-189	1735	2571	1776	2475	1963	1901	2854	2182	
15SLH-331850239111552200247823972572214916RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	14	VH-402	1572	2452	1113	2161	2353	2314	2119	2012	
16RH-6702113221217463693318531152435264317GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	15	SLH-33	1850	2391	1155	2200	2478	2397	2572	2149	
17GH-Uhad2726269020782312407040372089285718FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	16	RH-670	2113	2212	1746	3693	3185	3115	2435	2643	
18FH-1552607287021392153322022842102248219FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	17	GH-Uhad	2726	2690	2078	2312	4070	4037	2089	2857	
19FH-Super Cotton 20172835245119522432354135222039268220FH-AM cotton 20171527233218882536333633062813253421BH-2231915281014582529243323682967235422MNH-103524331401163111762822281629622177	18	FH-155	2607	2870	2139	2153	3220	2284	2102	2482	
20       FH-AM cotton 2017       1527       2332       1888       2536       3336       3306       2813       2534         21       BH-223       1915       2810       1458       2529       2433       2368       2967       2354         22       MNH-1035       2433       1401       1631       1176       2822       2816       2962       2177	19	FH-Super Cotton 2017	2835	2451	1952	2432	3541	3522	2039	2682	
21       BH-223       1915       2810       1458       2529       2433       2368       2967       2354         22       MNH-1035       2433       1401       1631       1176       2822       2816       2962       2177	20	FH-AM cotton 2017	1527	2332	1888	2536	3336	3306	2813	2534	
22 MNH-1035 2433 1401 1631 1176 2822 2816 2962 2177	21	BH-223	1915	2810	1458	2529	2433	2368	2967	2354	
	22	MNH-1035	2433	1401	1631	1176	2822	2816	2962	2177	

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	CV%	8.4	14.5	12.8	11.2	15.8	12.4	11.5	
	CD 1%	201.4**	353.3**	403.6**	242.8**	381.3**	318.9**	436.8**	
	CD 5%	136.8**	271.2**	223.7**	169.5**	202.4**	184.7**	227.1**	
29	CIM-602 (Std.)	2248	2581	1295	2124	2918	2839	2312	2331
28	CIM-303	1200	1630	1800	1420	3334	3300	1734	2060
27	CIM-878	2672	2060	1730	1319	3745	3767	1931	2461
26	CIM-789	2151	1918	1889	2149	3476	3486	2863	2562
25	Cyto-511	2232	2054	1692	1380	2815	2595	3119	2270
24	CRIS-673	2318	2429	1847	1948	2852	2804	2057	2322
23	CRIS-671	1945	2052	2395	2453	2929	2768	1948	2356

Table 4: Two year's average performance (seed cotton yield kg/ha) of 28 candidate varieties tested in NCVT at 7 locations of Sindh and Balochistan during 2018-19 and 2019-20 Cotton Seasons.

<u>Cr</u>	Genotypes	Sindh				Balochistan			
No.		Sakrand	Mirpur Khas	Ghotki	Tandojam	Khuzdar	Lasbela	Sibi	Average
1	Tassco-112	1925	1919	2968	2002	3313	3269	2363	2537
2	Tahafuz-12 (C-II)	1891	3050	3261	1611	3104	2625	2389	2561
3	Rohi-1	2243	2521	2977	1766	3515	3602	2435	2723
4	TJ-King (C-II)	2345	2449	2107	1868	3633	2584	2467	2493
5	Eye-111	2170	2407	2709	1844	3630	3251	2810	2689
6	Eye-20	1740	2766	2095	1513	3331	3431	3017	2556
7	Rustam-11	2423	2063	3643	1766	3728	3649	2984	2893
8	ICI-2424	1742	2350	2655	1733	3199	2802	2605	2441
9	IR-NIBGE-13	2051	2290	3085	1933	3081	2518	2855	2545
10	NIAB-135	2615	3044	2329	2312	3370	3138	2776	2797
11	NIAB-1011	2824	2553	2703	2341	3562	3412	2680	2868
12	VH-383	2643	2314	2838	1830	3311	3149	3037	2731
13	VH-189	2435	2649	2722	2054	3015	2625	2911	2630
14	VH-402	2043	2303	2716	2049	3151	2773	2203	2462
15	SLH-33	1500	2416	1878	1592	3154	2515	2407	2209
16	RH-670	2158	2254	2841	2696	3448	2994	2466	2693
17	GH-Uhad	2620	2422	3199	2124	4010	3634	2188	2885
18	FH-155	2016	2225	2713	2667	3465	2997	2547	2661
19	FH-Super Cotton 2017	2255	2446	2851	1955	3566	3556	2398	2718
20	FH-AM Cotton 2017	1488	2099	3356	2238	3762	3807	2881	2804
21	BH-223	2071	2625	2518	2059	3251	2860	2892	2611
22	MNH-1035	2054	1705	1953	1405	3446	3443	2828	2405
23	CRIS-671	2295	2820	2871	1994	3439	3179	2295	2699
24	CRIS-673	2589	2722	1832	1804	3042	3018	2408	2488
25	Cyto-511	2247	2247	2587	1556	3382	3212	2892	2589
26	CIM-789	1877	1677	2938	1828	3055	3718	2767	2551
27	CIM-878	2407	3255	2747	1373	3847	3858	2372	2837
28	CIM-303	947	1820	2823	1316	3642	3685	2326	2365
29	CIM-602 (Std.)	2432	2475	2203	2117	3269	2990	2533	2574

However, when the results of 2018 and 2019 (both seasons) mean performance were summed up, then top ten high yielding varieties were found Rustam-11, GH-Uhad, NIAB-1011, CIM-878, FH-AM cotton 2017, NIAB-135, VH-383, Rohi-1, FH-Super Cotton and CRIS-671 which produced maximum seed cotton yield (kg ha-1) 2893, 2885, 2868, 2837, 2804, 2797, 2731, 2723, 2718 and 2699 as compared with other candidate strains and standard check variety CIM-602 (table 4). It is interesting to recorded that among top ten high yielding varieties, only two varieties (GH-Uhad and NIAB-135) were found stable during the both years and yield performance due to the fact that these varieties keep their superiority in individual year (2018 and 2019) and also when the average performance was looked at. Other varieties shown their stability in a particular single year but were included in top 10 varieties when the yield results were averaged. Seeing the yield results, it is suggested that the top two high yielding

varieties (GH-Uhad and NIAB-135) with stability in performance must be approved by the provincial seed council of Sindh and Balochistan to revive the cotton production of the provinces and not to waste/garbage this high yielding stuff. The results are in line with Shah *et al.* (2015) who evaluated candidate strains in national coordinated varietal trial in Sindh province with recommendation of high yield strains for commercial cultivation. Koutu and Shastry (2004) reported that performance of variety can be judged by the genotypes and its interaction with various environments for yield performance. Kairon *et al.* (2000) stated that stable cotton genotypes with high yielding potential are of paramount important among the large number of varieties recommended for cultivation for particular zone.

**ONCLUSION:** During the two consecutive years 2018 and 2019, twenty eight (28) advance cotton strains were tested in national coordinated varietal trials (NCVT) at

seven locations of Sindh and Balochistan. On the basis of two years average performance only two candidate strains GH-Uhad and NIAB-135 shown their stability in yield performance during both the years. Therefore, it is recommended that top two high yielding varieties (*GH-Uhad and NIAB-135*) with stability in performance must be approved by the provincial seed council of Sindh and Balochistan to revive the cotton production of the provinces and not to waste/garbage this high yielding stuff.

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