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Evaluation of advanced cotton genotypes at the field conditions of different locations of Sindh and Balochistan

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ABSTRACT

Thirty advanced candidate cotton lines were tested during two consecutively years (2019 and 2020) and at seven locations of Sindh and Baluchistan Provinces in national coordinated varietal trials (NCVT). The trials were conducted to evaluate promising line for seed cotton yield and fiber properties against standard check variety. The results revealed highly significant differences among the varieties during both the years. In 2019, on an average of seven locations, top ten high yielding varieties recorded were Rustam-11, GH-Sultan, Saim-102, CIM-775, Diamond-2, NIA-88, NIA-89, ASPL-710, IR-NIBGE-15 and CRIS-644 which given maximum seed cotton yield. In 2020, on an average of top ten high yielding varieties were GH-Sultan, CIM-775, NIA-88, Diamond-2, Cyto-535, Siam-102, FH-Anmol, Cyto-226, ASPL-710 and NIAB-512 which attained highest seed cotton yield. However, when the results of 2019 and 2020 were summed up, top ten high yielding varieties were GH-Sultan, CIM-775, Rustam-11, Diamond-2, NIA-88, Siam-102, Cyto-535, NIA-89, ASPL-710 and IR-NIBGE-15. It was noted from the present research that among top 10 high yielding varieties during both years, only six varieties (GH-Sultan, CIM-775, Diamond-2, NIA-88, Siam-102 and ASPL-710) were stable with yield performance due to the fact that these varieties keep their superiority in individual year (2019 and 2020) it is suggested that the top six high yielding varieties (GH-Sultan, CIM-775, Diamond-2, NIA-88, Siam-102 and ASPL-710) 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.

Keywords: Seed cotton yield, fiber traits, locations, Sindh, Baluchistan environment

INTRODUCTION: Cotton is known as white gold as well as silver fiber of Pakistan. It is grown in Major areas of Sindh and Punjab and brings cash profit for the farmers. Cotton provides raw material to the textile industries and create employments to both rural and urban areas. Yearly economic impact of cotton crops is more than 600 billion dollars globally (Ashraf *et al.*, 2018). The Cotton (*Gossypium hirsutum* L.) is an important cash and fiber crop; it plays a key role and position as compared with all other crops. In cropping pattern and sowing of any crop, selection of appropriate cultivar is the basic decision for management (Nichols *et al.*, 2004). It was observed that genotypes of any breed from one region may not perform well at the other regions (Gommes *et al.*, 2010). It was observed that some of the genotypes have the potential to adapt the environmental conditions of other regions and performing well, while the other genotypes fail in adaptation under changed environmental conditions. Therefore, selection of appropriate genotypes should be on basis of adaptability, yield potential, growth period, tolerant to biotic and aboitic factors and fiber quality traits that have the economic values in textile sector. The climatic conditions of Pakistan differ from province to province and within the province as well. The cotton crop behaves differently under different environmental conditions; therefore, stability in performance is one of the most desirable characteristics of any genotype to be released for commercial cultivation. The yield of cotton is affected by the site and the season and at the same time highly significant differences in yield due to varieties.

Pakistan is 4th largest cotton producer in the world after China, USA, and India and also 3rd larger consumer in the world. Globally cotton area estimates has been slackened by 9.1% to 31.665 million hectares in 2020-21 season as compared to 34.855 million hectares in 2019-20. Global cotton production estimates were revised down to 24.110 million tons with increasing consumption currently remaining at 24.5 million tons in 2020-21 (PCCC, 2021). Genotypes exhibits different behavior in different environments/locations which is due to their varied genetic makeup. The behaviour may be cross over (in which significant change in ranking order occurs from one environment to another) or cross over nature (in which the ranking of genotypes remains constant across environments and the interaction is significant because of change in the magnitude of response) depending upon the ranking order of genotypic performance under different environments (Ali *et al.*, 2005; Elsiddig *et al.*, 2019). 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 have accelerated momentum to fulfil the requirements of growers, textile industry and other stakeholders. In this context, the 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 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 (2019 and 2020) 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.

OBJECTIVES: The objective of study to screen out promising genotypes at seven locations of Sindh and Baluchistan for seed cotton yield and adoptability during two consecutive years. The stable advance genotypes could be recommended for varietal approval and general cultivation in both provinces to boost up cotton production.

MATERIALS AND METHODS: The research was conducted to screen out the most outstanding high yielding advance lines in different agro-ecological zones of Sindh and Baluchistan provinces. 30 candidate cotton varieties from public and private sectors duly coded by the Director Research PCCC were sown and tested at four public sector research centres in Sindh (CCRI, Sakrand; CRS Ghotki, CRS Mirpur khas, and ARI Tandojam) and three public sectors in Baluchistan (CRS Sibi, CRS Lasbela, Uthal and ARI-Khuzdar) against standard/check variety (CIM-602) during the years 2019 and 2020. The coded varieties seed provided by the Director Research, PCCC was sown on the bed and furrow at all the seven locations. The plot size, however, varied location-wise with the choice of the scientist or availability of land at the station who was deputed for conducting NCVT by the station in-charge. The trials were arranged in a randomized complete block design (RBCD) replicated three times at each location. The trials were agronomically and entomologically supervised and protected by the agronomist and entomologist of each location. The required yield data were recorded at all the stations when the crop was fully matured and was ready to harvest. The data were statistically analysed after Gomez and Gomez (1984) calculating C.V. % and CD values at 5% and 1% probability levels to differentiate the varieties included in the trials. Each year after compilation of data, the yield results are sent back to Director, Research PCCC with same variety codes. Based on yield and fiber properties results, the better performing varieties could then be released as a commercial variety for the general cultivation in the province of Sindh and Baluchistan.

RESULTS AND DISCUSSION: Thirty advance candidate cotton lines were tested during two consecutively years (2019 and 2020) at the seven locations of Sindh and Baluchistan Province in national coordinated varietal trials (NCVT) program. The trials were conducted to explore seed cotton yield potential and fiber quality parameters of these candidate varieties against the standard/check variety (CIM-602). Table 1 depicts the cotton area, production and yield of Pakistan, Punjab, and Sindh for the last five years (2015-16 to 2019-20) which serves as ready reference for the readers to judge the ups and downs in the cotton crop in the last half decade. It was noted that the cotton area has been decreased, while production was increased during 2017-18 and 2018-19 as compared to other years (Table-1).

Year-Wise	2015-16	2016-17	2017-18	2018-19	2019-20
			PAKISTAN		
Area (000 hectares)	2901.98	2488.97	2700.27	2372.96	2526.99
Production (000 million bales)	9917.41	10671.00	11945.60	9860.77	9178.03
Yield (kg/ha)	581	729	752	706	617
			PUNJAB		
Area (000 hectares)	2242.72	1815.34	2052.93	1887.81	1889.44
Production (000 million bales)	6343.00	6978.00	8077.03	6862.00	6336.00
Yield (kg/ha)	481	653	669	615	570
			SINDH		
Area (000 hectares)	621.25	636.65	611.68	448.19	598.71
Production (000 million bales)	3475.60	3596.88	3775.76	2936.40	2745.60
Yield (kg/ha)	951	960	1049	1115	780

Table 1: Pakistan, Punjab and Sindh Cotton Area, Production and Yield for last five years (2015-16 to 2019-20).
Source: Cotistics October 2020 Bulletin published by Pakistan Central Cotton Committee, Multan.

Table 2 demonstrates the yield performance and results of statistical analysis (CD in 1 and 5% level probability, including CV%) of the candidate varieties during 2019, whereas table 3 revealed the yield and statistical analysis results for 2020 cotton season against the two check varieties. The two years average yield performance of candidate varieties was calculated and is presented in table 4. The seed cotton yield data of all seven locations are presented in table 2 and table 3 revealed highly significant yield differences among the varieties during both years of trailing. In the year 2019, on an average of seven locations (table 2), top ten high yielding varieties recorded were Rustam-11, GH-Sultan, Saim-102, CIM-775, Diamond-2, NIA-88, NIA-89, ASPL-710, IR-NIBGE-15 and CRIS-644 which given maximum seed cotton yield 2908, 2770, 2762, 2758, 2696, 2682, 2512, 2474, 2471 and 2457 kg/ha respectively. Ehsan *et al.* (2008) also reported comparative yield performance of cotton genotypes.

During the investigation of year 2020 trial results (table 3), on an average of seven locations of the Sindh and Balochistan, top ten high yielding varieties were GH-Sultan, CIM-775, NIA-88, Diamond-2, Cyto-535, Siam-102, FH-Anmol, Cyto-226, ASPL-710 and NIAB-512 which attained highest seed cotton yield 2076, 1720, 1695, 1684, 1661, 1612, 1590, 1579, 1577 and 1559 kg/ha respectively. However, when the results of 2019 and 2020 (both seasons) were summed up, top ten high yielding varieties were GH-Sultan, CIM-775, Rustam-11, Diamond-2, NIA-88, Siam-102, Cyto-535, NIA-89, ASPL-710 and IR-NIBGE-15 given utmost seed

Sr. No.	Varieties	Sindh				Baluchistan			Average
		Sakrand	Ghotki	Tando Jam	Mirpur Khas	Sibbi	Lasbela	Khuzdar	
1	CRIS-644	2504	1355	2702	2231	2678	2975	2752	2457
2	Cyto-226	355	1898	1931	1533	1847	2835	1928	1761
3	Eye-22	1947	1989	2930	1546	2925	2357	3012	2387
4	IR-NIBGE-14	1956	1857	2511	1493	2589	2392	2661	2208
5	NIAB-SANAB-M	2578	2189	2571	1579	2236	1957	2766	2268
6	IR-NIBGE-15	1865	1729	2631	1513	3360	2814	3384	2471
7	CRIS-638	2262	2030	1094	1195	2714	3066	2848	2173
8	Cyto-533	2014	1864	2391	1765	2750	2972	2784	2363
9	Cyto-535	2378	2311	2145	1454	3468	1846	3543	2449
10	FH-Anmol	1815	1839	2451	2309	2954	1698	3088	2308
11	FH-492	2139	1686	2332	2072	1847	2773	2053	2129
12	SLH-33	1850	1155	2391	2200	2397	2572	2478	2149
13	NIA-89	2118	750	2451	3372	2625	3251	3019	2512
14	NS-211	1712	2292	2810	1799	3044	1958	3082	2385
15	Sayban-209	1792	2105	2451	2164	2167	2287	2239	2172
16	Saim-102	2438	2286	2571	1746	3945	2739	3608	2762
17	Rohi-2	1454	1023	2212	1587	2805	2640	2836	2080
18	Suncrop-3	2061	1238	2691	1754	2625	2251	2708	2190
19	Diamond-2	1506	1827	2272	2044	4055	3220	3951	2696
20	YBG-2222	1841	2186	2690	1637	3134	2257	3273	2431
21	ASPL-709	1940	1588	2690	1157	2995	2039	3024	2205
22	ASPL-710	1895	1920	3169	1616	2925	2867	2928	2474
23	Rustam-11	2847	2301	2690	1857	3708	3206	3745	2908
24	NIAB-512	2382	1787	2631	2090	2356	2425	2525	2314
25	RH-Afnan-II	2240	1532	2451	2269	2780	1979	2819	2296
26	BH-224	2256	1411	2332	2064	2991	2719	3299	2439
27	NIA-88	3117	965	2402	2544	3480	2735	3530	2682
28	CIM-775	2507	1752	2479	2587	3910	2132	3942	2758
29	MNH-1050	2266	2108	2033	1721	2571	2736	2585	2289
30	GH-Sultan	2629	2467	2750	2299	3535	2181	3526	2770
31	CIM-602 (Std.)	2156	972	2421	2265	2836	2386	2899	2276
	CD 5%	157.6**	201.5**	236.8**	183.7**	243.1**	211.8**	239.4**	---
	CD 1%	223.2**	359.4**	396.5**	264.1**	369.7**	341.2**	399.8**	---
	CV %	9.4	13.6	10.8	12.8	17.2	15.4	16.7	---

Table 2: Seed Cotton Yield (kg/ha) of 30 cotton varieties tested in NCVT at seven locations of Sindh and Baluchistan during 2019.

Sr. No.	Varieties	Sindh				Balochistan			Average
		Sakrand	Ghotki	Tando Jam	Mirpur Khas	Sibbi	Lasbela	Khuzdar	
1	CRIS-644	1223	379	921	1139	2767	1795	1556	1397
2	Cyto-226	947	730	886	601	2981	2633	2274	1579
3	Eye-22	1480	714	661	1076	2006	2393	1795	1446
4	IR-NIBGE-14	1376	539	727	619	2084	2274	2034	1379
5	NIAB-SANAB-M	1758	1790	722	1211	2327	1794	1196	1543
6	IR-NIBGE-15	1311	435	871	731	3246	2512	1674	1540
7	CRIS-638	1164	466	907	545	2184	2274	1915	1351
8	Cyto-533	358	786	884	222	2710	2752	2393	1444
9	Cyto-535	1277	897	872	638	2438	2752	2752	1661
10	FH-Anmol	1481	406	849	629	2861	2633	2274	1590
11	FH-492	1764	941	880	704	2070	2153	1914	1489
12	SLH-33	1094	610	808	834	2681	2154	1675	1408
13	NIA-89	1513	401	824	1067	2674	2274	2034	1541
14	NS-211	364	558	767	682	2628	2274	2393	1381
15	Sayban-209	1406	591	727	852	2376	2513	1556	1432
16	Saim-102	1124	1627	818	1245	2405	2631	1435	1612
17	Rohi-2	890	295	935	558	1884	2274	1915	1250
18	Suncrop-3	1093	527	903	519	2449	2034	1675	1314
19	Diamond-2	1943	705	879	1103	2588	2393	2154	1681
20	YBG-2222	1376	539	727	619	2084	2274	2034	1379
21	ASPL-709	1771	558	751	1238	2363	2154	1915	1536
22	ASPL-710	1624	932	860	1275	1801	2512	2033	1577
23	Rustam-11	1555	837	920	932	1773	2633	2154	1543
24	NIAB-512	1457	460	791	587	2714	2513	2393	1559
25	RH-Afnan-II	1307	738	884	386	2642	2513	1675	1449
26	BH-224	867	423	904	670	2010	2392	1555	1260
27	NIA-88	1621	752	813	1695	2316	2513	2154	1695
28	CIM-775	1098	713	756	953	3017	2872	2633	1720
29	MNH-1050	1764	941	880	704	2070	2153	1914	1489
30	GH-Sultan	2202	1766	860	1324	3120	2870	2392	2076
31	CIM-602 (Std.)	1543	408	764	807	2383	2274	2034	1459
	CD 5%	131.5**	170.3**	197.7**	180.4**	256.8**	324.5**	203.3**	---
	CD 1%	201.2**	286.4**	323.5**	296.4**	384.9**	477.2**	302.7**	---
	CV %	8.2	10.7	12.8	14.4	17.3	19.8	13.8	---

Table 3: Seed Cotton yield (kg/ha) of thirty cotton varieties tested in NCVT at seven locations of Sindh and Baluchistan during 2020.

cotton yield 2423, 2239, 2226, 2189, 2188, 2187, 2055, 2027, 2026 and 2005 kg/ha respectively (table 4).

Sr. No.	Varieties	Sindh		Balochistan					Average
		Sakrand	Ghotki	Tando Jam	Mirpur Khas	Sibbi	Lasbela	Khuzdar	
1	CRIS-644	1864	867	1812	1685	2723	2385	2154	1927
2	Cyto-226	651	1314	1409	1067	2414	2734	2101	1670
3	Eye-22	1714	1352	1796	1311	2466	2375	2404	1917
4	IR-NIBGE-14	1666	1198	1619	1056	2337	2333	2348	1794
5	NIAB-SANAB-M	2168	1990	1647	1395	2282	1876	1981	1905
6	IR-NIBGE-15	1588	1082	1751	1122	3303	2663	2529	2005
7	CRIS-638	1713	1248	1001	870	2449	2670	2382	1762
8	Cyto-533	1186	1325	1638	994	2730	2862	2589	1903
9	Cyto-535	1828	1604	1509	1046	2953	2299	3148	2055
10	FH-Anmol	1648	1123	1650	1469	2908	2166	2681	1949
11	FH-492	1952	1314	1606	1388	1959	2463	1984	1809
12	SLH-33	1472	883	1600	1517	2539	2363	2077	1779
13	NIA-89	1816	576	1638	2220	2650	2763	2527	2027
14	NS-211	1038	1425	1789	1241	2836	2116	2738	1883
15	Sayban-209	1599	1348	1589	1508	2272	2400	1898	1802
16	Saim-102	1781	1957	1695	1496	3175	2685	2522	2187
17	Rohi-2	1172	659	1574	1073	2345	2457	2376	1665
18	Suncrop-3	1577	883	1797	1137	2537	2143	2192	1752
19	Diamond-2	1725	1266	1576	1574	3322	2807	3053	2189
20	YBG-2222	1609	1363	1709	1128	2609	2266	2654	1905
21	ASPL-709	1856	1073	1721	1198	2679	2097	2470	1870
22	ASPL-710	1760	1426	2015	1446	2363	2690	2481	2026
23	Rustam-11	2201	1569	1805	1395	2741	2920	2950	2226
24	NIAB-512	1920	1124	1711	1339	2535	2469	2459	1937
25	RH-Afnan-II	1774	1135	1668	1328	2711	2246	2247	1873
26	BH-224	1562	917	1618	1367	2501	2556	2427	1850
27	NIA-88	2369	859	1608	2120	2898	2624	2842	2188
28	CIM-775	1803	1233	1618	1770	3464	2502	3288	2239
29	MNH-1050	2015	1525	1457	1213	2321	2445	2250	1889
30	GH-Sultan	2416	2117	1805	1812	3328	2526	2959	2423
31	CIM-602 (Std.)	1850	690	1593	1536	2610	2330	2467	1868
	CD 5%	144.6**	185.9**	217.3**	182.1**	250.0**	268.2**	221.4**	---
	CD 1%	100.6**	143.2**	161.8**	148.2**	192.5**	238.6**	151.4**	---
	CV %	8.8	12.2	11.8	13.6	17.3	17.6	15.3	---

Table 4: Two year's average performance (seed cotton yield kg/ha) of thirty cotton candidate varieties tested in NCVT at seven locations of Sindh and Baluchistan during 2019 and 2020 cotton seasons.

It was confirmed that among top 10 high yielding varieties in both years, only 6 varieties (GH-Sultan, CIM-775, Diamond-2, NIA-88, Siam-102 and ASPL-710) were stable with yield and keep their superiority in individual year (2019 and 2020) when average performance was calculated. Other varieties showed stability in a particular single year but did not perform well in top 10 varieties when the yield results were averaged. It is suggested that top 6 high yielding varieties (GH-Sultan, CIM-775, Diamond-2, NIA-88, Siam-102 and ASPL-710) with stability in performance must be approved by provincial Seed Council of Sindh and Balochistan to revive cotton production of provinces and not to waste/garbage this high yielding stuff. The findings were similar with Shah *et al.* (2015) who investigated promising lines for seed cotton yield and reported high yield genotypes. Results of fiber quality characters during 2019 are presented in table 5, it was noted that ASPL-709, NIAB-SANAB-M, Cyto-226, IR-NIBGE-14, ASPL-710, IR-NIBGE-15, Cyto-533, Rohi-2, Cyto-535 and MNH-1050 were meeting prefixed fiber standards, whereas ginning outturn percent was low as set standard due to environmental conditions and could be improved. Regarding fiber properties during 2020 (table 6), only 4 varieties (CRIS-644, MNH-1050, NIAB-SANAB-M, and NIA-80 could qualify all fiber standards prefixed by the government. The results revealed that top 6 high yield varieties could not qualified or attained the fiber quality traits, due to the changing in environmental conditions of every location, where varieties were tested. Therefore, these varieties were also retested for the fiber characters in both provinces and single plant might be tested at breeding stations for improvement in fiber quality parameters as these are supported in releasing/approval of varietal program. Wang *et al.* (2004) who reported that high lint yield and fiber traits was changed by the change of varieties?

CONCLUSION: Thirty advanced candidate cotton lines were tested during two consecutively years (2019 and 2020) and at seven locations of Sindh and Baluchistan Provinces in national coordinated varietal trials (NCVT). The trials were conducted to evaluate promising line for seed cotton yield and fiber properties against standard check variety. It was noted from the present research that among top 10 high yielding varieties during both years, only six varieties (GH-Sultan, CIM-775, Diamond-2, NIA-88, Siam-102 and ASPL-710) were stable with yield performance due to the fact that these varieties keep their superiority in individual year (2019 and 2020) it is suggested that the top six high yielding varieties (GH-Sultan, CIM-775, Diamond-2, NIA-88, Siam-102 and ASPL-710) 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.

Sr. No.	Varieties	GOT%	Staple Length	Micronaire Value	Fiber Strength	Uniformity Index
		>37.5	28	<5.0	>25.5	>80
1	CRIS-644	37.1	27.6	4.6	28.6	83.6
2	Cyto-226	36.2	28.8	4.3	30.2	83.2
3	Eye-22	37.4	28.0	4.4	28.9	82.8
4	IR-NIBGE-14	35.8	28.8	4.3	29.5	83.8
5	NIAB-SANAB-M	38.4	29.0	4.7	30.1	83.4
6	IR-NIBGE-15	36.2	28.6	4.3	27.3	81.9
7	CRIS-638	39.3	27.6	4.2	27.3	83.3
8	Cyto-533	38.1	28.5	4.7	29.7	84.4
9	Cyto-535	37.1	28.1	4.3	29.6	83.5
10	FH-Anmol	37.7	27.2	4.1	27.5	83.5
11	FH-492	36.3	25.9	4.3	27.7	80.2
12	SLH-33	37.4	27.3	4.6	28.4	82.4
13	NIA-89	35.2	25.7	5.0	26.4	81.6
14	NS-211	40.5	25.7	4.6	26.1	83.4
15	Sayban-209	36.0	27.9	4.4	28.7	83.6
16	Saim-102	39.2	27.3	4.5	29.1	83.4
17	Rohi-2	40.0	28.5	4.5	29.4	83.8
18	Suncrop-3	40.8	27.0	4.3	28.2	83.0
19	Diamond-2	38.8	26.1	4.4	27.8	83.1
20	YBG-2222	35.6	26.4	4.5	28.4	81.6
21	ASPL-709	37.9	29.4	4.7	27.1	83.4
22	ASPL-710	38.6	28.8	4.8	26.3	82.1
23	Rustam-11	34.9	27.0	5.2	27.8	82.7
24	NIAB-512	40.6	27.8	4.5	27.8	83.4
25	RH-Afnan-II	35.2	26.7	3.9	28.5	83.1
26	BH-224	38.3	27.2	4.4	28.7	82.8
27	NIA-88	36.3	25.3	5.3	26.2	81.1
28	CIM-775	35.2	25.1	4.0	26.1	80.5
29	MNH-1050	38.3	28.1	4.1	30.0	83.8
30	GH-Sultan	39.1	27.2	5.0	28.8	83.9
31	CIM-602 (Std.)	36.1	28.3	4.0	29.7	81.8

Table 5: Fiber Traits of Thirty Cotton Candidate Varieties tested in NCVT at Seven Locations of Sindh and Baluchistan during 2019.

Sr. No.	Varieties	GOT%	Staple Length	Micronaire Value	Fiber Strength	Uniformity Index
		>37.5	28	<5.0	>25.5	>80
1	CRIS-644	37.8	28.6	4.5	29.8	82.3
2	Cyto-226	35.4	25.1	5.1	24.4	81.6
3	Eye-22	37.5	27.3	4.4	27.7	82.3
4	IR-NIBGE-14	35.9	27.0	4.7	27.6	82.7
5	NIAB-SANAB-M	39.0	28.1	5.1	27.2	82.0
6	IR-NIBGE-15	34.4	26.4	4.6	26.2	82.3
7	CRIS-638	35.9	25.2	5.1	26.1	82.0
8	Cyto-533	35.6	27.1	5.5	26.5	83.6
9	Cyto-535	34.5	27.5	4.2	27.6	82.3
10	FH-Anmol	36.1	25.9	4.9	25.6	81.2
11	FH-492	38.7	27.3	5.4	25.1	82.6
12	SLH-33	38.9	26.4	4.8	25.8	82.5
13	NIA-89	36.5	28.0	4.9	27.9	80.6
14	NS-211	40.2	25.8	5.3	25.7	82.7
15	Sayban-209	37.2	26.4	5.0	26.3	81.7
16	Saim-102	37.6	26.0	4.4	25.7	81.7
17	Rohi-2	37.0	26.8	4.5	26.4	80.2
18	Suncrop-3	38.4	25.4	5.2	25.4	82.9
19	Diamond-2	37.5	27.2	5.1	27.4	82.0
20	YBG-2222	36.9	26.7	3.8	28.2	81.6
21	ASPL-709	36.9	26.2	4.8	26.8	823.0
22	ASPL-710	37.6	25.6	5.4	25.1	82.6
23	Rustam-11	36.6	26.6	5.3	27.1	82.2
24	NIAB-512	37.5	26.3	4.8	26.5	80.9
25	RH-Afnan-II	33.5	24.6	4.3	25.2	82.5
26	BH-224	35.6	27.0	5.0	26.3	83.5
27	NIA-88	35.0	26.9	4.8	27.0	80.7
28	CIM-775	32.2	24.8	3.7	24.9	80.9
29	MNH-1050	36.6	28.2	4.6	26.5	83.8
30	GH-Sultan	38.7	27.4	5.2	26.5	83.4
31	CIM-602 (Std.)	35.5	27.3	4.3	26.0	80.1

Table 6: Fiber traits of thirty cotton candidate varieties tested in NCVT at seven locations of Sindh and Baluchistan during 2020.
Source: Spot examination of cotton candidate varieties held during 2018 at CCRI-Sakrand and fiber traits results were tested fromCCRI-Multan.

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