

MM 1.4: Genetic Improvement of Cotton Seed Oil

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Multilocation Evaluation of Various Breeding Materials

CICR, Nagpur

Trial 1 Evaluation of Advanced cultures of *G. hirsutum*

No. of entries	:	15
No. of Replications	:	3
No. of rows	:	3
Spacing	:	60 X 60 cm
Plot size	:	10.80 m ²
Locations	:	4

The genotypes evaluated under advance culture of *G. hirsutum* showed that seed cotton yield varied from 925.93 kg/ha to 1956.79 kg/ha. The highest seed cotton yield (SCY) was recorded by culture TMOH 603 followed by TMOH 604. Check LRK 5166 recorded the seed cotton yield of 1651.23 kg/ha.

Oil % varied from 16.77 to 18.65 %. The highest oil % was recorded by culture TMOH 614 followed by TMOH 604.

A number of lines recorded 2.5% span length of more than 27.0 mm. The highest fibre length of 28.5 mm was recorded by line TMOH 610 followed by TMOH 608 (28.0 mm). Fibre strength ranged from 20.2 to 23.2 g/tex and did not vary much across the genotypes. Incidentally, line TMOH 610 which recorded the highest fibre length also recorded the highest value (23.1 g/tex) for fibre strength also. Micronaire value ranged from 3.4 to 4.4 and there was not much variation recorded for uniformity ratio.

TRIAL 2 : Evaluation of Germplasm of *G. hirsutum*

No. of entries	:	20
No. of Replications	:	2
No. of rows	:	2
Spacing	:	60 X 60 cm
Plot size	:	7.20 m ²

Seed cotton yield varied from 586.60 kg/ha to 1135.21 kg/ha. The highest seed cotton yield (SCY) was recorded by line TMGH 663 closely followed by TMGH 679. A number of lines were found to be statistically at par for seed cotton yield.

Oil % varied from 14.78 to 18.03 %. Highest oil % was recorded by culture TMGH 662 followed by TMGH 664.

A number of lines recorded 2.5% span length of more than 27.0 mm and it varied from 23.8 to 28.6 mm. The highest fibre length of 28.6 mm was recorded by line TMGH 675 followed by TMGH 674 (28.5 mm). Fibre strength ranged from 19.1 to 25.5 g/tex and showed wide variation across genotypes. Incidentally, line TMGH 675 which recorded the highest fibre length also recorded the highest value (25.5 g/tex) for fibre strength also. Similarly, TMGH 674 also recorded good fibre strength (25.0 g/tex) along with good fibre length.

TRIAL 3 : Evaluation of Advanced cultures of *G. arboreum*

No. of entries	:	9
No. of Replications	:	3
No. of rows	:	4
Spacing	:	60 X 60 cm
Plot size	:	14.40 m ²

Seed cotton yield among the nine advanced cultures of *G. arboreum* varied from 870.91 kg/ha to 2462.96 kg/ha. The highest seed cotton yield (SCY) was recorded by CICR, Nagpur culture TMOA 627. Cultures TMOA 626,

TMOA 621 and TMOA 628 also recorded the higher seed cotton yield. Check AKH 4 recorded the seed cotton yield of 1525.93 kg/ha.

Oil % varied from 18.02 to 20.53 %. The highest oil % was recorded by culture TMOA 623 followed by TMOA 621.

A good number of lines recorded 2.5% span length of more than 26.0 mm. The highest fibre length of 27.2 mm was recorded by line TMOA 625 followed by TMOA 624 (26.8 mm). Fibre strength ranged from 18.8 to 23.1 g/tex. Incidentally, line TMOA 624 which recorded the second highest fibre length also recorded the highest value (23.1 g/tex) for fibre strength also. The other genotype TMOA 625 also recorded the bundle strength of 22.9 g/tex. Micronaire values displayed wide variation and ranged from 4.9 to 6.2 and there was not much variation recorded for uniformity ratio.

<u>TRIAL 4</u>	:	Evaluation of Germplasm of <i>G. arboreum</i>
No. of entries	:	13
No. of Replications	:	2
No. of rows	:	2
Spacing	:	60 X 60 cm
Plot size	:	7.20 m ²

The genotypes evaluated under germplasm evaluation of *G. arboreum* showed that seed cotton yield varied from 560.10 kg/ha to 1505.49 kg/ha. The highest seed cotton yield (SCY) was recorded by line TMGA 640 followed by TMGA 637 and TMGA 636. A number of lines were found to be statistically at par for seed cotton yield.

Among the 13 *G. arboreum* germplasm lines evaluated, oil % varied from 16.71 to 19.63 %. The highest oil % was recorded by culture TMGA 635 followed by TMGA 643.

The highest fibre length of 24.2 mm was recorded by line TMGA 610 closely followed by TMGA 636 and TMGA 638 (24.0 mm). Fibre strength ranged from 17.4 to 22.0 g/tex and showed much variation across the genotypes. Incidentally, line TMGA 638 which recorded the highest fibre length also recorded the highest value (22.0 g/tex) for fibre strength also. Micronaire value ranged from 4.9 to 6.5 and there was not much variation recorded for uniformity ratio.

<u>TRIAL 5</u>	:	Evaluation of Segregating material of <i>G. hirsutum</i>
No. of entries	:	21
No. of Replications	:	1
No. of rows	:	5
Spacing	:	60 X 60 cm
Plot size	:	18.00 m ²

Seed cotton yield among the twenty one segregating lines of *G. hirsutum* varied from 744.44 kg/ha to 1397.22 kg/ha. The highest seed cotton yield (SCY) was recorded by CICR, Nagpur culture TMSGH 683. Lines TMSGH 675, TMSGH 673 and TMSGH 676 also recorded the higher seed cotton yield.

Oil % varied from 16.29 to 20.43 %. The highest oil % was recorded by culture TMSGH 673 followed by TMSGH 687.

Fibre length displayed a wide variation and ranged from 24.9 to 31.2 mm. A number of lines recorded 2.5% span length of more than 30.0 mm. The highest fibre length of 30.9 mm was recorded by line TMSGH 674 followed by TMSGH 684 (30.9 mm). In comparison to fibre length another very important fibre property, fibre strength did not record very encouraging values across the genotypes. Fibre strength ranged from 19.7 to 23.6 g/tex. Incidentally, line TMSGH 674 which recorded the highest fibre length also recorded the highest value (23.6 g/tex) for fibre strength also. Micronaire values varied from 3.5 to 4.6 and variation was recorded for uniformity ratio also and it varied from 46.0 to 52.0.

<u>Station Trial</u>	:	Evaluation of Advanced cultures of <i>G. hirsutum</i>
No. of entries	:	22
No. of Replications	:	2

No. of rows	:	3
Spacing	:	60 X 60 cm
Plot size	:	10.80 m ²

The genotypes evaluated under advance culture of *G. hirsutum* showed that seed cotton yield varied from 791.50 kg/ha to 1212.89 kg/ha. The highest seed cotton yield (SCY) was recorded by culture 40EP followed by 24 DC-SP1 and 26 DC-SP2. Check LRK 5166 recorded the seed cotton yield of 950.46 kg/ha .

Among *G. hirsutum* cultures, plant height varied from 74.83 cm to 99.33 cm. Range for no. of sympodia varied from 12.16 to 18.10. Character, number of bolls recorded a range from 13.83 to 19.00 being highest in the culture 16 DC-SP1. The highest boll weight (4.22 g) was recorded by culture 26 DC-SP1, while the value for the trait varied from 3.11 to 4.22 g.

Entries in AICCIP Trials

- Culture CNHO 12 was promoted to Br 04 (a) in Central zone and Br 03 (a) in South zone for the season 2006-07.
- Two *G. hirsutum* high oil cultures CNHO-23 Br 02 (a) and CNHO – 40 Br 02 (b) were sponsored for National trail for the season 2006-07.

Culture CNHO 12 has been retained in Br 03 (a) in South zone and Br 04 (a) in Central zone for the season 2007-08.

PAU Regional Station, Faridkot

Gossypium hirsutum In TMC MM 1.4 – advance culture trial, TMOH 602 (22.8%) and TMOH 606 (21.6%) gave higher per cent oil content than the check, F 1861 (20.7%) (Table 24). In TMC MM 1.4 – germplasm trial, TMGH 667 (23.7%), TMGH 679 (23.2%), TMGH 662 (22.3%) and TMGH 663 (22.2%) gave higher per cent oil content than the check, F 1861 (21.9%) (Table 25).

Gossypium arboreum In TMC MM 1.4 – advance culture trial, TMOA 629 (23.1%), TMOA 623 (22.8%), TMOA 623 (21.8%) and TMOA 622 (21.7%) recorded higher per cent oil content than the check, LD 694 (21.4%) (Table 26). IN TMC MM 1.4 – germplasm trial, TMGA 642 (22.3%) and TMGA 635 (21.4%) gave higher per cent oil content than th check, LD 694 (Table 27).

Improvement of seed oil content To ameliorate the percentage oil content in future breeding materials, the entries with high oil content were crossed with well adaptive and promising genotypes using different mating designs.

Evaluation of genotypes for yield and other traits

***Gossypium hirsutum* Advance culture trial**

Three genotypes, TMOH 613 (2364 kg/ha), TMOH 609 (2339 kg/ha) and TMOH 615 (2334 kg/ha) gave significantly higher seed cotton yield than the check, F 1861 (1983 kg/ha). TMOH 612 (842 kg/ha), TMOH 609 (832 kg/ha), TMOH 615 (801 kg/ha), TMOH 613 (791 kg/ha) and TMOH 607 (788 kg/ha) recorded significantly higher lint yield than the check, F 1861 (668 kg/ha). The highest ginning outturn (37.8%) was recorded by TMOH 612. TMOH 613 exhibited the highest boll weight (3.61 g), whereas TMOH 605 recorded the highest bolls/plant (35.8). TMOH 602 recorded the highest seed index (9.84 g) and lint index (5.47 g). TMOH 607 recorded the highest 2.5% span length (29.0 mm), whereas TMOH 612 recorded the highest uniformity ratio (54). TMOH 610 recorded the lowest micronaire value (3.9) and highest fibre strength (24.2 g/tex). The highest FQI was recorded by TMOH 610 (346) followed by TMOH 607 (321), TMOH 608 (320), TMOH 609 (317) and TMOH 615 (293).

All the genotypes recorded moderately resistant reaction against bacterial blight. TMOH 606, TMOH 608, TMOH 609, TMOH 611, TMOH 612, TMOH 613, TMOH 614, TMOH 615 and F 1861 recorded resistant reaction against cotton leaf curl disease, whereas the remaining genotypes recorded susceptible reaction. Against myrothecium leaf spot, TMOH 602, TMOH 604, TMOH 605, TMOH 606, TMOH 609, TMOH 611, TMOH 612, TMOH 613, TMOH 614 and F 1861 showed moderately resistant reaction, whereas the remaining genotypes showed moderately susceptible reaction. TMOH 601, TMOH 603, TMOH 603, TMOH 608, TMOH 610 and TMOH 615 gave moderately susceptible reaction against alternaria leaf spot, whereas the remaining genotypes gave moderately resistant reaction. TMOH 601, TMOH 603, TMOH 607, TMOH 608, TMOH 610 and TMOH 615 recorded moderately susceptible reaction against cercospora leaf spot, whereas the remaining genotypes showed moderately resistant reaction.

Germplasm trial

TMGH 662 (2615 kg/ha), TMGH 663 (2433 kg/ha), TMGH 676 (2385 kg/ha), TMGH 671 (2337 kg/ha), TMGH 677 (2313 kg/ha), TMGH 675 (2232 kg/ha), TMGH 679 (2150 kg/ha), TMGH 680 (2064 kg/ha), TMGH 672 (1985 kg/ha), TMGH 678 (1984 kg/ha) and TMGH 665 (1967 kg/ha) gave significantly higher seed cotton yield than the check, F 1861 (1613 kg/ha). These genotypes also exhibited significantly higher lint yield than the check, F 1861 (542 kg/ha). TMGH 670 recorded the highest ginning outturn (38.9%), whereas TMGH 663 had highest boll weight (3.71 g) and bolls/plant (40.8). TMGH 667 had the highest seed index (9.87 g) and TMGH 670 had the highest lint index (5.44 g).

TMGH 672 had the highest 2.5% span length (28.6 mm), whereas TMGH 668 and TMGH 669 had the highest uniformity ratio (53) (Table 46). The lowest micronaire value (3.8) and the highest fibre strength (25.2 g/tex) were recorded by TMGH 670 and TMGH 674, respectively. The highest FQI (341) was recorded by TMGH 674, followed by TMGH 675 (340), TMGH 672 (331), TMGH 673 (318) and TMGH 670 (310).

All the genotypes showed moderately resistant reaction against bacterial blight. TMGH 665, TMGH 666, TMGH 667, TMGH 668, TMGH 672, TMGH 673, TMGH 674, TMGH 675, TMGH 676, TMGH 678, TMGH 680 and F 1861 were resistant to cotton leaf curl disease, whereas the remaining genotypes were susceptible. All the genotypes, except F 1861 which was moderately resistant were moderately susceptible to myrothecium, alternaria and cercospora leaf spots.

Gossypium arboretum Advance culture trial

A perusal of Table 48 revealed that TMOA 629 (2450 kg/ha), TMOA 2310 kg/ha), TMOA 622 (2255 kg/ha), TMOA 625 (1930 kg/ha) and TMOA 624 (1865 kg/ha) recorded significantly higher seed cotton yield than the check, LD 694 (1536 kg/ha). Significantly higher lint yield than the check, LD 694 (622) was recorded by TMOA 629 (842 kg/ha), TMOA 623 (737 kg/ha) and TMOA 622 (848 kg/ha). The highest ginning outturn was recorded by the check, LD 694 (40.5%). The highest boll weight (2.53 g) was recorded by TMOA 626, whereas the highest bolls/plant was recorded by TMOA 629 (78.5). The highest seed index (6.73 g) and lint index (3.85 g) was recorded by TMOA 629 and LD 694, respectively.

TMOA 627 recorded the highest 2.5% span length (27.8 mm), followed by TMOA 626 (27.1 mm), TMOA 625 (27.0 mm), TMOA 628 (26.6 mm) and TMOA 623 (24.2 mm) (Table 49). The highest Fibre strength (23.9 g/tex) was recorded by TMOA 626, followed by TMOA 627 (22.8 g/tex), TMOA 628 (21.6 g/tex), TMOA 625 (21.5 g/tex) and TMOA 624 (20.2 g/tex).

Germplasm trial

TMGA 641 (1773 kg/ha), TMGA 643 (1753 kg/ha) and TMGA 633 (1696 kg/ha) recorded significantly higher seed cotton yield than the check, LD 694 (1461 kg/ha). Only one genotype TMGA 643 (684 kg/ha) recorded significantly higher lint yield than the check, LD 694 (584 kg/ha). The check, LD 694 recorded the highest ginning outturn (40.0%). TMGA 641 and TMGA 633 recorded the highest boll weight (2.46 g) and bolls/plant (59.2), respectively. TMGA 633 recorded the highest seed index (6.26 g), whereas LD 694 gave the highest lint index 3.96g).

The highest 2.5% span length (26.1 mm) was recorded by TMGA 638, followed by TMGA 637 (25.3 mm), TMGA 631 (25.2 mm), TMGA 636 (24.6 mm), TMGA 640 (24.8 mm) and TMGA 636 (24.6 mm) (Table 51). TMGA 638 gave the highest fibre strength (22.9 g/tex), followed by TMGA 637 (21.4 g/tex), TMGA 640 (21.3 g/tex), TMGA 641 (21.0 g/tex) and TMGA 636 (20.9 g/tex).

Per cent oil content Advance culture trial of *G. hirsutum*

Genotype	Oil content (%)	Genotype	Oil content (%)	Genotype	Oil content (%)
TMOH 601	20.1	TMOH 607	20.1	TMOH 613	20.6
TMOH 602	22.8	TMOH 608	19.9	TMOH 614	19.4
TMOH 603	18.5	TMOH 609	20.2	TMOH 615	20.3
TMOH 604	20.6	TMOH 610	16.9	F 1861	20.7
TMOH 605	20.7	TMOH 611	17.4		
TMOH 606	21.6	TMOH 612	20.5		

Per cent oil content Germplasm trial of *G. hirsutum*

Genotype	Oil content (%)	Genotype	Oil content (%)	Genotype	Oil content (%)
TMGH 661	19.1	TMGH 668	22.0	TMGH 675	20.3
TMGH 662	22.3	TMGH 669	22.6	TMGH 676	21.2
TMGH 663	22.2	TMGH 670	19.6	TMGH 677	21.2
TMGH 664	21.0	TMGH 671	19.8	TMGH 678	16.8
TMGH 665	21.3	TMGH 672	22.0	TMGH 679	23.2
TMGH 666	20.7	TMGH 673	21.3	TMGH 680	21.9
TMGH 667	23.7	TMGH 674	19.1	F 1861	21.9

Per cent oil content Advance culture trial of *G. arboreum*

Genotype	Oil content (%)	Genotype	Oil content (%)	Genotype	Oil content (%)
TMOA 621	21.8	TMOA 625	18.7	TMOA 629	23.1
TMOA 622	21.7	TMOA 626	19.7	LD 694	21.4
TMOA 623	22.8	TMOA 627	21.1		
TMOA 624	21.4	TMOA 628	20.2		

Per cent oil content Germplasm trial of *G. arboreum*

Genotype	Oil content (%)	Genotype	Oil content (%)	Genotype	Oil content (%)
TMGA 631	20.7	TMGA 636	20.9	TMGA 641	19.9
TMGA 632	21.1	TMGA 637	18.7	TMGA 642	22.3
TMGA 633	21.0	TMGA 638	18.3	TMGA 643	20.5
TMGA 634	20.7	TMGA 639	20.1	LD 694	21.3
TMGA 635	21.4	TMGA 640	21.3		

CICR Regional Station, Sirsa

Effect of sterile cytoplasm on yield, fibre quality traits and oil content:

To compare the effect of male sterility on seed cotton yield and fibre quality traits the material for the study comprised of five cytoplasmic male sterile A lines (LRA 5166A, SH 2379A, JohrarA, Bikaneri Narma A and F 505 A), five maintainer B lines (LRA 5166B, SH 2379B, JhorarB, Bikaneri NarmaB and F 505B) and six restorers (CIR 23 A, CIR 26, CIR 28 A, CIR 32, CIR 70 and CIR 72). The crosses were attempted between Ax R, B x R lines to produce two types of combinations, i.e. A x R and B x R. These 60 crosses along with conventional check hybrid CSHH 198 were evaluated in single replication. To study the effect of male sterile cytoplasm, mean performance of hybrids with sterile cytoplasm (A x R) and hybrids with normal cytoplasm (B x R) were compared. The mean seed cotton yield of all the B x R hybrids were higher than A x R hybrids except with LRA 5166A x R lines. It was interesting to note that fibre quality traits in all the Ax R hybrids were found to be better as compared to B x R hybrids. This revealed that, sterile cytoplasm has negative effect on yield and not on fibre quality traits in cotton.

Estimation of oil content among CMS and conventional hybrids revealed that in general the oil content in CMS hybrids was higher than corresponding conventional hybrids.

Effect of male sterility on seed cotton yield, fibre quality traits and oil content:

To study the effect of male sterility on seed cotton yield and fibre quality traits material for the study comprised of male sterile line K 34007 (A), maintainer line K 34007 (B), GMS lines K34007 and six restorer lines (CIR 23 A, CIR 26, CIR 28 A, CIR 32, CIR 70 and CIR 72). The restorer lines were crossed with male sterile line (A), maintainer line (B) and GMS line to produce three types of hybrids. These 18 hybrids, along with conventional check hybrids CSHH 198 and Om Shankar were grown in randomized block design with three replications. To study the effect of male sterility mean performance with sterile cytoplasm (AxR), hybrids with normal cytoplasm (B x R) and hybrids with GMS x R were compared. The mean seed cotton yield of B x R hybrids (2556 kg/ha) was highest followed by GMS based hybrids (2238 kg/ha). Mean seed cotton yield of the A x R hybrids (2139 kg/ha)

recorded the lowest mean seed cotton yield, indicating that sterility has negative effect on seed cotton yield in cotton. However, no significant differences were observed on fibre quality traits.

Achievements

Estimation of oil content: Four entries were found to contain more than 23 % seed cotton oil content namely TMGH 5, RS 810, V3-73/355 P6 and SH 2379. Estimation of oil content among CMS and conventional hybrids revealed that in general the oil content in CMS hybrids was higher than corresponding conventional hybrids.

Estimation of oil content in CMS and conventional intra-hirsutum hybrids

SNO.	NAME OF THE CROSS	CMS hybrids	Conventional
1	CMS 5166 X A	18.59	17.31
2	CMS 5166 X B	19.81	18.35
3	CMS 5166 X C	17.56	
4	CMS 5166 X D	19.79	
5	CMS 5166 X E	19.95	
6	CMS 5166 X F	20.60	
7	CMS 2379 c/c X A	19.62	20.39
8.	CMS 2379 X B	20.07	19.23
9	CMS 2379 X C	19.20	18.43
10	CMS 2379 X D	19.63	18.80
11	CMS 2379 X E	17.91	
12	CMS 2379 X F	17.46	
13	CMS Jhorar X A	19.77	19.44
14	CMS Jhorar X B	18.38	19.35
15	CMS Jhorar X C	19.28	19.42
16	CMS Jhorar X D	19.31	18.06
17	CMS Jhorar X E	18.36	18.59
18	CMS Jhorar X F	19.29	19.97
19	CMS BN X A	18.07	
20	CMS BN X B	20.73	
21	CMS BN X C	20.05	18.99
22	CMS BN X D	19.60	17.98
23	CMS BN X E	17.11	18.87
24	CMS BN X F	19.56	19.28
25	CMS F505 X A	18.61	17.51
26	CMS F505 X B	19.56	19.17
27	CMS F505 X C	19.01	18.70
28	CMS F505 X D	17.57	-
29	CMS F505 X E	19.87	19.26
30	CMS F505 X F	19.91	20.55

JNKVV, Khandwa

Following genotypes were tested under groups during the year 2006-07

GROUP	ENTRY	Replication
. Segregating material of <i>G. hirsutum</i> (TMSGH)	20	1
. Germplasm of <i>G. hirsutum</i> (TMGH)	20	2
. Advance culture of <i>G. arboreum</i> (TMOA)	8	3
. Germplasm of <i>G. arboreum</i> (TMGA)	11	2

Segregating material of *G. hirsutum* - The performance of the genotypes under this group revealed the oil content varies from 13.16 to 21.90 with an average of 17.81%. The highest oil percent was recorded with genotype TMSGH 36. However the highest yield was recorded in genotype TMSGH686.

Germplasm of *G. hirsutum* - The performance of the genotypes under this group revealed the oil content varies from 15.01 to 20.74 with an average of 18.52%. The highest oil percent was recorded with genotype TMGH 59.

Advance culture of *G. arboreum* -Under Advance culture of arboreum group the oil content varies from 16.53 to 20.25% with an average of 18.40%. The highest oil percent of TMOA 201 (20.25%) was recorded.

Germplasm of *G. arboreum* -Under germplasm of arboreum group it was observed that the oil content varies from 16.36 to 21.01% with an average of 18.01%. The highest oil percent of TMGA 22 (21.01%) was recorded.

CICR Regional Station, Coimbatore

Seventy four genotypes of Sirsa were analysed for their seed oil content.

Among the genotypes analysed, many were found to contain more than 24 % seed oil content, and cultures CRB 12, CIR 8, CISV 60, CSHH 238 and KH 2 possessed around 25-26% seed oil content.

Three hundred IC lines available at CICR, Regional Station, Coimbatore were screened for seed oil content and genotypes *viz.*, IC 38, IC 44, IC 194, IC 336, IC 397, IC 416, possessed more than 24% and genotypes *viz.*, IC 125, IC 308, IC 314, IC 370, IC 487, IC 539 possessed more than 25% seed oil content.

Performance of Some Select Segregating Lines of *G. hirsutum* for oil content.

TMOA 7 (Advanced Arboreum Line)	24.66
TMOA 12 (Advanced Arboreum Line)	23.56
TMOA 14 (Advanced Arboreum Line)	24.93
TMGA 14 (Arboreum Germplasm Line)	24.93
TMOH 21 (Advanced Hirsutum Line)	24.07
TMOH 25 (Advanced Hirsutum Line)	25.31
TMGH 29 (Hirsutum Germplasm Line)	24.81
TMGH 30 (Hirsutum Germplasm Line)	25.08

Single plant selections from the F3 segregating populations were evaluated for seed oil content. Among the segregating materials, TMSGH 21 – (3), TMSGH 15 – (3) possessed seed oil content around 25%, whereas TMSGH20 – (2), TMSGH 20 – (7), TMSGH 18 – (5), TMSGH 18 – (7) were noticed to possess around 27% seed oil content.

Selection	Oil Content (%)
TMSGH 21 - (3)	23.12
TMSGH 15 - (3)	23.66
TMSGH 20 - (2)	23.57
TMSGH 20 - (7)	24.04
TMSGH 18 - (5)	25.00
TMSGH 18 - (7)	24.35