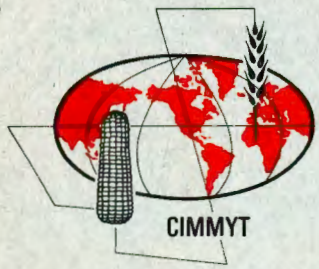

CENTRO INTERNACIONAL DE MEJORAMIENTO DE MAIZ Y TRIGO

INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER

México

ANNUAL REPORT CIMMYT-I.D.G.C.

1976-1977

ALGERIA

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I. INTRODUCTION

The season of 1976-77 started with excellent prospects for another record crop for Algeria and ended up as one of the worst. Preseeding rainfall was excellent and at times too much in the east and this hindered proper land preparations. As a result in many places in the eastern zone wheats were seeded up to the last part of January. The rains stopped alltogether towards the later part of December, and the drought continued up to April. Early seeded wheats had bad infestation of weeds, especially wild oats while the late seeded wheats although the weeds were low did not develop enough secondary root system and hence very poor tillering. Warm weather in February and March advanced the wheat faster than usual. April on-wards almost all the regions received much above average rainfall. This came too late for the early wheat to develop maximum density, since it was already in late shooting or boot stage. Most of the cereal areas had a 4 to 5 days of heavy frost during mid April. This caused considerable damage to the early seeded wheats. Thus combination of drought and frost rendered unrecoverable damage to most of the cereals during the cropping year of 1976-77. Barley was the worst affected of all the cereals.

Many fields of wheat seeded after fallow in late November and December were able to withstand the drought much better than other due to the availability of more stored moisture. Also the yield of late seeded wheats and very late varieties were good due to the late rains and lack of prolonged hot periods in May and June.

Stripe rust started to develop fairly early in the season in the eastern zones on Siete Cerros. But the warm weather conditions of February and March prevented heavy infection of the spike. However the damage due to the disease was considerable and the yield levels of Siete Cerros was reduced to almost the level of Florence Aurore. Some stripe rust on Anza was also noticed in this region indicating the possibility of a newer race which can attack Anza.

Stem rust and leaf rust although present never did devclop into major epedamic proportions. Septoria was almost non excistant except on some bottom leaves of early planted wheats.

II. CEREAL BREEDING

A. Introduction

The cereal improvement work in Algeria is carried out in seven experimental stations. These seven stations can cover adequately at present the major agroclimatic conditions of the major cereal production areas of Algeria. These are Guelma (East, Littoral), Constantine (East, Sub-Littoral), Setif (East, High-Plateau), Oued Samar (Central, Littoral), Tiaret (West, High-Plateau), Saida (West, High-Plateau) and Sidi Bel Abbes (West, Sub-Littoral).

The program is fullfledged for the durum and bread wheats. While barley, oats and triticales are experimented only at a limitted scale. The handling of segregating material yield trials and priliminary multiplications at all the experimental stations for all the species of cereals are done by the same group of people. This lack of specialization and the major emphasis on durum and bread wheats are due to the insufficiency of adequate trained staff.

The crop improvement is centrally coordinated and the techniques and methods emploid by all the stations are the same. First year yield evaluations are done in 3 stations, second year in 4 and the third year in all the seven stations.

The cereal areas of Algeria can be roughly devided into 12% under littoral, 43 % under sub-littoral and 45% under high-plateau. The probability to have good crop growing conditions in general in littoral zone is good. So all the material from

F3 to F6 and observation nurseries are grown in two locations one being always a littoral station. The selections are done on the basis of the performance in the sub-littoral or high-plateau at the littoral zone station if the crop development was not adequate to differenciate between plants in a population. If conditions were good then selection is done in both the locations.

The crop season of 1976-77 was highly unfavourable for the crop development. In contrast the season before (1975-76) was more favourable. Hence an attempt is made to compare the behaviour of high yielding bread wheats and durum wheats under these two variable years. The data is presented in Table A.1. It is evident that during a good season the high yielding varieties of both bread and durum is far superior to the locals in all regions. This superiority tend to reduce in the sub-littoral and high-plateau during a bad year. The local varieties seems to suffer more than the high yielding varieties in the littoral zone during a bad year. In contrast the local bread wheat performs better in the high-plateau in a bad year than a good. Even under its best potential under adverse conditions, it is only 98% of the high yielding varieties under the same conditions.

The last four colums of the Table A.1 an attempt is made to compare between high yielding bread wheats verses high yielding durums and local bread wheats verses local durum wheat under these two different years. It is evident that the present high yielding durum gemotypes under evaluation are lower in production potential to that of the high yielding bread wheats under both bad and good years. Same is true for the local durums except

TABLE A.1

A COMPARISON BETWEEN 1975-76 A GOOD CROP PRODUCTION YEAR VERSES 1976-77 A BAD YEAR FOR CROP PRODUCTION

(Based on 3rd year trial results)

	Littoral Yield/Q/ha	Sub Littoral Yield/Q/ha	High Plateau Yield/Q/ha
1. Average yield of 5 top bread wheat varieties during 1975-76	59.97	42.38	32.76
2. Average yield of 5 top bread wheat varieties during 1976-77	43.82	26.81	23.30
3. Yield of the local bread wheat check during 1975-76	49.37	34.02	18.55
4. Yield of the local bread wheat check during 1976-77	27.83	24.39	22.92
5. Average yield of 5 top durum wheat varieties during 1975-76	50.27	38.38	30.41
6. Average yield of 5 top durum wheat varieties during 1976-77	38.53	23.75	19.79
7. Yield of the local durum wheat check during 1975-76	32.81	33.46	24.11
8. Yield of the local durum wheat check during 1976-77	17.33	22.47	20.46
9. Local bread wheat as a percentage of the 5 top varieties during 1975-76	82.0	80.0	57.0
10. Local bread wheat as a percentage of the 5 top varieties during 1976-77	64.0	91.0	98.0
11. Local durum wheat as a percentage of the 5 top varieties during 1975-76	65.0	87.0	79.0

Continuation on next page

Continuation TABLE A.1.

	Littoral Yield/Q/ha	Sub Littoral Yield/Q/ha	High Plateau Yield/Q/ha
12. Local durum wheat as a percentage of the 5 top varieties during 1976-77	45.0	95.0	103.0
13. 1976-77 yield of the top 5 bread wheats as a percentage of 1975-76	73.0	63.0	71.0
14. 1976-77 yield of local bread wheat as a percentage of 1975-76	56.0	72.0	124.0
15. 1976-77 yield of the top 5 durum wheats as a percentage of 1975-76	77.0	62.0	65.0
16. 1976-77 yield of local durum wheat as a percentage of 1975-76	53.0	67.0	85.0
17. Top yielding 5 durums as a percentage as 5 top yielding bread wheats 75-76	84.0	91.0	93.0
18. 5 Top yielding durums as a percentage of 5 top yielding bread wheats 1976-77	88.0	89.0	85.0
19. Yield of the local durum variety as a percentage of local bread wheat 1975-76	67.0	98.0	130.0
20. Yield of the local durum variety as a percentage of local bread wheat 1976-77	62.0	92.0	89.0

they are superior in the high-plateau during a good season. Although it is far superior to the local bread wheat in a good year under the same conditions it is only 79% in yield to that of the high yielding durums.

B. Bread Wheat

Performance of the standard cultivars and the potential varieties during the 1976-77 season are reported in Table A.2. Varieties Pavon, Arz, Strampelli and Anza were the best for the littoral zone. Syrimex can also be good for this zone. The predominant variety Siete Cerros and Mexicano 1481 were highly suceptable to the prevailing races of yellow rust and hence were poor yielders.

In the sub-littoral zone the difference between varieties were not as marked as that of littoral zone. Local check, Anza and Siete Cerros were the three poorest. The situation in high plateau was similar to the sub-littoral with the exception the yield levels were lower and the local variety was almost equal to the high yielding varieties. Pavon was the top yielder and Anza and Strampelli were the poorest in this region.

Results of the best 7 varieties from the second year trials from 4 locations are reported in Table A.3. The cross (No66-Bb/Cnox Nad-Chr"s")7c was the best taking all four locations into account. Crosses Bobito"s" and 7C-Pato (B) were very good in the sub-littoral and high-plateau stations. Table A.4 the top 14 varieties out of 225 varieties in 9 first year trials from 3 different locations are reported.

TABLE A.2

PERFORMANCE OF STANDARD AND POTENTIAL BREAD WHEAT VARIETIES DURING 1976-77 IN ALGERIA. AVERAGE OF MANY TRIALS AND LOCATIONS

Location	Littoral [1]	Sub-Littoral [2]	High Plateau [3]
Varieties	Yield Q/ha	Yield Q/ha	Yield Q/ha
Strampelli	42.93	27.88	19.14
Siete Cerros	33.35	26.74	20.65
F x Aor MDA [4]	27.83	24.39	22.92
Anza	42.31	26.06	18.92
Mexicano 1481	33.52	27.39	21.59
Arz	46.48°	27.60	20.46°°
Syrimex	41.37	27.16	21.09
Pavon	47.00	27.07	23.83

° Only one station

°° Only two stations

1. Oued Samar and Guelma
2. Khroub and S. B. Abbes
3. Setif, Saida and Tiaret
4. F x A = Florence Aurore
   MDA = Mahon Demias

TABLE A.3

TOP YIELDING BREAD WHEAT VARIETIES IN THE SECOND YEAR YIELD TRIALS.

ALGERIA 1976-77

V. No	Cross and Pedigree	Oued Samar		Khroub		S.B. Abbes		Setif	
		Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank
AA279	Vg8881(Fn-Th^{3}xII44-29/Th^{2})N.818-3P-6P-1P-OY	43.00	6	32.29	1	18.57	9	18.39	3
AA286	Bobito"s 38838-9Y-2M-IY-3M-OY	39.86	13	28.21	3	21.86	2	18.21	4
AA292	7C-Pato(B) CM-790-8MB-6Bj-6bj	38.43	19	28.11	5	22.39	1	20.79	1
AA293	PatoxCC-Inia CM 1021-7MB-14Bj-4Bj	48.57	1	27.71	6	20.11	7	16.36	7
AA285	Strampelli	44.18	4	27.71	6	20.25	6	15.61	10
AA295	F x A or MDA Local Check	30.11	25	22.39	15	21.36	3	19.04	2
	LSD 5%	5.29		4.36		3.40		2.27	
	C.V.	9.38		12.66		14.17		10.88	
BA317	CC-Kal(AzxNad-LR64/Bb)CM11663-E-IY-IM-3Y-OM	37.71	18	36.00	2	19.89	10	20.04	1
BA319	(We/LR-IniaxBb)7cxTob-Cno"s"CM8935-D-5M-3Y-IM-2Y-OM	38.64	17	31.43	10	22.50	2	19.00	4
BA321	(NO66-Bb/CnoxNad-Chr"s")7C.CM5375-F-IY-IM-3Y-4M-OY	45.61	3	36.79	1	20.57	5	18.75	5
BA320	Strampelli	46.54	1	34.21	3	20.32	8	16.36	11
BA310	FxA or MDA Local Check	24.25	25	24.64	21	23.61	1	18.21	6
	LSD 5%	5.38		4.89		3.73		2.57	
	C.V.	9.75		11.91		15.30		11.63	

TABLE A.4

TOP 14 BREAD WHEAT VARIETIES FROM THE 1st YEAR YIELD TRIALS ALGERIA 1976-77

V.No.	Cross and Pedigree	Oued Samar		Saida		Khroub		Average	
		Yield	Rank	Yield	Rank	Yield	Rank	Yield	% Best Check
A 4	Emu"s" CM 8327-C-9M-4Y-3M-OY	50.21	1	14.14	1	34.36	9	32.90	114
A13	Vg 8881 ($FN-Th^3$xII44-29/Th^2) N.818-3P-6P-1P-OY	43.00	7	13.71	2	33.29	6	30.00	106
A19	Nad 63xSu92-Burt4/ C.1008-OW-2E-2E-OE-OS	39.50	11	12.21	6	35.79	5	29.17	101
A15	Siete Cerros	42.29	8	11.29	13	35.14	8	29.57	100
C71	Bb-Kal CM 9160-IIM-5Y-4M-IY-OM	40.07	22	19.79	2	38.29	1	32.72	102
C73	(We/LR64-IniaxInia-Bb)7CxTob-Cno"s" CM8625-G-IM-4Y-IM-OY	44.00	12	19.93	1	36.21	5	33.38	103
C74	(We/LR64-IniaxInia-Bb)7CxTob-Cno"s" CM8625-G-IM-4Y-IM-IY	41.79	20	19.29	3	35.57	6	32.22	100
C65	Siete Cerros	47.57	7	18.07	7	34.00	9	33.21	100
D78	Brochi"s" CM5872-C-IY-IM-3Y-2M-OY	47.21	7	19.79	9	41.64	2	36.21	100
D87	Fury x Cno"s"-No66 CM 4210-10Y-4M-8Y-5M-IY-OM	45.14	10	22.79	2	40.43	4	36.12	103

Continuation next page

Continuation TABLE A.4

V. No.	Cross and Pedigree	Oued Samar Yield	Rank	Saida Yield	Rank	Khroub Yield	Rank	Average Yield	% Best Check
D 93	Moncho"s"CM8288-A-3M-6Y-5M-2Y-IM-OY	46.71	8	21.21	7	38.64	6	35.52	100
D 80	Strampelli	50.14	3	20.93	8	37.14	10	36.07	100
G 168	Soty-Tob"s"xGb54-Mxp^2 T4-729-14A1-5A1-OG	42.21	15	19.14	6	43.07	1	34.81	100
G 165	Strampelli	50.00	1	17.43	9	40.93	4	36.12	100
H 193	BonxBb-Gallo CM21439-6Bj-1A1-OG	50.29	3	19.50	3	39.79	1	36.53	100
H 200	HI-418xAZ67 CM23271-5Bj-1A1-OG	51.50	1	21.29	1	33.21	9	35.33	99
H 180	Strampelli	51.00	2	19.50	3	38.93	3	36.48	100
1219	G3-GbxMag27/OfnDW-Nai"s" SWD70031-01W-2H-IH-OH	48.14	3	24.21	4	40.50	2	37.62	110
1223	Kal-PMF/7C-CnoxCal SWD70439-04W-IP-IH-OH	29.71	18	26.14	1	45.64	1	33.83	106
1210	Strampelli	50.86	2	18.00	19	40.07	3	36.31	100

The 13th International spring wheat yield nursery (ISWYN) was grown in the two littoral experimental stations and the results of the top seven varieties in comparison to Anza and Siete Cerros are reported in Table A.5. Pavon F76 the most promissing variety under test in Algeria was again the first, closely followed by Pavon "S". The next group Sapsucker, Nacozari and Yecora although high yielders their performance in the sub-littoral and high-plateau stations were poor in the other yield trials, close to 90% of the cereals in Algeria are grown under these two zones. Hence good performance in the sub-littoral and high-plateau are essential. The cross Flicker also was yielding very well in this trials. Since not much is known about its adaptation it will be further tested during the coming year. In addition to these seven the performance of Candor"s" and Dougga were also good.

C. Durum Wheat

Performance of the standard varieties and most promissing lines in the 3rd year yield trials are reported in Table A.6. The yield of Cocorit was fair to good in all the locations. Capeiti and Inrat 69 were very poor in all the locations. The crosses Rab"s"-Fg"s" and Masa of CIMMYT origin were showing good performance in all the regions. The yield of the cross Cit"s" x Pg"s"-AA"s"/Ruff x T.dic. Ver-Gill"s" in the littoral zone was outstanding. However its performance in the sub-littoral and high-plateau was only fair. Three Chilian lines Bidi 17^2 x Cfn-Landwarf/Lan and its sister and (CP x Landwarf-Lan) BYE-Tc^2 were excellent in the high-plateau and sub-littoral stations. However their performance in the

TABLE A.5

TOP 7 VARIETIES OF THE 13th ISWYN DURING 1976-77 IN ALGERIA

V. No.	Cross	Oued Samar Yield	Oued Samar Rank	Guelma Yield	Guelma Rank	% Anza
42	Pavon F.76	56.48	2	46.76	1	118.49
5	Pavon"S"	57.33	1	43.71	5	115.81
9	Sapsucker	49.71	7	44.95	3	108.81
23	Nacozari F.76	54.67	3	40.00	13	108.43
30	Yecora 70	47.52	15	45.52	2	107.05
36	Flicker"s"	52.95	5	40.10	12	106.64
12	Flicker"s	50.38	6	41.52	8	105.47
19	Anza	44.95	24	42.00	6	100.00
10	Siete Cerros	46.48	19	27.90	41	84.92
	LSD 5%	7.56		4.94		
	C.V.	10.51		8.76		

TABLE A.6

PERFORMANCE OF STANDARD AND PROMISSING DURUM WHEAT VARIETIES AND LINES IN THE 3rd YEAR YIELD TRIALS ALGERIA 1976-77

AVERAGE OF 7 STATIONS

Locations	Littoral		Sub-Littoral		High Plateau	
Varieties	Yield	Rank	Yield	Rank	Yield	Rank
Cocorit	35.72	6.0	19.41	11.5	15.79	12.0
Capeiti	27.13	20.0	18.52	15.5	13.30	18.0
Inrat	27.34	20.5	9.70	24.0	8.15	23.7
Oued Zenati	18.22	22.5	18.29	13.5	16.57	9.0
Rabi"s"-Fg"s" CM10162-76M-4Y-OM	37.15	4.0	21.00	8.5	18.11	6.0
Cit"s"xPg"s"-AA"s"/RuffxT.dicVer-Grll"s" CM 14528-C-IY-IM-OY	42.04	1.5	17.32	14.0	15.94	13.0
Bidi 17^2xCfn-Land dwarf/Lan T 3847-18T-IV-1P	28.80	19.0	22.00	7.0	19.56	2.7
Bidi 17^2xCfn-Land dwarf/Lan T 3847-18T-IV-IP	30.00	17.0	24.21	2.0	21.25	2.0
(CPxLan dwarf-Lan)BYE-Te^2 A 10345-16P-6P-6P-1P	33.57	8.5	23.89	2.5	16.66	10.0
MASA	34.95	7.5	22.27	5.5	16.90	8.7

high plateau and sub-littoral stations was poor. Taking into account that there is very little durums grown in the littoral zone these lines have excellent potential for the future in Algeria.

Results of the best lines from the second year trials are reported in Table A.7. Crosses Ho"s"-AA"s"xPlc"s" and Plc"s"-Cr"s"s/Mca"s"xPg"s"-Parana were the best. Two Turkish lines from the cross Uveyik x 61-130 were performing good in the high-plateau and sub-littoral stations.

Results of the top yielding lines from the IDYN and EDYT are reported in Tables A.8 and A.9 since these were tested only one year in a littoral station these will be further tested in the other regions during the coming years.

The experimental station at Oued Samar in the littoral zone had an excellent outbreak of leaf rust. Table A.10 gives the cross, pedigree and the rust score of 21 lines from the IDSN which showed moderate to good resistance.

275 F-1[2]9 of 1976-77 were advanced to the F2 generation and about 350 new crosses were attempted during the season.

TABLE A.7

PROMISSING LINES IN THE SECOND YEAR DURUM YIELD TRIALS

ALGERIA 1976-77

	Oued Samar		Saida		S.B. Abbes		Khroub	
	Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank
Cocorit	41.75	9	15.05	7	10.04	19	26.46	14
Bidi 17 or Hedba 3 (Local Check)	16.39	25	17.57	3	14.74	8	27.14	12
Rabi"s"-Fg"s" CM-10162-76M-4Y-OM	41.21	10	16.46	4	13.64	10	28.50	7
Cr"s"-21564xHcl/Pg"s" CM-17747-C-IM-5Y	43.79	5	11.64	19	14.04	9	27.93	9
Plc"s"-RuffxGta"s"-RolCM-17904-B-3M-IY	44.33	3	14.39	9	10.39	18	30.00	3
Plc"s"-Cr"s"/Mca"s"xPg"s"-Parana 66/270 CM-18001-B-3M-7Y	43.71	6	18.68	1	19.36	3	27.32	11
Ho"s"-AA"s"xPlc"s" CM3337-IY-3M-OY	43.29	7	18.04	2	17.14	6	31.04	1
Pg"s"-31810 CM-10071-2M-OY	45.39	2	13.64	11	13.32	12	30.32	2
Uveyik 126xGl-130 C23-9-OA	30.14	19	15.75	6	23.21	1	28.11	8
Uveyik x 61-130 1A-69-A-OA	32.68	16	13.50	12	19.71	2	26.61	13
LSD 0.5	5.09		2.60		2.75		N.S.	
C.V.	9.88		13.87		14.74		17.68	

TABLE A.8

TOP 5 VARIETIES OF THE IDYN DURING 1976-77 IN GUELMA-ALGERIA

Variety No.	Cross and Pedigree	Yield Q/ha
17	Jo"s"-Cr"s"xMarte"s" CM-12969-2Y-IM-IY-OM	41.62
22	Cocorit 71	41.24
15	21563-AA"S"xFg"s" CM9799-126M-1M-4Y-OY	38.95
23	Mexicali 75	36.76
16	Ruff"s"-Fg"s" CM 9880-25M-IY-IM-IY	36.76
	LSD 5%	4.12
	C.V.	7.60

TABLE A.9

TOP 5 VARIETIES OF THE EDYT DURING 1976-77 IN GUELMA-ALGERIA

Variety No.	Cross and Pedigree		Yield Q/ha
2	Rabi"s"-31810		43.71
5	21563-AA"S" x Fg"s"		41.71
16	S.15-Cr"s"		39.57
20	Mexi"s"-Fg"s"		39.29
7	Mexi"s"-Fg"s"		39.21
		LSD 5%	5.76
		C.V.	11.35

TABLE A.10

LINES SHOWING RESISTANCE TO LEAF RUST IN THE 8th IDSN AT OUED SAMAR IN ALGERIA DURING 1976-77 SEASON

8th IDSN No.	Cross and Pedigree	Reaction 1-9
4	Balcarceno Inta	4
16	Gerardo VZ 512	2
18	P66/270-Ptl"s" CM-18409-8Y-2Y-IY	4
26	Gta"s"-Mexi"s" CD-771-17Y-OY	5
31	Ruff"s"xJo"s"-Crs CM-13102-10M-4Y-OM	1
34	Hcl-Gta"s"xKif"s" CD-1247-C-IY	5
45	Magh"s"xGs"s"-AA"s"/Gta"s"-Cit"s" CM-14472-B-8Y-IM-3Y-OY	5
47	Ruff"s"-Fg"s" CM-9880-37M-3Y-3M-IY	5
52	Cit"s"-Fg"s" CD-3568-8Y-2M-OY	3
79	Ato"s"xCr"s"-Gs"s" CD-7464-8Y-5M-OY	5
84	Ruff"s"-Fg"s" CD-7472-6Y-3M-OY	5,7
85	Jo"s"-Cr"s"xD. Coll-01 CD-7473-24Y-IM-OY	5
108	V01658-Mexi"s"xRuff"s" CD-4389-A-IY-IM-OY	3
145	Gta"s"-Tc60xMexi"s" CD-4853-E-IY-IM-OY	4
178	Mexi"s"-Fg"s" CD-1895-12Y-2Y-2M-OY	5
182	ZB-M. M.'RarixS. 15-Cr"s"/Mexi"s" CD-1283-A-4Y-IY-IM-OY	4
232	Lds. Mut-Gta"s" CM-18347-500Y-IY	5
246	(Cr"s"/21563x61. 130-Lds)Mexi"s"CD-3857-5Y-OM	5
250	Cit"s"-Fg"s" CD 3568-8Y-OM	5
266	(Cr"s"-Fg"s"/21563-Gs"s"xCit"s")P66/270 CD-1074-IY-3Y-OM	4
277	Gdo 471-Br"s"xPg"s" CM-13919-34Y-4Y-3Y	5

III. PRODUCTION RESEARCH

The results reported in this report are based on studies conducted in the eastern region of Algeria, where one of the CIMMYT agronomist was located. The extrem climatic conditions present during the season should be taken into account in interpreting these results.

A. Rate and Date of Seeding and Rate of Nitrogen Application Studies

Twnety eight trials were established to study the effect of seeding, date of seeding, and rate of nitrogen application on both improved higher yielding varieties and old tall straw varieties still in production. These were 4 x 4 factorial trials with 4 rates of seeding and 4 rates of nitrogen. In general 3 dates of seeding were used. At the Khroub station only 2 dates were completed due to inclemate weather during the second programed date. Seeding dates were about one month apart starting November 8 and ending January 22 at the different locations. The first half of the nitrogen was applied with the seeding, and a second application at tillering. Trials were established at Khroub, Guelma, Tamlouka, Setif and Ain Beida. Results from Ain Beida were non-significant and very low yielding, and are not reported for the one date of planting at that location. Table A.11 gives the results of the rate of seeding for 25 trials. Nine trials gave a significant yield response to rate of seeding. The response at Khroub and Guelma for 7 trials was negative. As the seeding rate was increased the yield was reduced. As the rate increased to 120 kg per hectare, for these seven trials, there was a

TABLE A.11

AVERAGE YIELD IN QUINTALS/HECTARE AT FOUR RATES OF SEEDING, THREE DATES OF SEEDING, FOUR LOCATIONS AND SEVEN VARIETIES OF WHEAT*

Date of Seeding		Rate of Seeding	Khroub				Guelma		Tamlouka		Setif			
			Anza	Fl, Aurore	Cocorit	O, Zenati	Anza	Fl, Aurore	S, Cerros	Fl, Aurore	Anza	Fl, Aurore	M,B, Bachir	Pol x ZB
1st Date		60	38.64	26.26	30.70	23.17	23.16	not harvested	22,54	10.66			15.42	21.36
Setif	8-11-76	90	35.01	22.99	29.93	22.09	22.02		22,63	10.02			17.01	21.91
Tamlouka	10-11-76	120	31.88	23.81	25.80	20.82	18.09		22,18	9.57	NOT PLANTED		16.60	21.41
Guelma	13-11-76	150	28.62	20.59	25.80	19.41	17.21		20,99	9.52			17.19	21.59
		AVE	33.54	23.41	28.06	21.37	20.12	BIRD	22.09	9.94			16.55	21.56
		LSD 05	3.56	1.23	1.62	0.75	2.76	DAMAGE	N.S.	0.91			N.S.	N.S.
		C.V.	12.7	12.1	14.1	8.6	16.5		11,1	10.9			11.0	11.8
2nd Date		60					16.70	10.45	22.31	21.22			14.51	16.83
		90					15.46	9.58	24.49	22.99			14.86	16.42
Setif	12-12-76	120		NOT PLANTED			12.01	10.33	25.62	24.89	NOT PLANTED		15.56	18.76
Tamlouka	19-12-76	150					13.39	9.58	26.39	24.13			15.06	19.00
Guelma	21-12-76	AVE					14.39	9.98	24.72	23.31			15.00	17.76
		LSD 05					1.66	N.S.	1.90	N.S.			N.S.	N.S.
		C.V.					19.1	17.3	9,20	11.7			23.0	23.0
3rd Date		60	34.60	28.07	28.48	25.67	20.15	16.59	15.15	22.95	22.63	22.81		
		90	34.20	28.93	27.66	25.40	20.59	16.15	16.19	23.49	22.81	22.40		
Setif	22- 1-77	120	32.80	28.93	27.07	25.94	18.71	14.71	17.37	22.31	25.31	23.36	NOT SEEDED	
Tamlouka	19- 1-77	150	31.79	27.30	24.85	25.90	18.64	14.58	18.82	22.18	25.71	24.22		
Guelma	15- 1-77	AVE	33.23	28.31	27.02	25.72	19.53	15.51	16.88	22.73	24.36	23.19		
Khroub	4- 1-77	LSD 05	N.S.	N.S.	N.S.	N.S.	N.S.	0.93	2.68	N.S.	N.S.	N.S.		
		C.V.	11.5	11.4	11.0	7.0	12.9	9.9	19.0	10.9	18.0	11.7		

* Each yield is the average of 12 individual plots

significant yield reduction. Six trials at these two locations gave no significant yield response to rate of seeding. Five of the six were at the late date of seeding, but the trend here was also to decrease yield at the higher seeding density.

The negative response probably resulted from the high plant density using more moisture during the prolonged drought. This resulted in greater drought stress as was indicated by smaller heads and a high percentage of tiller abortion at high seeding rates at these two locations. At Guelma for the first date, the high plant density and excessive vegatative growth of Anza resulted in a high infestation of stem maggot. At both the lower fertility level and low (60 Kg) seeding rate, a greatly reduced infectation was noted. Apparently the high plant density was favorable for the adult to lay eggs. It was also noted that very few stems were infected in the border rows. As much as 30% of the stems were infected by the stem maggot. Yields decreased by as much as 10 quintals at the high rates of seeding at Khroub and Guelma. At Setif no significant response to seed rates was observed. At Tamlouka, three of the six trials responded to seed rate. This occured at all three dates but only Siete Cerros indicated a possitive response at the 2nd and 3rd dates of seeding. The first date response of Florence Aurore can be discounted because 50% of more frost damage occured which would obscure the true affect. Yields were increased at the 120 Kg rate at Tamlouka for Siete Cerros by about 3 quintals.

Caution must be used in interpreting there results this year. The long drought during tillering favored the lower seeding rate. Also under the trial conditions of excellent land preparation, and seeding with properly adjusted well adapted seeder resulted in almost 100% emergence. These conditions are not commonly duplicated under production. The trials point out the importance of good land preparation and good seeding equipment. Also the results were predictatable under the weather conditions where moisture was limited. Less early growth saved moisture to carry the plant until late rain came with less yield loss at the low plant density. High seeding rates can reduce yields under drought the same as high levels of nitrogen reduce yields with limited moisture. Improved seed bed preparation and better seeding equipment could save considerable seed without reducing yields, and in year of drought might increase yields.

Table A.12 and A.13 report the results of the response to different rates of nitrogen. At Khroub and Guelma there was no response to nitrogen. At Setif and Tamlouka eight of twelve trials had a possitive significant yield response to levels of nitrogen.

At Khroub and Guelma a high residual nitrogen carryover resulted from the previous cropping history. At Guelma, the previous crop was potatoes, and Khroub peas that were plowed down before maturity. With the prolonged drought, the residual nitrogen was sufficient for the yield level reached. At both locations the yield of Anza was reduced about 4 quintals at the first date of planting at the 126 unit levels, but it was not

TABLE A.12

AVERAGE YIELD IN QUINTALS/HECTARE AT FOUR LEVELS OF NITROGEN, THREE DATES OF SEEDING, TWO LOCATIONS AND SIX VARIETIES OF WHEAT°

Date of Seeding	Rate of N Kg/Ha	Tamlouka		Setif			
		S. Cerros	Fl. Aurore	Anza	Fl. Aurore	M.B. Bachir	Pol x Z.B.
1st Date Setif 8-11-76 Tamlouka 10-11-76	0	21.27	9.61			14.74	18.55
	33	21.86	9.80			16.64	21.63
	67	21.36	9.89	NOT SEEDED		17.23	23.17
	100	23.85	10.48			17.60	22.90
	AVE	22.09	9.94			16.55	21.56
	LSD 05	2.05	N.S.			1.52	2.12
	C.V.	11.1	10.9			11.0	11.8
2nd Date Setif 12-12-76 Tamlouka 19-12-76	0	22.63	22.59			11.29	13.79
	33	24.40	22.99			15.33	15.87
	67	26.44	23.95	NOT SEEDED		15.56	21.59
	100	25.40	23.71			17.82	19.77
	AVE	24.72	23.31			15.00	17.76
	LSD 05	1.90	N.S.			2.37	3.34
	C.V.	9.2	11.7			23.0	23.0
3rd Date Setif 22- 1-77 Tamlouka 19- 1-77	0	15.87	21.54	16.10	15.92		
	33	16.51	22.81	23.17	22.36		
	67	17.55	23.45	29.21	27.30	NOT SEEDED	
	100	17.60	23.13	28.98	27.31		
	AVE	16.88	22.73	24.36	23.19		
	LSD 05	N.S.	N.S.	3.71	2.26		
	C.V.	19.0	10.9	18.0	11.7		

° Each yield is the average of 12 individual plots.

TABLE A.13

AVERAGE YIELD IN QUINTALS/HECTARE OF FOUR LEVELS OF NITROGEN, 3 DATA OF SEEDING, 2 LOCATIONS AND 6 VARIETIES OF WHEAT°.

Date Seeded	Rate of N Kg/Ha	Khroub				Guelma	
		Anza	Fl. Aurore	Cocorit	O. Zenati	Anza	Fl. Aurore
1st Date	0	35.60	22.81	27.21	22.13	22.54	not harvested
Khroub 15-11-76	50	34.29	23.41	27.84	21.00	19.89	
Guelma 13-11-76	83	32.38	24.67	28.71	21.91	20.27	
	126	31.88	22.72	28.48	20.45	17.77	
	AVE	33.54	23.41	28.06	21.37	20.12	
	LSD 05	N.S.	N.S.	N.S.	N.S.	N.S.	
	C.V.	12.7	12.1	14.1	8.6	16.5	
2nd Date	0					15.40	10.51
Guelma 21-12-76	50					14.64	10.39
	83		NOT SEEDED			14.13	9.76
	126					13.39	9.26
	AVE					14.39	9.98
	LSD 05					N.S.	N.S.
	C.V.					19.1	17.3
3rd Date	0	32.83	29.11	27.12	25.71	18.33	16.96
Khroub 4- 1-77	50	32.88	28.48	27.39	26.21	20.02	15.77
Guelma 15- 1-77	83	33.65	27.53	26.57	25.49	19.40	15.71
	126	33.56	28.12	26.98	25.49	20.34	15.58
	AVE	33.23	28.31	27.02	25.72	19.53	15.51
	LSD 05	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
	C.V.	11.5	11.4	11.0	7.0	12.9	9.9

° Each yield is the average of 12 individual plots.

statistically significant. All other trials varied less than two quintals amoung the rates. At Guelma, increased infestation of stem maggot at the higher level of N may have accounted for the yield decrease.

At Setif a good response to N resulted even under the drought conditions. The previous crop was chick peas. Previous trials have indicated good nitrogen responses following chick peas. At Tamlouka the previous crop or land use was pasture fallow which usually needs less nitrogen than a cropping sequance.

These trials point out the need for basing recommendations of nitrogen use based on previous crop history. Other trials in previous years have shown similar results. In general, wheat following potatoes, sugar beets or vegetable responds less to nitrogen than when following forage, dry legumes cereal crop or pasture fallow. A general recommendation would be to seed without nitrogen following the crops which normally are heavily fertilized, observe the seeding vigour of the wheat and adjust the rate at tillering. The last mentioned crops should be fertilized with nitrogen at the recommended rates.

As would be expected in a drought year, nitrogen response was bellow expected response. Future nitrogen studies should concentrate more on effects of previous cropping history, to more efficiently estimate nitrogen needs and use.

B. Residual Effect of Treflan on Wild Oat Control.

Infestation on wild oats in cereal production has been increasing. Part of the problem is late harvest of forage which allows wild oats to mature and drop. Another factor is poor weed control in dry legumes which allows wild oats to drop seed. At the Khroub station, Treflan is used to control grass type weeds in dry legume production. A comparison was made on the residual effect of Treflan on wild oat control in the wheat following treatment in the previous dry legume crop. These data are given in Table A. 14.

It is difficult to get accurate yield data on wild oats. It is almost impossible to recover the seed before it falls to the ground. Recovering the seed from the ground is also difficult because of the self seeding action of the barb. Perhaps the most logical estimate can be made by counting the florets and grains per spike and calculating from the 1000 kernel weight. This is the method used for these estimations.

Yield from 6 side by side cuts in each of the treated and untreated area was determined with 20 meter combine cuts. Samples were taken of the number of wheat heads per meter square and wild oats heads in a square meter. The number of florets per head was counted for a random sample of 80 spikes from each square meter in the untreated and all the spikes in the treated. An average of 1,5 kernels for each spikelet was used to calculate the number of kernels for untreated. Since spikelets were larger in the treated area, two kernels per spikelet was used to determine the number of kernels produced per square meter.

TABLE A.14

RESIDUAL EFFECT ON WILD CONTROL IN SIETE CERROS FOLLOWING TREFLAN TREATED LENTIL CROP. BOTH AREAS SEEDED AT THE SAME TIME WITH SHEARER SEEDER.

Factor	Treated with Treflon 1975	Untreated 1975
Wheat Spikes M^2	369	112
Wild Oat Spikes M^2	20	381
Calculated Wild Oat seeds M^2	784	7115
Calculated Wild Oat seed yield Qx/Ha	2.76	20.33°°
Yield Siete Cerros Qx/Ha	21.83	4.84
Total Yield Qx/Ha	24.59	25.17

Wild oat seed recovered wrighed 35 gr. per 1000 kernels.

° Calculation based on 35 gr per 1000 kernels.

°° Calculation based on 30 gr per 1000 kernels.

A lower kernel weight estimates was used on the untreated area because the heads were smaller and seed size some what less.

Since land use in 1975-76 was not identical for both treated and untreated areas, the results may not be strictly comparable for wheat yield. However the total grain production when both wild oat and wheat yields are compared are about the same. The significance of the comparison is the great reduction in wild oat infectation following a control in the previous crop. Althrough there is still plenty of seed left on the treated area, it is only about one tenth the amount on the untreated area. The untreated area, except for the test strip was cut for forage, but too late to prevent most of the seed from falling on the ground. A rotation using chemical control of grass type weeds in the dry legume crop, and followed with wheat of fallow can assist in reducing the wild oat problem. Wild oat treatment in the wheat with Suffex would further reduce the seed supply of wild oats for successive crops.

C. Effect of Seed Drills on Yield.

In continuation of the studies reported in the 1975-76 report a further comparison was made between a heavy constructed cultivator seeder combination with shovel type hoe (Shearer) to the most commonly used simple seeder of light construction and fragile furrow openers (Nordsten). The land was prepared by scarifier and disc in both cases. During the final seed bed preparation the weed growth was well developed and the soil was wet. As a result the land preparation and weed control was poor

and thus the conditions were very poor for seeding. The extra cultivation given by the cultivator seeder combine was beneficial in controlling weeds and emergence was excellent. The area seeded by the simple seeder had less weed control at seeding because of no weed control by the seeder. Wheat emergence was poor and uneven. No weed control was applied in either area.

Combine cuts of Siete Cerros, were made side by side of the two different seedings which were adjoining each other. Estimation of wild oats stand and yields are given below.

	Cultivator Seeder	Simple Seeder
Yield Qx/Ha	11.66	2.46
Wild Oats M^2	75.00	125.00
Grassweeds M^2 (Brome, Rye grass)	10.00	30.00
Broad Leaf Weed	10.00	50.00

The results reported here illustrate the importance of good seed bed preparation. The extra cultivation at seeding by the cultivator seeder greatly aided the weed control, while the simple seeder had no additional weed control. The result was a complete failure of the crop seeded by the simple seeder. The crop from the cultivator seeder was also poor but about 500% better than the other. There is no substitute for good seed bed preparation, and it is absolutely necessary to have some post seeding weed control when no cultivation occurs with the seeding operation.

D. Herbicide Trial

One herbicide trial on Anza wheat was established at Khroub. Materials arrived late for testing. Of the herbicides used only

Dichlorophenoxy Methyl (Hoe 23408) was effective in controlling wild oats. About 97% control was obtained when applied in the late tillering stage. Combination of Certol P (Mexoprop + ioxynil) and 9 liters of Suffix (Benzoil Prop Ethyl) was not effective in controlling wild oats. Approximates 50% of the wild oats retillered and produced seed. Late application of Suffix was more effective in control of wild oats than early (mid tillering). Late rains encouraged late tillering of wild oats treated with Suffix. The trial was accidently harvested by combine before yield data was taken, however severe drought and very uneven growth made yield comparison of little value.

Hoe 23408 (Dichlorophenoxy Methyl) lookes extremely promising. Earlier application is recommended and some reduced growth was noted. The extreme drought conditions at time of application may also have been a factor in apparent slight phytotoxity at 3 liters of product per hectare. Recommendations are apply next year at early tillering and 3 leaf stages as well as in combination with 2.4 D at late tillering.

IV. MEDICAGO RESEARCH

A. Introduction

Research work into the adaption of annual species of Medicago has continued to develop in the West of Algeria, based at Oran, and the work consists two parts:

1) Varietal Evaluation Trials. The varieties under evaluation were the currently available Australian cultivars. In the current season, four trials were carried out in the agricultural zones of western Algeria. They were sown early in October, before the opening rains. Although this presents problems in an experimental sense (e.g. very high weed populations or uneven weed populations), it is considered necessary to simulate the situation as it occurs on the farms, where seeding of Medicago is carried out as the first seeding operation of the year.

Two seeding rates of each were evaluated, the higher seeding rate serving to simulate a natural regeneration and also to indicate where an increase in established seeding rate would be desirable.

The plots were then subjected to various cutting treatments ("Simulated Grazing") to evaluate seasonal forage production, ability for regrowth and finally seed production.

2) Evaluation and Selection of Local Ecotypes. This work was commenced this year with over 700 accessions from the Mediterranean region being evaluated in (single pod) observation rows in the sub-littoral zone (Tessala). Observations were

made on emergence, plant vigour, flowering date and duration and seed yield.

The lines selected from this nursery are to be sown in micro-sward experiments in 1977/78 on the high plateau (Ain-El Hadjar) and sub-littoral (Sidi-Bel-Abbes)

B. Climatic Conditions

In general terms, all of the region suffered from drought. The variety evaluation trials suffered to differing extents during the germination and establishment period. At Taferaoui, temperatures were abnormally high during November and December (e.g. Air 24°C, Topsoil 18°C) and rainfall was minimal. Soil moisture during this period was about 14% (November-December). Following the lightfalls of rain, some germinations occurred but with the high temperatures, the young seedlings were killed. This accounted for the very low establishment percentage (best cultivar 15.5%, average of the trial 10.6% compared with previous two years average of slightly more than 50%).

Rainfall was received at the end of December and the first part of January, but little was received following that period. At the time of winter forage yield determinations at the end of February, drought stress was again apparent.

The trial was completely dead at the end of March.

At the sub-littoral (Tessala) soil moisture conditions (22-30%) and temperatures (Air 10-15° C, soil 9-13° C) were never inhibiting to germination and emergence, thus establishment was considerably higher (best cultivar 55.5%, trials average 35.3%). Growing conditions were ideal through until mid-March when drought stress was apparent although not severe. High falls of rain were received through the rest of the growing season and acceptable quantities of seed were produced. On the high plateau, at Telagh low soil moisture (15-17%) coupled with hot winds reduced establishments (best cultivar 17.5%, trials average 12.5%) whilst at Ain-El Hadjar, although moisture was not limiting (20-28% during November-December) soil temperatures were rather low (7-9°C). Several heavy frosts were received, resulting in low establishments (best cultivar 34%, trial average 19.7%)

C. Variety Evaluation Trials.

As pointed out in the previous section, climatic conditions did not allow the cultivars to express their full potentials. Thus the absolute production levels should not be taken as a guide to a so-called normal year. Rather than present all data, most of which would be irrelevant under those normal conditions, it seems more usefull to consider the reactions of the cultivars to the prevailing conditions and imposed treatments. However; to obtain a brief indication of relative production levels between sites, Table A.15 shows the trial averages for Medicago dry matter.

TABLE A.15

WINTER FORAGE PRODUCTION (KG/HA DRY MATTER OF MEDICAGO 1976-77 AVERAGED OVER ALL CULTIVARS

Seeding Rate Kg/Ha	Tafaroui (Littoral)	Tessala (Sub-Littoral)	Telagh (High-Plateau)	Ain-El Hadjar (High-Plateau)
12	340 (42.0)°	1468 (57.2)	45 (8.0)	62 (7.4)
24	307 (39.8)	2230 (71.6)	89 (15.4)	83 (12.1)

° Medicago as percentage of total forage

As would be expected seeding rate affects early forage production and botanical composition except at Tafaraoui where drought stress depressed production from the higher plant population.

The minimal contribution of Medicago to total forage on the high-plateau should be noted.

The littoral trials (Tafaroui) showed "Borung" and "Jemalong" (both M. truncatula) to be superior in forage production in the period November to the end of February. "Snail" (M. scutellata), which normally yields close to "Jemalong" in this area was significantly depressed due to drought-stress.

Of the five cultivars tested, only "Jemalong" exhibited greater forage production at the higher rate indicating greater drought tolerance.

On the sub-littoral (Tessala) as mentioned earlier, the conditions were less adverse, drought stress not being apparent until mid-March. The forage yield showed "Borung" and "Snail" to have the greatest production followed by "Harbinger" (M. littoralis), "Jemalong" and lastly "Cyprus" (M. truncatula).

Another harvest was taken at the end of March on the same plots. By this time, drought effects were beginning to show. This is evidenced by the fact that in the first harvest, overall forage production increased by 52% when seeding rate was doubled whilst in the second harvest, there was a 13% reduction in ~~forgae~~ forage yield when seeding rate was doubled.

The most affected variety was "Snail" which dropped from rank two in harvest one to rank four in harvest two, once again showing its poor drought tolerance. In this second harvest "Borung" showed its capacity for strong regrowth and particularly its competitive ability with weeds (Table A. 16) .

The seed yields obtained from virtually all plots after these treatments were acceptable. Where the plots were cut, there were significant seed yield decreases where plant populations were increased (24 Kg/Ha seed rate). In the uncut plots, the decrease was not significant.

"Borung" demonstrated good seed yield stability over all treatment and seeding rates. Table A. 17 shows the ranking of cultivars with regard to seed yield.

The fall in position of "Snail" second in "plots uncut 12 Kg/Ha" to last position in all other treatments should be noted. This is due to poor drought tolerance.

The relatively good performance by "Cyprus" in "plots cut twice" is due to its more prostate habit which in fact gives it a cutting-escaping mechanism (and thus its relative forage yield by cutting was low in all trials).

"Jemalong" was stable in the middle yield range through all treatments, whilst the seed production ranking of "Harbinger" was increased by one cut depressed by two cutting treatments.

TABLE A.16

YIELDS OF MEDICAGO, EXPRESSED AS A PERCENTAGE OF WEEDS YIELDS MARCH 1977, TESSALA.

	Medicago / Weeds %
Borung	457
Harbinger	228
Jemalong	134
Snail	111
Cyprus	40

TABLE A.17

RANKING OF MEDICAGO SEED YIELDS WITH RESPECT TO PRIOR CUTTING TREATMENT TESSALA

Seeding Rate	Plots Uncut	Plot Cut Once	Plot Cut Twice
12 Kg/Ha	Borung	Borung	Cyprus
	Snail	Harbinger	Borung
	Jemalong	Jemalong	Jemalong
	Cyprus	Cyprus	Harbinger
	Harbinger	Snail	Snail
24 Kg/Ha	Borung	Borung	Borung
	Cyprus (?)	Harbinger	Cyprus
	Jemalong	Jemalong	Jemalong
	Harbinger	Cyprus	Harbinger
	Snail	Snail	Snail

On the high plateau, the two trials (Ain-El-Hadjar and Telagh) gave similar results with respect to forage yield. At these sites, the most severe problem up to the time of cutting was that of low temperature.

"Snail" and "Borung" significantly outyielded the other varieties and although there was a significant effect (positive) of seeding rate, the relative rankings remainded identical.

With respect to seed yield, cutting treatment increased seed yields, except of "Snail", by reducing competition and increasing tillering. (This contrast with results from Tessala where seed yields were decreased by cutting but plant populations were greater). Overall, the seed yields were unacceptable from the point of view of starting a self-regenerating system (yields ranged from 82 Kg/Ha to zero).

Table A. 18 shows the ranking of cultivars with respect to seed yield following cutting. Snail was the highest seed producer in the uncut plots but did not regrow strongly after cutting and dropped its ranking to third. This was undoubtably again due in part to poor drought tolerance but also due to a poor capacity for regrowth after cutting (or grazing) which has been observed over three years. In addition there was a high proportion of poorly formed (or abnormal) seeds present in the pods of "Snail" both from the uncut and cut plots. "Jemalong" and "Borung" exhibited reasonable stability under these treatments.

TABLE A.18

RANKING OF CULTIVARS OF MEDICAGO, SEED YIELDS AIN-EL-HADJAR AND TELAGH

Seeding Rate	Plots Uncut	Plots Cut
12 Kg/Ha	Snail	Jemalong
	Jemalong	Borung
	Borung	Snail
	Harbinger	Harbinger
	Cyprus	Cyprus
24 Kg/Ha	Snail	Borung
	Borung	Jemalong
	Jemalong	Snail
	Harbinger	Cyprus
	Cyprus	Harbinger

General Conclusions, Variety Evaluation Trials 1976/77

1) "Borung" (M. truncatula) has shown great promise in all areas. It has consistently high winter forage yield and good seed yields, with a fair degree of drought tolerance. It is probably best suited to the heavy clay soils.

2) "Jemalong" (M. truncatula) continues to demonstrate its wide adaptability and this year has shown somewhat greater drought tolerance than the other cultivars. It may possible be replaced by "Borung" in many areas because of the superiority of the latter in forage yield. However, the hard-seed characteristics of "Jemalong" are more favorable for strong regeneration than those of "Borung".

3) "Snail" (M. scutellata) has shown once again its ability to produce large quantities of forage (if uncut or ungrazed) under favourable conditions. However its ability to respond after cutting or grazing is poor as is its ability to tolerate dry conditions.

D. Evaluation and Selection of Local Ecotypes .

The 717 lines sown in observation rows at Tessala in 1976/77 were mainly of Algerian origin although there were lines included from Tunisia, Syria and Europe, plus selections from South Australia.

The nursery was sown in the last week of November and was followed by relatively warm conditions and growth was rapid. Unfortunately there was no attack by Sitona lineata which was hoped to be one of the selection criteria.

Observations were made on winter vigour compared to a standard cultivar, Jemalong (M. truncatula) equal to a rating of 10.

Results of the major species are summarised in Table A. 19, which gives the percentage of the total of each species having a given winter vigour rating.

It is apparent that there is a good deal of material with vigor greater than "Jemalong". However winter vigor in a sward depends as much on plant density (which depends on seed production ability, seed size and seedcoat impermeability characteristics) as spaced plant vigour and thus these results should not be viewed alone.

There was also considerable variability in flowering dates, as shown in Table A. 20. The standard variety "Jemalong" required 101 days from emergence to flowering.

The variations in seed yields were large both within and between species. M. ciliaris was the highest yielder of seed followed by M. polymorpha, M. aculeata, M. scutellata and M. truncatula.

Sixty eight lines have been selected on the basis of winter vigour, tillering ability and seed yield for micro-sward evaluations in 1977/78 on the high-plateau and sub-littoral zones. Within each species a range of flowering dates have been selected to elucidate the environmental requirements with regard to this factor.

TABLE A.19

WINTER VIGOUR RATING ("JEMALONG"=10), MEDICAGO OBSERVARION NURSERY, TESSALA

	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Number
M. polymorpha			0.8	0.8	1.2	4.3	11.4	21.3	36.2	17.7	5.1	1.2		254
M. truncatula	0.4		0.4	1.3	5.5	9.7	34.3	34.3	12.7	1.3				236
M. littoralis		5.6			16.7	27.8	27.8	22.2						18
M. scutellata								5.3	21.1	47.4	15.8	10.5		19
M. orbicularis		1.3			2.6	20.8	33.8	32.5	9.1					77
M. cilliaris						4.3		14.9	31.9	27.7	21.3			47
M. aculeata						5.9	26.5	26.5	35.3	5.9				34
M. tornata					7.7	61.5	30.8							13

TABLE A.20

DAYS TO FLOWERING, MEDICAGO OBSERVATION NURSERY, TESSALA

(EXPRESSED AS A PERCENTAGE OF TOTAL OF EACH SPECIES)

	94	101	104	110	115	121	123	128	130
M. polymorpha	10.2	37.8	22.4	6.7	13.4	8.7		0.4	
M. truncatula	2.5	22.9	35.6	4.7	22.9	11.0	0.8		
M. littoralis		44.4	22.2		27.8		5.6		
M. scutellata	36.8	26.3	26.3			10.5			
M. orbicularis		2.6	10.4		1.3	71.4	11.7		2.6
M. ciliaris	14.9	48.9	27.7		4.3	4.3			
M. aculeata		52.9	32.4			11.8	2.9		
M. tornata						76.9	23.1		

During the coming season, particular emphasis will be placed on seedcoat impermeability studies to define which species (or lines) will be capable of reliable regeneration.