

# DETERMINATION OF POSITION AND DURATION OF SUGAR BEET LIFE CYCLE ACCORDING TO VARIETIES TYPE AT DUKKALA REGION, MOROCCO

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## ABSTRACT

Doukkala sugar beet cultivated area has been increased since the introduction of the crop in the region in 1970. The occupied area varied from 3,900 ha in 1970 to 18,400 ha in 2001. Moreover, sugar beet irrigated fields will attain 25,000 ha in 2002 after current management of the region. Root yield has also been increased 30 to 65 t/ha. Thus, potential production will be about 1,625,000 tonnes in 2003 compared to 1,125,000 t at the present time. Since factories capacity is limited, the only possibility is to extend the machining campaign. However, because of deterioration of sugar beet quality at the end of the season (July-august) due to high temperature, diseases etc., the machining period should start early. Therefore, three experiments were conducted at COSUMAR station at Sidi Bennour and at INRA experimental station at Khémis Zemamra. The objectives were to determine seeding and harvesting dates per varieties type in order to extend the machining period while maintaining good sugar beet quality. Six varieties of each sugar beet type (Z, N, E) were planted at five seeding dates starting from September 22 to January 17, and harvested at two different dates (Standard life cycle for each type and 15 days before). Results showed that root and extractable sugar yield were significantly reduced when harvested 15 days before the end of the standard life cycle. October and November were the best seeding dates. To start harvesting early in the season (April-may), Z type should be seeded in October, N type during November and E type at the beginning of October-November.

## ABRÉGÉ

Les superficies emblavées en betterave à sucre dans la région des Doukkala n'ont pas cessé d'augmenter depuis l'introduction de la culture en 1970. Elles sont passées de 3900 ha en 70 à 18400 ha en 2001. Ces superficies irriguées atteindront 25.000 ha en 2002 après aménagement du haut service. Cette évolution des superficies a été accompagnée d'une évolution importante des rendements racines qui sont passés de 30 t en 70 à 65 t/ha ces dernières années. Ainsi, la production potentielle serait d'environ 1.625.000 t en 2003, soit un surplus de 500.000t par rapport à la production actuelle. La capacité globale des usines implantées dans la région étant limitée, il serait donc souhaitable d'étendre la campagne d'usinage. Or, étant donné la baisse de richesse et la dégradation de la qualité technologique observées en fin de cycle (Juillet-août) ces dernières années, en raison des conditions climatiques, des attaques parasitaires etc., la période d'usinage devrait commencer plutôt dans la saison

(Avril - mai). C'est ainsi que trois essais ont été conduits à la fois à la station COSUMAR à Sidi Bennour et à celle de l'INRA à Khémis Zemamra. L'objectif était de déterminer les dates de semis et de récolte par type de variétés afin d'étendre la période d'usinage tout en maintenant une bonne qualité technologique de la betterave. Six variétés par type (Z, N, E) ont été semées à cinq différentes dates entre le 22 septembre et le 17 janvier et récoltées 15 jours avant et à la fin des cycles correspondants pour chaque type. Les résultats ont montré que les rendements moyens des racines et du sucre extractible étaient significativement réduits pour les récoltes précoces. Les meilleurs rendements ont été obtenus pour les semis du début octobre et début novembre. Ils ont également montré que pour démarrer la campagne d'usinage en avril - mai et la terminer vers début juillet, il faudrait semer des variétés type Z au en octobre, type N durant le mois de novembre et type E début octobre - début novembre.

## INTRODUCTION

Determination of sugar beet seeding and harvesting optimal dates is very important in extending sugar campaign while preserving or maintaining good sugar production and quality. Harvesting sugar beet at the end July-beginning August decreased sugar content and deteriorates technological quality (Esteban, 1999). Having different variety types (Z, N and E) permitted to avoid late harvest. Nevertheless, Moroccan sugar beet producer did not take advantage of this opportunity since the position of sugar beet life cycle per type is not known. Some variety types were even abandoned in some regions.

Best placement of sugar beet life cycle in the season may also help to avoid southern sclerotium rot disease and quality deterioration (Esteban, 1999).

The objectives of this study were to: 1) determine the optimum seeding and harvesting dates according to varieties type, 2) exploit results to extend the machining campaign, 3) study possibilities to reduce type's life cycles.

## MATERIALS AND METHODS

Six varieties of each type (Z, N and E) were seeded on clay irrigated soils at Sidi Bennour and Khmis Zmamra.

Experimental design was a split-plot with four replicates. Five seeding dates were affected to the main plots while the six varieties were affected to the small plots. Each type was Harvested 15 days before and at the end of corresponding life cycle (Table 1).

Measures concerned root yield, sugar content, sugar yield, juice purity and extractible sugar yield.

Data analysis was done using SAS program.

Table 1. Seeding and harvesting dates tested for each type

Tableau 1. Dates de semis et de récoltes testées pour chaque type

Seeding date	Z Type	N Type	E Type
	Harvesting date		
9/22/00	3/07/01	4/07/01	5/7/01
	3/22/01	4/22/01	5/22/01
10/2/00	3/21/01	4/17/01	5/29/01
	4/02/01	5/02/01	6/02/01
11/1/00	4/16/01	5/16/01	6/16/01
	5/01/01	6/01/01	7/02/01
11/30/00	5/15/01	6/15/01	7/15/01
	5/30/01	6/30/01	7/30/01
1/17/01	7/01/01	7/30/01	7/30/01
	7/15/01	7/30/01	7/30/01

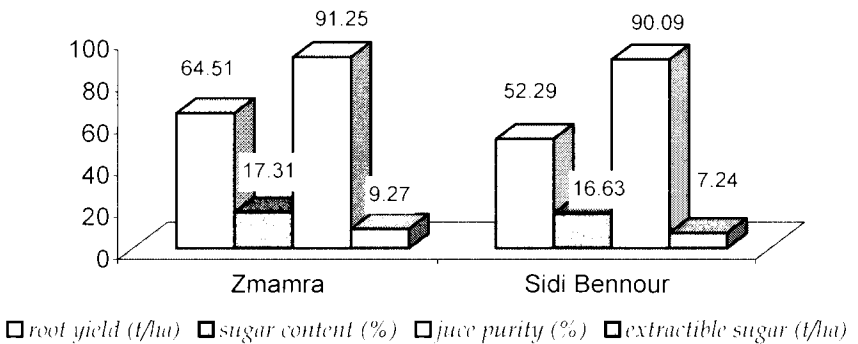
## RESULTS AND DISCUSSION

### SITE EFFECT

General data analysis showed that root and extractable sugar yield at Zemamra were significantly better than those obtained at Sidi Bennour location. However, no difference was observed for sugar content and juice purity. Nevertheless, sugar content was better at Zemamra than at Sidi Bennour (Figure 1)

Figure 1. Site effect on agronomic and technological factors

Figure 1. Effet du site sur les facteurs agronomiques et technologiques

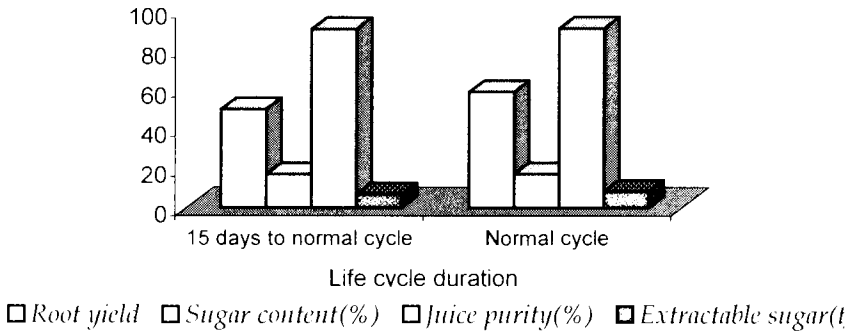


## EFFECT OF DURATION OF SUGAR BEET TYPE LIFE CYCLE

Reducing type life cycle 15 days compared to normal sugar beet life cycle decreased root and extractable sugar yield 8.7 and 1.54 t/ha, respectively (Figure 2). However, sugar content and juice purity were not affected.

*Figure 2. Life cycle duration effect on agronomic and technological factors*

*Figure 2. Effet de la durée du cycle sur les facteurs agronomiques et technologiques*

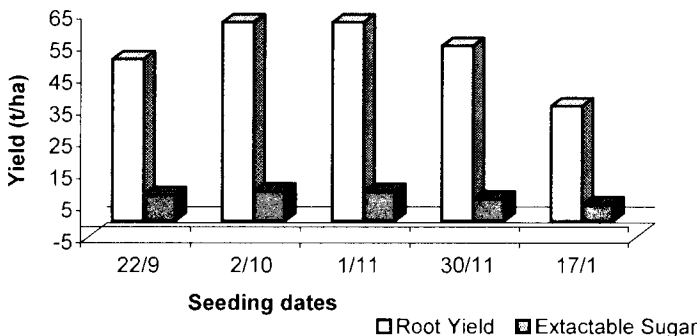


## EFFECT OF SEEDING DATES

In general, agronomic and technological factors measured were affected by seeding dates. In fact, the best root and extractable sugar yields were obtained in plots seeded October 02 and November first (Figure 3). These yields exceeded 62 and 9 t/ha for root and extractable sugar, respectively. Juice purity was good and exceeded 90% for the three first seeding dates. All varieties gave more than 17 % sugar content.

*Figure 3. Seeding dates effect on root and extractable sugar yield*

*Figure 3. Effet des dates de semis sur les rendements racines et sucre extractible*



## CONCLUSION

Root and extractable sugar yield was better at Zemamra than at Sidi Bennour. Both yields significantly decreased when sugar beet life cycle was 15 days reduced. In general, October and November were the best seeding dates. Juice purity and sugar content decreased when seeding dates were late in the season (End of November – December).

Z type permitted to start harvesting at the beginning of April and therefore avoid late harvest in the summer. Machining campaign may be extended by at least 3 to 4 weeks.

According to this study, the positioning of sugar beet life cycle per variety type may be suggested as follow:

Zemamra location

	Seeding dates						Harvesting dates					
	S	O	N	D	J	F	M	April	May	June	July	
Z												
N												
E												

Sidi Bennour location

	Seeding dates						Harvesting dates					
	S	O	N	D	J	F	M	April	May	June	July	
Z												
N												
E												

## REFERENCE

1. ESTEBAN J. A.: Caractérisation de la Betterave de Semis d'Automne, Proceedings of the 62<sup>nd</sup> IIRB Congress, 1-8, 1999.

### Thanking

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