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STUDY EFFECT OF SPROUTING SEEDS AND PLANTING DATES ON GROWTH AND YIELD OF TARO PLANT (*Colocasia esculenta, L.*) AT NORTH DELTA REGION

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ABSTRACT

Two field experiments were carried out during the two successive growing seasons of 2003 and 2004 on taro (local var.) at EL-Zahraa; Mansoura; Dakahlia Governorate, Egypt (as a quite representation of north delta region).

The main objective of this investigation was for study the effect of using pre-sprouted taro corm seeds in plantation (new method) instead of the un-sprouted ones which are still used (conventional method), as well as the effect of planting date on the vegetative growth,total yield and its components of taro plant.

The results indicated that the percentage of plants emergence, plant height, leaf area, fresh and dry weight of arial parts of plant, weight of corms/plant, average of corm weight and total yield/feddan significantly increased by using pre-sprouted corm seeds as compared with the un-sprouted ones , the average increment in the total yield / feddan reached (18.05 – 20.17 %) during the two study seasons .On the other hand , dry matter, starch, protein, N, P, K, Ca, Mg and total oxalate contents in corm were not affected by sprouting process.

Concerning planting dates, results showed that the planting on (15^{h} March) increased significantly the vegetative growth parameters and the total yield/feddan, while, planting on (15th April) significantly increased percentage of plants emergence and led to an increase in corm constituents of dry matter, starch, protein, N, Ca, Mg and total oxalate. The planting on (1st April) significantly increased corms weight /plant, and the average weight of corm.

The interaction between sprouting methods of taro seeds and planting dates showed that using pre-sprouted seeds for planting on(15th March) increased the vegetative growth parameters and the total yield/ feddan under conditions of north delta region.

Finally,it could be concluded that success cultivation of taro plant through different planting dates in this region might be good indicator for prolonging taro production season in the near future in Egypt

INTRODUCTION

Taro (Colocasia esculenta L., Schoot) is a wetland crop cultivated in many tropical and subtropical areas of the world. Taro-generally- is a neglected crop in Egypt, although, more than 400 million people in the world are still use taro in their diets (Steinke *et al..*, 1983). Taro plantation and the most favourable planting dates are still unknown in the different areas of Egypt specially in north delta region. Follett (1996) indicated that planting date of taro is limited by the soil temperature to mid-late spring and found that best growth occures at 25-35 °c for sprouting, also he found that earlier production can therefore be achieved by sprouting under cover or in a hot

Table 4: Effect of sprouting methods and planting dates on Taro corm quality during 2003 and 2004 seasons.

Characters		Dry matter (%)		Starch (%)		Protein (%)	
Treatments		2003	2004	2003	2004	2003	2004
Pre-sprouted seeds (New method)		61.30	61.20	26.21	26.59	7.644	7.619
Un-sprout. seeds (Conven. method)		59.94	60.41	26.25	26.55	7.447	7.430
F. Test		NS	NS	NS	NS	NS	NS
Dates							
15/2		59.62	60.10	24.38	24.73	7.235	7.256
1/3		59.68	60.18	24.58	24.88	7.305	7.362
15/3		59.98	60.58	25.80	26.02	7.475	7469
1 / 4		60.23	61.33	27.58	27.90	7.762	7.700
15/4		63.59	61.86	28.80	29.32	7.930	7.805
F. Test		**	**	**	**	*	*
LSD at 0.05		0.21	0.16	0.35	0.44	0.57	0.64
Interaction							
Pre-sprouted seeds	15/2	59.65	60.23	24.27	24.73	7.350	7.375
	1/3	59.72	60.28	24.53	24.93	7.410	7.475
	15/3	59.98	60.73	25.77	26.00	7.540	7.568
	1 / 4	60.23	61.87	27.63	27.93	7.940	7.750
	15/4	66.93	62.89	28.87	29.37	7.980	7.930
Un-sprouted seeds	15/2	59.58	59.97	24.50	24.73	7.120	7.137
	1/3	59.65	60.07	24.63	24.83	7.200	7.250
	15/3	59.97	60.42	25.83	26.03	7.410	7.432
	1 / 4	60.23	60.80	27.53	27.87	7.624	7.650
	15/4	60.25	60.82	28.73	29.27	7.880	7.680
F. Test		*	*	*	*	*	*
LSD at 0.05		0.65	0.34	0.56	0.82	0.37	0.26

The results indicated that there were no significant effects on the previous parameters by using pre-sprouted seeds during both seasons of 2003 and 2004 . With respect to the effect of planting dates on corm quality and its chemical contents, data in Tables (4, 5 and 6) also showed that there was no significant effect on the corm contents of phosphour and potassium in both seasons.

The higher contents of dry matter, starch, protein, nitrogen, calcium, magnesium and total oxalate in taro corm were recorded at the planting date of (15th April) , this superiority might be due to the favorable effects of high temperature and the long day during the grow periods, which simulte the plant metabolism and increase the vegetative growth of the plant and consequently more metabolites are stored in corm. Similar conclusions were obtained by Bradbury and Holloway (1988), Metwally (1996), Chan *et al.* (1999), Wei *et al.* (1999), Hsiu (2000), Keates *et al.* (2001), Susan *et al.* (2003) and Machado (2005).

The interactions in Tables (4, 5 and 6) between sprouting methods and planting dates had also significant effect on the corm contents of dry matter, starch and protein. Whereas phosphorus, potassium, calcium, magnesium and total oxalate contents were not significantly affected in the two seasons. Data indicated that planting taro seeds on (15th April) with pre-sprouted seeds gave a favour quality of taro corms.

Table 5: Effect of sprouting methods and planting dates on chemical contents of corm during 2003 and 2004 seasons at harvest time.

Characters / Treatments		N (%)		P (%)		K (%)	
		2003	2004	2003	2004	2003	2004
Pre-sprouted seeds (New method)		1.225	1.219	0.782	0.796	1.457	1.547
Unsprouted seeds (conven. method)		1.191	1.189	0.781	0.795	1.461	1.543
F. Test		NS	NS	NS	NS	NS	NS
Dates							
15/2		1.157	1.161	0.776	0.795	1.447	1.528
1/3		1.170	1.178	0.780	0.792	1.458	1.538
15/3		1.198	1.201	0.782	0.794	1.453	1.547
1 / 4		1.246	1.232	0.782	0.795	1.470	1.558
15/4		1.270	1.250	0.788	0.801	1.467	1.553
F. Test		*	*	NS	NS	NS	NS
LSD at 0.05		0.47	0.36	--	--	--	--
Interaction							
Pre-sprouted seeds	15/2	1.176	1.180	0.777	0.796	1.447	1.530
	1/3	1.187	1.196	0.781	0.793	1.450	1.540
	15/3	1.210	1.212	0.782	0.794	1.453	1.547
	1 / 4	1.272	1.240	0.783	0.795	1.470	1.560
	15/4	1.280	1.270	0.788	0.802	1.467	1.557
Un-sprouted seeds	15/2	1.138	1.142	0.776	0.795	1.447	1.527
	1/3	1.153	1.160	0.780	0.792	1.467	1.537
	15/3	1.186	1.190	0.782	0.793	1.453	1.547
	1 / 4	1.220	1.224	0.781	0.794	1.470	1.557
	15/4	1.260	1.230	0.787	0.800	1.467	1.550
F. Test		*	*	NS	NS	NS	NS
LSD at 0.05		0.27	0.22	--	--	--	--

Table 6: Effect of sprouting methods and planting dates on chemical contents of corm during 2003 and 2004 seasons at harvest time.

Characters / Treatments		Ca (%)		Mg (%)		Oxalate (%)	
		2003	2004	2003	2004	2003	2004
Pre-sprouted seeds (New method)		0.396	0.345	0.209	0.233	1.825	1.884
Un-sprouted seeds (Conven. method)		0.391	0.352	0.204	0.22	1.827	1.884
F. Test		NS	NS	NS	NS	NS	NS
Dates							
15/2		0.358	0.287	0.155	0.163	1.805	1.862
1/3		0.36	0.332	0.183	0.193	1.805	1.858
15/3		0.373	0.352	0.203	0.227	1.825	1.865
1 / 4		0.408	0.37	0.225	0.248	1.843	1.907
15/4		0.468	0.403	0.267	0.3	1.853	1.928
F. Test		**	**	**	**	**	**
LSD at 0.05		0.030	0.027	0.020	0.023	0.020	0.022
Interaction							
Pre-sprouted seeds	15/2	0.367	0.29	0.157	0.17	1.807	1.857
	1/3	0.38	0.323	0.193	0.21	1.803	1.863
	15/3	0.373	0.35	0.203	0.233	1.827	1.867
	1 / 4	0.397	0.36	0.227	0.257	1.84	1.907
	15/4	0.463	0.403	0.267	0.293	1.85	1.927
Un-spouted seeds	15/2	0.35	0.283	0.153	0.157	1.803	1.867
	1/3	0.34	0.34	0.173	0.177	1.807	1.853
	15/3	0.373	0.353	0.203	0.22	1.823	1.863
	1 / 4	0.42	0.38	0.223	0.24	1.847	1.907
	15/4	0.473	0.403	0.267	0.307	1.857	1.93
F. Test		NS	NS	NS	NS	NS	NS
LSD at 0.05		--	--	--	--	--	--

22Conclusion

It could be concluded that taro plant can be planted succssefully in the north region of Delta until the 15th of April, but the most favourable planting date was 15th March to get the highest yield.

Moreover, using pre-sprouted taro seeds (new method) in cultivation might decrease the quantity of seeds required per feddan,as well as decrease the percentage of absent hills in the field as compared with the un-sprouted seeds which is used in the conventional method, in addition to an increment in total yield /feddan by 18.05 – 20.17% .

Finally, this study proved the possibility of growing taro plant in the northern part of Delta and consequently will prolong taro production in Egypt.

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دراسة تأثير عملية تنبيت التقاوى ومواعيد الزراعة على نمو ومحصـــول نبـــات القلقاس فى منطقة شمال الدلتا

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أجريت تجربتان حقليتان فى موسمي نمو ناجحين ٢٠٠٣ و٢٠٠٤ علـى نبـات القلقـاس (صنف محلى) بالزهراء – المنصورة- محافظة الدقهلية – مصر. (كمثال جيد لمنطقـة شـمال الدلتا).الهدف الرئيسى لهذا البحث هو دراسة تأثير استخدام تقاوى قلقاس تم تنبيتها قبل الزراعـة كطريقة جديدة بدلاً من الزراعة بتقاوى لم يجر لها تنبيت وهى الطريقة التقليدية وكذلك تأثير ميعاد الزراعة على النمو الخضرى والمحصول ومكوناتهم لنبات القلقاس.

أوضحت النتائج أن نسبة الإنبات، طول النبات، المساحة الورقية، الوزن الطازج والجاف للأجزاء الهوائية للنبات، وزن الكورمات/نبات، متوسط وزن الكورمة والمحصول الكلى للفدان قد زادت زيادة معنوية عند استخدام تقاوى تم إنباتها قبل الزراعة مقارنة بتلك التى لم يجر لها انبات قبل الزراعة و أدى استخدام تقاوى تم انباتها قبل الزراعه الى زيادة المحصول الكلى للفدان بمعدل (١٨،٠٥-١٧،٢٠%) مقارنة بالطريقه التقليديه خلال موسمى الدراسة على الترتيب . من ناحيـة اخرى لم يتأثر محتوى الدرنات من المادة الجافة، النشـا، البـروتين، النيتـروجين، الفوسـفور، البوتاسيوم، الكالسيوم، الماغنسيوم والأوكسالات الكلية بعملية التنبيت.

فيما يتعلق بمواعيد الزراعة، اوضحت النتائج ان الزراعة فى (١٥ مارس)اعطت زيـادة معنوية فى قياسات النمو الخضرى والمحصول الكلى للفدان، بينما أعطت الزراعة فى (١٥ أبريل) زيادة فى نسبة وفى مكونات الكورمة من المادة الجافة، النشا، البروتين، النيتروجين، الكالسـيوم، الماغنسيوم والأوكسالات الكلية. اعطت الزراعة فى الأول من ابريل زيـادة معنويـة فـى وزن الكورمات/نبات ومتوسط وزن الكورمة . أوضح التفاعل بين طريقتى التنبيت لتقاوى البقلقـاس ومواعيد الزراعة أن استخدام تقاوى تم إنباتها قبل الزراعة فى ١٥ مارس قد أعطت زيـادة فـى قياسات النمو الخضرى والمحصول الكلى تحت ظروف منطقة شمال الدلتا.

أخيرا ، أوضحت التجربة أن نجاح زراعة نبات القلقاس من خلال مواعيد زراعة مختلفة فى هذه المنطقة قد يكون مؤشرا جيدا لاطالة موسم إنتاج القلقاس فى المستقبل القريب فى مصر.