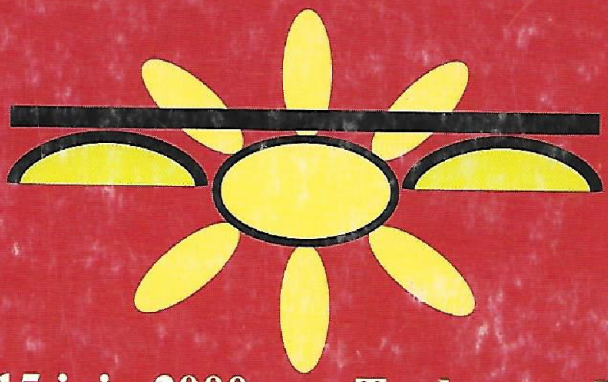
15e Conférence Internationale Tournesol
15th International Sunflower Conference



12-15 juin 2000 — **Toulouse - France**
12-15 June 2000 — *Toulouse - France*

ACTES
PROCEEDINGS

Tome I

AVANT-PROPOS

Ces deux volumes des actes de la 15ème Conférence Internationale Tournesol contiennent les textes des conférences données lors des séances plénières et ceux correspondants aux posters présentés lors des ateliers.

Le Comité Scientifique avait pensé qu'il serait utile de faire le point sur tous les aspects de la recherche sur le Tournesol. C'est pourquoi il a invité seize personnalités reconnues dans leurs domaines d'activité à présenter des conférences lors de quatre séances plénières consacrées à l'Economie, à la Technologie, à l'Agronomie et l'Environnement et à la Génétique, la Sélection et la Biotechnologie. Elles avaient pour tâche de permettre à tous les participants, spécialistes ou non des sujets traités, d'approfondir leurs connaissances dans tous les domaines de recherche touchant au tournesol.

Le Comité Scientifique remercie vivement les conférenciers pour leurs apports et les présidents des séances plénières qui ont accepté d'animer les débats avec la salle.

Par ailleurs, le Comité Scientifique avait aussi souhaité que les travaux de recherche consacrés au tournesol à travers le monde soient présentés lors d'ateliers posters et fassent l'objet de synthèses et de discussions. Les résumés des posters reçus par le Comité lui ont permis d'organiser 15 ateliers. Des Présidents ont été proposés pour présenter les synthèses et organiser les débats. Ils étaient assistés de correspondants français qui ont eu la lourde tâche de relire et éventuellement de corriger les textes publiés ici. Les Présidents ont reçus tous les textes de leurs ateliers avant la conférence.

Le Comité Scientifique tient à remercier les Présidents et les correspondants pour leur travail et leur engagement dans la réussite de la conférence et la qualité de la publication.

Le Comité Scientifique

Foreword.

These two volumes of the Proceedings of the 15th International Sunflower Conference contain the texts of the lectures given during the plenary sessions and those corresponding to the posters presented at the workshops. The scientific committee considered that it would be useful to have general updates on all aspects of research on sunflower and so invited sixteen acknowledged authorities in their domains of activity to give lectures during four plenary sessions devoted to Economics, to Technology, to Agronomy and Environment and to Genetics, Breeding and Biotechnology. Their task was to allow participants, specialists or not of the subjects dealt with, to widen their knowledge of all aspects of sunflower research.

The Scientific Committee warmly thanks the lecturers for their contribution and the plenary session chairmen who have accepted to lead the discussions with the audience.

The Committee also wanted to encourage the presentation of research programmes throughout the world during poster workshops, giving subjects for synthesis and debate. Poster summaries received by the Committee helped to decide the organisation of 15 workshops. Chairmen were proposed to present the syntheses and to organise the debates. They were assisted by french correspondents who had the hard task of reading and possibly correcting, the full texts published herein. The chairmen received all the texts for their workshops beforehand.

The scientific Committee wishes to thank both the chairmen and their correspondents for their work and their dedication to the success of the conference and the quality of this publication.

ANTHER CULTURE OF SUNFLOWER CULTIVARS

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SUMMARY

Anthers of six sunflower cultivars in the stage of uninucleate microspores were placed on six different culture media. Media were supplemented with basic MS (Murashige and Skoog 1962) macro and micro salts, 30 g l^{-1} sucrose, 0.3% gelrite, pH 5.7, while composition of vitamins varied. Two media were supplemented with 1 mg l^{-1} $AgNO_3$, and other two with 0.1% polyvinylpyrrolidone (PVP) (Zhong et al. 1995). Media were supplemented either with 2.2 mg l^{-1} BAP and 0.01 mg l^{-1} NAA or with 0.5 mg l^{-1} each of BAP and NAA. Anthers were cultured in the dark at 30°C. In contrast to PVP, silver nitrate was found to have a positive effect on intensity of organogenesis and somatic embryogenesis of sunflower anthers.

INTRODUCTION

For commercial hybrid production, homozygous lines are of great importance. Anther and microspore cultures allow acceleration of breeding programmes by providing homozygous doubled haploids within a comparatively short time.

Anther culture in sunflower still needs considerable improvement, as sunflower proved to be very recalcitrant in anther culture (Mezzarobba and Jonard 1986) and the regeneration rates are very low.

PVP was found to have a positive effect on regeneration capacity of sunflower anthers (Zhong et al. 1995), while silver nitrate had the same effect on regeneration capacity of some other sunflower tissues (Chraibi et al. 1991). The effect of these two components on organogenesis and somatic embryogenesis on anthers of sunflower cultivars is described in this paper.

MATERIAL AND METHODS

Anthers of six sunflower cultivars in the stage of uninucleate microspores were placed on six different culture media. Media were supplemented with basic MS (Murashige and Skoog 1962) macro and micro salts, 30 g l^{-1} sucrose, 0.3% gelrite, pH 5.7, while composition of vitamins varied. Two media were supplemented with 1 mg l^{-1} $AgNO_3$, and other two with 0.1% polyvinylpyrrolidone (PVP) (Zhong et al. 1995) (Table 1). Media were supplemented either with 2.2 mg l^{-1} BAP and 0.01 mg l^{-1} NAA or with 0.5 mg l^{-1} each of BAP and NAA. Anthers were cultured in the dark at 30°C.

Table 1. Composition of media used in the experiment

Medium	BAP (mg l^{-1})	NAA (mg l^{-1})	$AgNO_3$ (mg l^{-1})	PVP (%)
KM	0.5	0.5	1.0	-
R	2.2	0.01	1.0	-
N	0.5	0.5	-	-
N'	2.2	0.01	-	-
Z	0.5	0.5	-	0.1
Z'	2.2	0.01	-	0.1

Intensity of organogenesis and somatic embryogenesis was observed in the second week of culture.

RESULTS AND DISCUSSION

Culture of anthers on the media with 0.5 mg l^{-1} each of BAP and NAA favored callus formation (Table 2).

Table 2. Intensity of organogenesis and somatic embryogenesis of six sunflower cultivars depending on culture medium. Total number of anthers placed on one medium was 60 per genotype. Intensities of organogenesis and somatic embryogenesis are given in percentages of anthers with calli or somatic embryos.

Medium	KM		R		N		N'		Z		Z'	
Cultivar	Calli	Som. e.	Calli	Som. e.	Calli	Som. e.	Calli	Som. e.	Calli	Som. e.	Calli	Som. e.
1	90.0	20.0	10.0	5.0	86.7	15.0	76.7	11.7	0.0	0.0	0.0	8.3
2	81.7	6.7	40.0	0.0	65.0	3.3	53.3	0.0	0.0	0.0	6.7	0.0
3	60.0	0.0	53.3	1.7	75.0	6.7	48.3	3.3	18.3	1.7	10.0	0.0
4	68.3	51.7	55.0	5.0	63.3	26.7	60.0	16.7	3.3	5.0	20.0	0.0
5	50.0	15.0	43.3	25.0	26.7	3.3	28.3	10.0	0.0	6.7	11.7	5.0
6	88.3	10.0	40.0	15.0	71.7	0.0	48.3	10.0	33.3	6.7	8.3	0.0

Increased concentration of BAP (2.2 mg l^{-1}) in the medium did not lead to increase in somatic embryogenesis on anthers. This is in contrast with the results of Krasnyanski et al. (1992) and Trabace et al. (1995) who found that BAP in this concentration promotes somatic embryogenesis on calli induced on leaves of *H. giganteus* and calli regenerated from protoplasts of cultivated sunflower.

Both organogenesis and somatic embryogenesis were very poor on medium supplemented with PVP, which is in contrast with the results obtained by Zhong et al. (1995). Best results were obtained on the media supplemented with silver nitrate, which promoted both somatic embryogenesis and organogenesis. Positive effect of silver nitrate on regeneration and development of sunflower *in vitro* was observed by other authors (Chraibi et

al. 1991, Krasnyanski and Menczel 1993) and is thought to be the consequence of inhibition of ethylene activity by silver ions (Beyer 1976).

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