

ности фотосистем улучшенных индетерминантных форм гречихи за фазами развития гречихи в онтогенезе методом индукции флуоресценции хлорофилла.

Annotation. *The results perfectio of architectonics of plants of indeterminant forms of buckwheat are presented by the methods of index selection and their influence on forming of signs of the productivity and adaptivity. The change of level of activity of system to photosynthesis of the improved indeterminant forms of buckwheat is set after the phases of development of buckwheat in ontogenesis by the method of induction of fluorescence of chlorophyll.*

УДК 602.6:633.854.79

O.L. KLYACHENKO., Ph.D., head of ecobiotechnology and biodiversity department, National University of Life and Environmental Sciences of Ukraine
e-mail: Klyachenko@ukr.net

USING OF CELLULAR BREEDING FOR OBTAINING OF RESISTANT RAPE (BRASSICA NAPUS L.) LINES

Influence on body height callus tissues of rape osmotic and cold a stress was investigated. As reacting factors used PEG-6000, mannitol and low temperature. As a result of researches were selected drought- and coldresistant callus lines of rape and plants-regenerates from them are received.

INTRODUCTION

Rape as the source of alimentary oil and fodder protein takes the important place in the decision of a problem of a saturation of the market the foodstuffs. However, sorts of domestic selection which are raised on Ukraine I do not fully comply with requirements of effecting behind quality of oil and meal, and foreign - are poorly adapted to soil-climatic environments of Ukraine.

Resistance of plants - geneticaled caus attribute. But as he is potential shows only in environments of a stress. Therefore the success in making resistant sorts depends on presence of effective methods of diagnostics and sources of high resistance of a starting material for selection. The special interest for environments of Ukraine represents increase of resistance rape to unfavorable factors of environment, namely to a drought and low temperatures. For today works on cellular selection resistant against a drought and low temperatures of agricultural plants at a level callus, cellular suspensions and the whole plants [1-4] are known.

The purpose of our work was selection and reception callus lines of rape resistant against low temperatures and an osmotic stress.

MATERIALS AND METHODS

The object was the cellular suspension of various genotypes of rape. Tootain callus lines if sugar beet we used nutrient medium of Murasige-Scoog: 2,0 mg/1 NAA + 0,4 mg/1 BAP + 2,5 mg/1 of an ascorbic acid. Callus is received after 2-3 weeks of cultivation in diffused light on medium with 24-25°C temperature. Suspension crop was cultivated during 14 days in darkness, in liquid nutrient medium (2-3 g callus tissues in 60 ml of medium) at constant mixing on a shaker (90-100 rev/min) and temperature 25-26°C.

Research carried out under the circuit of classical selection. With the purpose of imitation in vitro effect of the deaquation accompanying a drought, was applied nutrient medium, which was supplemented osmotically active materials — polyethylene glycol PEG-6000 and mannitol [4, 6]. For reception of coldresistant plants callus tissue of rape was maintained at temperature +1°C during 6 hours. A survival rate callus ines was defined on an accretion callus tissue [7].

RESULTS AND DISCUSSION

On Ukraine the significant area of arable lands is placed in region of insufficient and unstable humidification. To lower risk of short-reception of production it is possible due to cultivation of drought-resistant sorts. Development of methods of selection of drought-resistant forms in culture in vitro an opportunity to carry out scale selections and tests of the best selection samples.

For studying influence of water deficiency on callus culture of rape in nutrient medium was brought PEG-6000 in concentrations of 5-25 % and 15- 20 % mannitol which represent osmotically awake materials not inpouring into a cell. Taking into account unequal ability of various genotypes to persist at introduction in structure of nutrient medium of osmotically awake materials, in the researches we used genetical various stuff - 23 genotypes (tab. 1).

As a result of the researches was established, that at selection of drought- resistant forms of rape behind a parameter of osmotic activity of an organism concentration PEG-6000 and 17 % mannitol is optimum 12 %.

Table 1

Influence of PEG-6000 and mannitol on an accretion of callus tissues of various sort rape

Sorts	Concentration in nutrient medium, %									
	Control with out PEG and mannitol	PEG 6000					Mannitol			
		5	9	12	16	20	12	15	17	20
Mariya	94,8	88,3	63,5	40,1	22,4	10,8	72,8	52,8	34,5	18,9
Oksamit	93,9	86,4	64,1	38,2	21,3	8,4	70,5	51,2	30,9	16,5
Aira	94,3	87,2	63,0	38,7	22,1	9,2	70,9	51,6	31,8	16,8
Otma	95,6	88,9	65,3	41,6	10,9	10,9	74,6	54,3	38,2	20,1
Sirius	96,1	89,2	67,2	42,0	11,0	11,0	75,3	53,9	37,4	20,3
Sriblyastyj	95,3	89,1	69,2	42,9	11,2	11,2	75,4	55,3	39,6	21,1
Zemirl	94,4	84,3	60,5	34,2	6,4	6,4	69,4	48,8	30,2	16,4
Likolli	92,9	88,0	66,4	36,8	6,8	6,8	70,8	50,7	33,8	17,8
Kwantum	94,8	87,5	62,5	35,7	6,3	6,3	71,3	49,6	31,6	16,9
Forte	97,3	83,6	55,6	31,8	5,2	5,2	67,4	45,4	27,9	14,1
Kosmol	96,5	85,9	60,2	32,9	5,3	5,3	70,2	47,3	28,4	15,3
Kawiar	90,4	86,3	64,1	33,4	5,5	5,5	71,9	50,2	30,1	16,8
Hajola	96,2	80,8	54,9	30,0	4,0	4,0	64,5	42,1	24,8	12,6
Lizone	92,8	88,5	61,8	32,4	3,9	3,9	69,3	45,8	25,9	13,2
Liga 1	95,3	84,4	57,7	28,6	3,5	3,5	66,7	44,5	24,4	12,1
Otaman	94,2	79,4	54,3	26,4	3,2	3,2	63,8	40,7	20,8	10,8
Arion	95,9	79,1	50,8	24,5	3,6	3,6	60,2	38,2	20,2	10,7
Titan	94,1	81,2	51,6	24,9	3,0	3,0	61,9	39,6	21,6	11,5
Iris	92,5	83,8	52,8	25,3	3,1	3,1	62,6	38,0	21,3	11,6
Mikitheschkiy	90,3	77,6	49,0	20,1	2,9	2,9	58,1	36,3	18,4	9,7
Kaliniivskiy	91,6	75,3	47,3	19,4	2,9	2,9	56,3	33,9	14,6	8,1
Shpat	91,9	70,2	44,6	18,2	2,6	2,6	50,9	30,1	13,0	8,1
Oredeg 2	92,8	69,7	42,1	18,0	2,8	2,8	49,1	29,4	11,5	6,6

The cause of a stress at plants was low temperature, it is especial concerns summer rape which due to difference of temperatures in the early spring very much freezes slightly. Receiving of initial selective material, resistant to extreme temperatures, is possible at use of methods of cellular selection. The cold stress caused plants the big temperature range: from 0 to +8°C. In the research-

es was used callus tissues was received from cotyledonous leaves and meristems of a callus of various genotypes summer rape. A degree cold damages was defined on an accretion callus tissues after refrigerating. Compared a degree cold damages of lines of the callus lines received from various explants, sustained at temperature +1°C during 6 hours. For this purpose was took explants with known weight (50 mg) from refrigerated and control callus, was placed them on nutrient medium and raised during 14-28 day then was weighed. Accretion of crude mass was expressed in percentage to the initial data. The highest cold constancy was marked at callus cultures received of cotyledonous leaves, and the lowest - at callus meristem parentages (tab. 2).

Table 2

Influence of 6-hour refrigerating at temperature +1°C on an accretion callus masses of summer rape a various parentage

Sort, explant	Masse after 14 days, mg		Masse after 28 days, mg		Accretion, %	
	control	refrigerating	control	refrigerating	control	refrigerating
Mariya cotyledonous leaves meristem	73,0±2,1	57,2±1,3	91,6±3,1	66,8±1,7	183,2±4,2	133,6±3,6
	76,2±2,3	53,1±1,1	92,7±1,7	60,41 ±2,3	185,4±3,7	120,8±2,8
Aira cotyledonous leaves meristem	78,1±3,1	59,3±1,4	95,8±3,4	71,6±3,3	191,6±4,0	143,2±3,8
	81,4±3,3	55,4±1,0	96,9±2,9	62,7±2,7	193,8±3,4	125,4±2,6
Kawiar cotyledonous leaves meristem	62,3±2,2	48,7±0,9	80,5±2,5	66,5±1,6	161,4±4,4	113,0±1,8
	66,1±2,4	47,1±0,8	83,2±2,7	52,9±1,8	166,4±4,2	105,8±2,4
Kosmol cotyledonous leaves meristem	60,5±1,9	47,3±1,2	79,4±1,8	58,1±2,9	158,8±4,7	116,2±3,2
	63,4±2,1	45,4±1,9	82,6±3,5	82,6±3,5	165,2±4,5	104,0±2,7
Likolli Cotyledonous leaves meristem	75,8±2,5	59,5±2,6	94,0±4,1	70,8±3,8	188,0±4,9	141,6±3,7
	80,3±2,8	52,4±2,3	98,6±3,9	60,9±3,6	197,2±4,5	121,8±2,5

Definition of an accretion callus after refrigerating enables to make the assumption of duration of conservation of unfavorable influence of the lowered temperatures on body height of cells. As a result of researches were selected frigostable callus lines of sorts summer rape Aira, Likolli and plants-regenerates which was used as a valuable starting material at receiving frigostable sorts rape are received from them.

REFERENCES

1. V. A. Sidorov: Biotechnology of plants. Cells selection. Kiev, 1990.280 c.
2. R.A. Bressan, P.M. Hasegana, A.K. Handa: Plant Sci Lett., (21), 23 (1981).
3. J.W. Heyser, M.W. Nabors: Plant Physiol., (63), 63 (1979).
4. A.S. Lukatkin: News AS., (3), 304 (1998).
5. R. H. Smith, S. Bhascaran, F. R. Miller: In vitro Cel. And Dev. Biol., 21 (10), 541 (1985).
6. C. T. Harms, J. J. Oertli: Plant Physiol., (12), 29 (1985).
7. L. A. Kucherenko, R. P. Maddumage, J. L. Gugkov: Agricultural biology. (3), 84 (1991).