International Journal of Engineering& Scientific Research
Vol.5 Issue 4, April 2017,
ISSN: 2347-6532 Impact Factor: 6.660
JournalHomepage:http://www.ijmra.us,Email:editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

THE RESULTS OF CLONAL SELECTION IN ORANGES, THE PECULIARITIES OF THE FORMATION OF THE FORM AND THEIR SIGNIFICANCE IN THE ALTERNATION OF THE VARIETIE

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Abstract

The diverse results of study of the clonal selection and the morphogenesis has been described in this article. The new clones of Washington Navel orange,distinguished with useful agricultural features, were studied and selected. The role of the pollenizer on the fruit-set and the productivity was ascertained. The effective doses of the certain mutagens was established for the first time for obtaining the morphologically altered forms of oranges.

Keywords: Race;Form;Clone;Productivity.

1. Introduction

Citriculture is the one of the major and profitable branch of the subtropical farming of the west Georgia. The genus citrus orange is widespread and the oldest species among the citruses. Washington Navel orange takes the first place in the world due to fruits production of Aurantioideae. The materials, obtained by Prof. N. Beridze in 2001 in USA, are presented to confirm this fact. Markets of USAare provided with 80 percent of Washington Navel oranges and the processing industry by the farmings of Citriculture.

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Fruits have got a lot of useful properties such as acidity (1.2%), sugar (10-15%) and a pleasant aroma. Orange fruits are characterized with the high storage capacity and portability.It is notable that citruses, especially oranges have got the ability of polymorphism. They easily comply with the artificial mutagenesis resulting in the new clones and forms. We have determined that the selected pollenizer has a great influence on the process of fruit inception, which consequently increases the yield.

2. Research Method

The studies were conducted on the various varieties of oranges. The aim ofour study was:

1. The selection of new perspective clones of Washington-Navel by conducting known method as the result of studying the plant biomorphological and precious agricultural characteristics;
2. to study the influence of pollen-grain of seperate species of citruses on the ability of fruit inception and select a better pollenizer
3. To study the morphological variation of the obtained mutants by influencing the chemical mutagenes such as nitrosomethyl urea and ethyl nitroso urea on the seeds obtained from the labeling hybridization.

The selection od clones of Washington Navel and experimental observations were carried out in the eqperimental and industrial plots.

The labeling hybridization was carried out in the collective plot of Aurantioideae of the Batumi Botanical Garden of Georgian national academy of science.

3. Results and Analysis

17 clones were chosen from 950 plants of Washington Navel by us in the experimental plot of Natanebi as results of long-term studies. № 487, №448, №421 were the best among them. Five best form № 1110, №1101, №1003, №1004, №1007 were selected among 1355 tested plants in the area of Kobuleti and Khelvachauri (the study was conducted in 2002-2008). These forms are characterised by high productivity, good quality of fruits, early-maturing and high-capacity of storage in comparison with the control variety. Plants are relatively resistant to frost and winter. The fruits have good biochemical measurements (Table №1).

It was firstly ascertained that the pollination of Citrus grandis L. Osbeck causes the formation offruits without seeds in Washington Navel oranges. The seeds also have xenia which are big in terms of size and weight.

It is estimated that the average number of embryos depends on the size of the seed due to the pollinators. The number of embryos obtained by pollinating Pompelmus with pollen are 2.5 times more in large seeds than in the seeds obtained by pollinating the local orange with pollens. As a result of the experiments, the cross-pollination of Washington Navel, Pompelmus and the local oranges increases their ability of fruit inception. Parthenocarpy of Washington Navel does not influence the fruit inception

The lifetime of flower depends on the flower shoots, its location and the meteorological conditions during the flowering period. The lifetime of an apical flower is 3-6 days shorter than the life of flowers, arranged along the length of the shoots.

Researcher N. Beridze argues that chemical mutagens cause changes in the seasonal development of the biological cycle in young plants, contributing to the acceleration of growth of shoot (2).

Academician I. Rapoport and others found that the stimulation of physiological processes of some mutagens occured not only in the low and medium doses but sometimes at the level of high doses(3).

As the result of the study of induced mutation it was revealed that the effect of various doses of nitroso methyl urea and nitroso ethyl urea on three varieties of orange seeds stimulates the development of additional seed embryo, intensive germination and intense vitality of mutants. The action of mutagens also impedes the natural process of chlorophyll mutation. A relatively large frequency of morphological mutations formed by the influence with 1 % of concentration of the solution of НЭМ mutagens for 24 hours and also with 0,5 % of concentration of the solution of HMM mutagens for 24 and 48.The morphologically altered mutant forms were obtained which are the interesting materials for selection work.

Table №1

The quantitative indicators of the distinctive form of Washington navel orange

Form №	Frost resistance (Mark)	The fruit maturation (by 5 November -Mark)	The crop of one plant - The quantity of fruit (one fruit)	Degustation evaluation (garden)	The index of sugar - acidity
1	2	3	4	5	6
Control	1	2,75	121	77,8 ± 2,4	5,5
500	1	4,00	150	83,6 ±3,2	6,6
497	1	4,00	157	85,5 ±3,4	6,3
488	1	3,00	163	80,1 ± 3,0	6,1
487	0	4,85	227	94,4 ± 2,8	6,7
486	0	4,50	190	83,4 ± 2,8	6,3
484	1	4,13	165	87,7 ± 3,0	6,2
482	0	4,40	154	88,0 ± 3,6	5,8
481	1	3,13	160	75,5 ± 2,8	6,4
479	1	3,63	161	80,4 ± 3,2	6,8
448	0	4,50	218	92,0 ± 3,4	5,8
431	0	3,75	151	85,5 ±2,6	6,5
421	0	4,80	221	85,5 ± 2,6	6,8
416	0	4,30	171	81,0 ± 2,4	6,5
412	0	3,75	165	80,4 ± 2,8	6,3
Khelvachauri and Kobuleti Districts					
Control	1	2,80	141	77,7 ± 2,3	5,6
955	1	3,40	228	80,2 ± 3,0	6,5
960	1	4,40	220	85,2 ± 2,8	6,6
1000	0	4,60	240	81,0 ± 2,4	6,5
1101	0	4,80	252	85,5 ± 2,6	6,7
1102	0,5	4,70	265	80,3 ± 2,4	6,6
1103	0	4,50	268	80,9 ± 3,5	6,8
1104	0	4,80	271	82,4 ± 3,1	6,7
1105	0,5	4,30	233	80,1 ± 2,6	6,2
1106	0	4,50	270	78,1 ± 1,9	6,8
1107	0	4,65	259	80,1 ± 2,6	6,0
1110	0	4,75	282	78,1 ± 1,9	6,4
1111	0,5	4,00	222	80,1 ± 2,4	6,3

4. Conclusion

1. The clone 33 of Washington Navel orange is characterized by agricultural and bio-morphological characteristics. Clones № 487, 421, 1110, 1101, 1103, 1104 are the interesting forms for farming households. Clone №487 titled "Kolektiuri" is characterized by producing the high-quality fruits. It is productive 2-2.5 times than the control plant, the fruit ripens 12-14 days earlier and it has got a relatively thin skin and the small size of the navel.It was adopted for the variety testing by the State Commission of Georgia.
2. The planting of the local orange plants and pommelo as the pollinators in the plantation of Hamlin and Washington Navel orange promotes the increase by 12-14 % of the fruit inception;
3. The lifetime of flower depends on the flower shoots, its location and the meteorological conditions during the flowering period. The lifetime of an apical flower is 3-6 days shorter than the life of flowers, arranged along the length of the shoots;
4. The effect of chemical mutagens, with 1%, 0.5% and 0.25% of concentrated solution of appropriate doses and with the exposure for 24-48-hour during the seeds processing, is specific for oranges. They have a high rate of formation of morphological mutations that are good starting material for the selection.

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