

PERSPECTIVES FOR CULTIVATION OF ACORUS CALAMUS L. IN ARMENIA

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Recently in scientific studies appeared some controversial information concerning the cancerogenic characteristics of this plant. Particularly it refers to poliploid forms of *Acorus calamus*, essential oils of which contain azaron. Despite of this kind of information, the interest toward study of the plant is not reducing. In many countries of the world the plant is still used in medicine [12,13]. The populations of *Acorus calamus* in Armenia are not abundant and the species are included into the Red Book of Armenia [14]. Taking into consideration above mentioned, the current study was undertaken to find out perspectives of plantational cultivation of *Acorus calamus* in conditions of Ararat valley and specifics of its cultivation.

Material and Methods

For the given research some examples of *Acorus calamus* were collected from neighborhood of the villages Mshchian, Artashat region, Tsakhkunk, Echmiadzin region, etc. as well as examples from the collection of Armenian National Botanical Garden. Selected representatives from different regions were planted on the territory of the Armenian National Botanical Garden. The study included air-dried rhizome, roots, leaves and spadixes of *Acorus calamus* (only rhizomes are considered as pharmacopoeial substance). For the study were used spadixes of *Acorus calamus* chosen in 1996 from the collection of Armenian National Botanical Garden.

In the process of drying the weight loss of rhizomes reached 30%, in roots – 27, in leaves – 24 and in spadixes – 40%.

Quantitative content of the essential oils in upper and underground parts of *Acorus calamus* were calculated in accordance with appropriate requirements of State Pharmacopoeia [1], method 2b (distillation with water steam).

Study of chromosome content of *Acorus calamus* was conducted on metaphase plates of the root plats of alive plants. Procuring was done in 0,4% liq-

uid of kolchicine for 2 hours. The preparations were worked out by methods of E. Battaglia [4].

Results and Discussion

Acorus calamus from cariological point of view is relatively well studied. The following numbers of chromosomes are characteristic for this plant (4-11): $2n = 18; 24; 36; 44; 45; 48$. Taking into consideration that basic number $X = 6$, it was revealed the population line of $3x; 4x; 6x; 8x$ and aneuploid members $2n = 44; 45$.

The results of cariological study showed that Armenian populations of this plant are aneuploid. The content of chromosomes in Armenian populations is following: $2n = 33-34$. Unbalanced content of chromosomes lead to disorders in division and appearance of anomalous cells. Morphologically the chromosomes of *Acorus calamus* are small (less than 1μ).

The quantity of essential oils obtained from upper parts of *Acorus calamus* appears to be in direct correlation with the size and type of phytomers (Fig. 1).

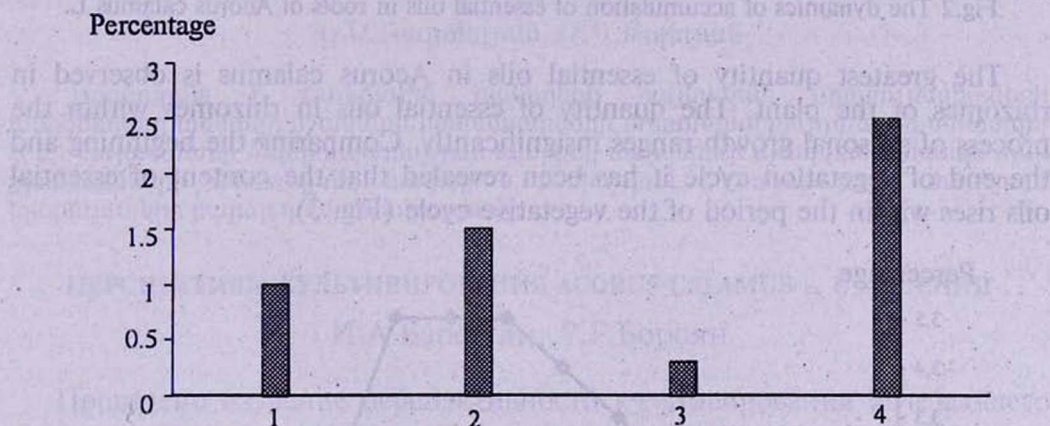


Fig.1 Quantitative correlation of essential oils in upper parts of *Acorus calamus* L. 1- scales; 2- catophils; 3-pellicle appearances; 4- folium.

It was revealed that the lowest content of essential oils, approximately 0.3%, was obtained from membrane parts of mixed buds and maximum — from assimilative phytomers, which contain up to 2.5% of essential oils. The quantitative content of essential oils of Armenian population of *Acorus calamus* undergoes changes within the process of seasonal growth. The content of essential oils in leaves reaches maximum in May and stays so until the end of vegetation season.

The quantitative content of essential oils in roots of *Acorus calamus* in the process of seasonal growth, after appearance of supplementary roots does not change. The start of the vegetative cycle (April - May) can be characterized by

a lower content of essential oils in comparison with the end of the season (September - October) when it reaches 2,5% (Fig. 2).

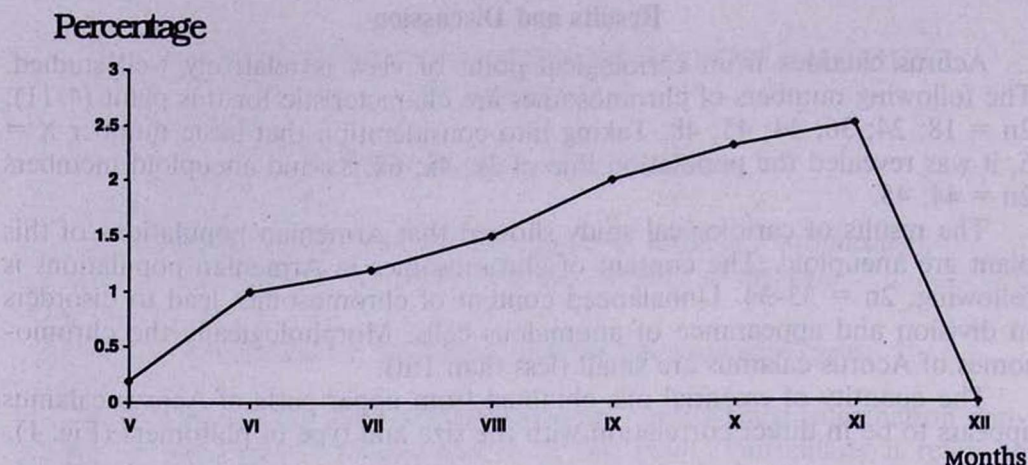


Fig.2 The dynamics of accumulation of essential oils in roots of *Acorus calamus* L.

The greatest quantity of essential oils in *Acorus calamus* is observed in rhizomes of the plant. The quantity of essential oils in rhizomes within the process of seasonal growth ranges insignificantly. Comparing the beginning and the end of vegetation cycle it has been revealed that the content of essential oils rises within the period of the vegetative cycle (Fig. 3).

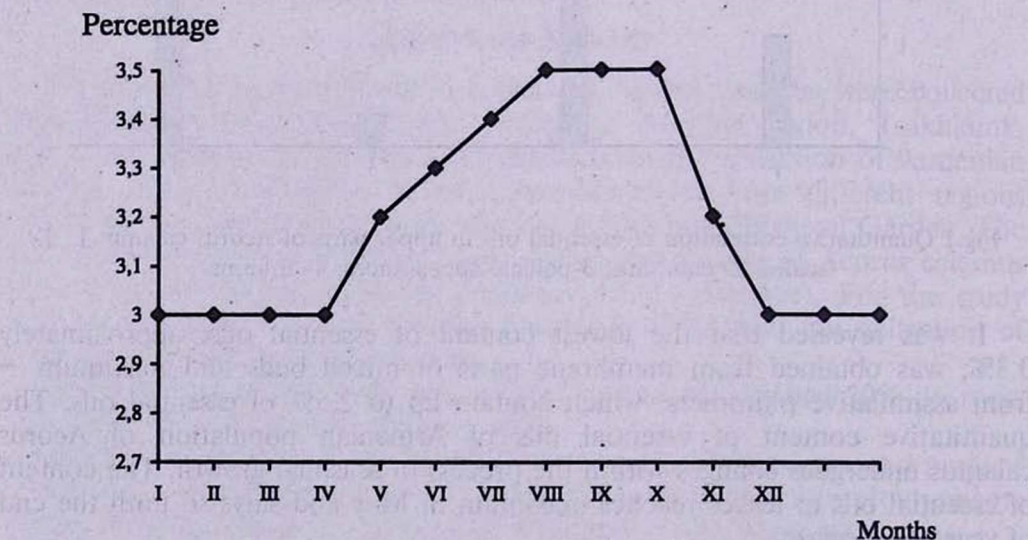


Fig.3 The dynamics of accumulation of essential oils in rhizomes of *Acorus calamus* L.

The concentration of ether oil in different organs of the aneuploid forms of *Acorus calamus* L.

Organ	Period of vegetation	Ether oil content (%)
Rhizome	the beginning of vegetation	5,3
Root	flowering	2,5
Folium	the beginning of vegetation	2,5
Spadix	flowering	1,5

The maximal quantities of essential oils were observed in the middle of July and the minimal – in the middle of May. In the table the content of essential oils in different parts of Armenian population of *Acorus calamus* is presented.

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ACORUS CALAMUS L. – Ի ՄԵԿԿՄԱՆ ՀԵՌԱՆԿԱՐՆԵՐԸ ՀԱՅԱՍՏԱՆՈՒՄ

Ն.Ա.Բարսեղյան, Ռ.Դ.Բորոյան

Կատարվել է ճահճային խնկեղեգի հայկական պոպուլյացիաների անհետացող տեսակի մշակման հեռանկարների ուսումնասիրություն: Հաստատվել է, որ Հայաստանի Հանրապետության տարբեր մարզերում մշակված տեսակն ունի քրոմոսոմների անեուպլոիդ հավաք և բնորոշվում է բույսի բոլոր մասերում էթերայուղերի բարձր պարունակությամբ:

ПЕРСПЕКТИВЫ КУЛЬТИВИРОВАНИЯ ACORUS CALAMUS L. В АРМЕНИИ

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Проведено изучение перспективности культивирования исчезающего вида аира болотного (*Acorus calamus* L.) армянских популяций. Установлено, что культивируемый вид, выращенный в различных регионах Республики Армения, имеет анеуплоидный набор хромосом и отличается высоким содержанием эфирного масла во всех частях растения.

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