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DYNAMICS OF THE DEVELOPMENT OF WORLD SCIENCE



**ABSTRACTS OF X INTERNATIONAL
SCIENTIFIC AND PRACTICAL CONFERENCE
JUNE 10-12, 2020**

**VANCOUVER
2020**

DYNAMICS OF THE DEVELOPMENT OF WORLD SCIENCE

Abstracts of X International Scientific and Practical Conference

Vancouver, Canada

10-12 June 2020

Vancouver, Canada

2020

UDC 001.1

The 10th International scientific and practical conference “Dynamics of the development of world science” (June 10-12, 2020) Perfect Publishing, Vancouver, Canada. 2020. 848 p.

ISBN 978-1-4879-3791-1

The recommended citation for this publication is:

Ivanov I. Analysis of the phaunistic composition of Ukraine // Dynamics of the development of world science. Abstracts of the 10th International scientific and practical conference. Perfect Publishing, Vancouver, Canada. 2020. Pp. 21-27. URL: <http://sci-conf.com.ua>.

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TABLE OF CONTENTS

1.	<i>Aliksieienko I., Leyko A.</i>	14
	ORGANIZATION OF STAFF SUPPORT FOR NEW STRUCTURAL DIVISIONS OF THE TRANSPORT COMPANY.	
2.	<i>Almazova O., Lysychenko M.</i>	21
	COHERENT AND MONOCHROMATIC IRRADIATION CHANGES THE ERYTHROCYTE HEMOLYSIS TIME AND THE SPEED OF THE ION COUNTER TRANSPORT THROUGH THE ERYTHROCYTE MEMBRANE.	
3.	<i>Babaev M. Sh., Huseynova N. T., Mamedova R. F.</i>	28
	RESEARCH OF OPTIMAL OPTIONS FOR EXTRACTION OF DUBILE SUBSTANCES OF TIMYAN CRAWLING IN THE FLORA OF AZERBAIJAN.	
4.	<i>Bibichenko V., Valentieva A., Fadieieva A.</i>	36
	HORMONAL MECHANISMS OF DEVELOPMENT OF PSEUDOGERMAPHRODITISM IN WOMEN.	
5.	<i>Brovko O.</i>	38
	THE CURRENT PROBLEMS OF YOUTH EMPLOYMENT IN THE LABOR MARKET OF UKRAINE.	
6.	<i>Cherniak Ye., Yorkin V.</i>	47
	«THE MAIN ISSUES OF THE DEVELOPMENT OF MUSICAL AND AUDITORY IMAGES OF PUPILS-MUSICIANS OF PRIMARY SCHOOL AGE».	
7.	<i>Daniyarov A. A., Kurbanbekova D. S.</i>	50
	STUDY THE EFFECTIVENESS OF THE MEDICAMENTOUS METHOD OF TERMINATION OF PREGNANCY IN WOMEN IN RURAL AREAS OF TASHKENT REGION.	
8.	<i>Datsko T., Kachmar N., Panasiuk R.</i>	54
	ANALYSIS OF THE POSSIBILITIES FOR THE SPREAD OF THE SPANISH SLUG DUE TO ITS AUTECOLOGICAL PECULIARITIES.	
9.	<i>Dekhtyar N.</i>	60
	THEORY OF ECONOMIC CYCLES IN FORECASTING THE ACTIVITY OF THE TOURISM INDUSTRY IN UKRAINE.	
10.	<i>Hruzevskiy O.</i>	71
	BACTERIAL DYSBIOSIS AS VAGINAL NORMOBIOTA INDICATOR.	
11.	<i>Kamilova I. A., Kobiljonova M.</i>	73
	PROGNOSIS OF CERVICAL INTRAEPITHELIAL NEOPLASIA IN WOMEN.	
12.	<i>Kvasova L. S., Tisagdio I. Yu.</i>	79
	STRATEGIC WAYS OF ORGANIZATION DEVELOPMENT.	

13.	<i>Khokhlov A. V., Khokhlova L. I.</i> BIOSORPTION COMPLEXES OF HIGH DESTRUCTIVE ACTIVITY FOR CLEANING SANDS FROM OIL.	87
14.	<i>Klepinina V. Y., Chaichenko N. L.</i> SPORT IS ONE OF THE WAY TO SUCCEED IN LIFE.	92
15.	<i>Listopadova V., Solomianiuk D.</i> METHODS OF PROCESSING THE RESULTS OF BALANCE TESTS OF THE COOLING TOWER.	98
16.	<i>Loiko V., Pozdieieva K.</i> SCHOOL EDUCATION FINANCING SYSTEM OF UKRAINE.	106
17.	<i>Lykhochvor V. V., Andrushko M. O., Andrushko O. M.</i> SYMBIOTIC ACTIVITY OF PEAS (PISUM SATIVUM) DEPENDING ON THE FERTILIZER SYSTEM.	112
18.	<i>Marzec-Jóźwicka M.</i> COMPETENCES OF A POLISH LANGUAGE TEACHER IN A CONTEMPORARY SCHOOL. SELECTED ISSUES.	120
19.	<i>Makhlynets N., Krasii M., Plaviuk L., Makhlynets M., Makhlynets P., Makhlynets P.</i> COMPLEX TREATMENT OF PATIENTS WITH GENERALIZED PERIODONTITIS.	127
20.	<i>Matorina K.</i> POTENTIOMETRIC SENSORS, WHICH ARE SELECTIVE FOR VITAMIN B ₁ .	136
21.	<i>Mustafayeva K. A., Bayramov E. E., Nabiyev A. A.</i> THE STUDY OF THE INFLUENCE OF LENTIL FLOUR OF THE ARZU VARIETY ON THE APPEARANCE OF BREAD PREPARED FROM FLOUR OF THE WHEAT VARIETY AZAMATLI-95.	145
22.	<i>Obushenko T., Tolstopalova N., Chyrieva M., Svirska S.</i> SOLVENT SUBLATION FOR OIL-FIELD PRODUCED WATER TREATMENT.	152
23.	<i>Olshevska O. V., Olshevskiy V. S., Husiev V. M.</i> TO THE QUESTIONS ABOUT STIMULS FOR SELF- PERFECTION AND WAYS OF IMPLEMENTATION OF EDUCATIONAL AND TREATMENT ACTIVITIES OF STUDENTS AT MEDICAL UNIVERSITIES.	156
24.	<i>Overchuk V.</i> PECULIARITIES OF PSYCHOLOGICAL BULLYING AMONG TEENAGE GIRLS.	162
25.	<i>Podolska O., Bogomolova K.</i> COMPETITIVENESS OF SMALL BUSINESSES IN A GLOBAL THREAT.	166
26.	<i>Savchenko-Pererva M. Yu., Radchuk O. V.</i> PRODUCTION AND CONSUMPTION OF MEAT PRODUCTS IN UKRAINE, THE WORLD'S LEADING COUNTRIES, TRENDS.	171

27.	Shcherbak V., Savchuk N. INCREASING THE EFFICIENCY OF SMALL AND MEDIUM-SIZED BUSINESSES WITH BENCHMARKING TOOLS.	178
28.	Sokolenko M. O., Sokolenko L. S., Sokolenko A. A., Andrushchak M. O. FORMATION OF A CULTURE OF A HEALTHY LIFESTYLE IN THE PROCESS OF TRAINING FUTURE PROFESSIONALS AT THE PRESENT STAGE.	184
29.	Tarasiuk N. COMMUNICATIVE APPROACH IN TEACHING ENGLISH.	191
30.	Tsykhanovska I., Tovma L., Vorobiov S., Kupriienko Yu. DEVELOPMENT OF THE WHITE-PINK MARSHMALLOW FORMULAS WITH USING OF "MAGNETOFOOD" FOOD ADDITIVE.	194
31.	Trach O. MORPHOMETRIC PARAMETERS OF THE WIDTH OF THE BRAIN'S OCCIPITAL LOBES.	202
32.	Voitovska V., Tretiakova S., Storozhyk L., Kononenko L. BOTANICAL AND MORPHOLOGICAL FEATURES AND SIGNIFICANCE OF THE CRAMBE ABYSSINICA.	209
33.	Zamikhovsky L. M., Ivanyuk N. I., Mirzoieva O. Yu., Pavlyk V. V. A COMPLEX APPROACH TO THE DEVELOPMENT OF METHODS OF CONTROL AND DIAGNOSIS OF THE TECHNICAL CONDITION OF GAS PUMPING UNITS.	215
34.	Андрух С. Л., Галушка С. А. МЕТОДИ ВИЗНАЧЕННЯ ФІЗИКО-МЕХАНІЧНИХ ВЛАСТИВОСТЕЙ КЛАДКИ.	225
35.	Ахмедов А. Н. ИССЛЕДОВАНИЕ ИЗМЕНЕНИЯ В ПРОЦЕССЕ ХРАНЕНИЯ СЕМЯН ХЛОПЧАТНИКА.	231
36.	Барсукова Г. В., Мікуліна М. О. АКТУАЛЬНЕ ЗАСТОСУВАННЯ ВІДХОДІВ РОСЛИННОГО ПОХОДЖЕННЯ В ЕНЕРГЕТИЦІ УКРАЇНИ.	235
37.	Бодра Ю. А., Суконна Н. Г. УПРАВЛІННЯ ОРГАНІЗАЦІЙНИМИ ЗМІНАМИ В СУЧАСНИХ УМОВАХ.	238
38.	Бондаренко М. В., Давидов П. Г. ЕТИЧНІ ТА ПРАВОВІ АСПЕКТИ КОРЕКЦІЇ СТАТІ.	244
39.	Бондаренко Н. М. ЕКОНОМІЧНА СУТНІСТЬ ПОДАТКУ НА ДОДАНУ ВАРТІСТЬ ЯК УНІВЕРСАЛЬНОГО АКЦИЗУ.	252
40.	Бурбело О. А., Патріарх Т. В., Бурбело С. О. ПРОТИКРИЗОВЕ УПРАВЛІННЯ ТА ТЕОРІЯ КОНВЕРГЕНЦІЇ.	259

UDC 633.85

**BOTANICAL AND MORPHOLOGICAL FEATURES AND SIGNIFICANCE
OF THE CRAMBE ABYSSINICA**

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Abstract. Based on the study of literature data, the morphological and biological features of different types of crambe, the area of its distribution and use in numerous industries are analyzing.

Key words: crambe, species composition, morphology, distribution, use.

Introduction. Currently, crambe is studying and grown in many countries (Sweden, Poland, Germany, Bulgaria, Ireland, Canada, USA, Denmark, Japan, China, etc.). Numerous tests have shown the great economic importance of this culture with its

multifaceted use. For example, in Ireland, crambe oil is using to increase the tack of rubber and for the preparation of plastic films. In the United States, it is using to produce plastics, resins, synthetic fibers and lubricants [2].

Crambe abyssinica or Abyssinian mustard (*Crambe abyssinica* Hochst.) Belongs to the genus *Crambe* (another name - *Katran*), a family of cabbage (*Brassicaceae*). The genus *Katran* has about 29 species and is representing by annual, biennial, perennial plants or shrubs [1]. The most famous of them:

Coastal tar (*C. maritima* L.) or, in other words, sea kale - a perennial plant that grows slowly and by the end of the first year of the growing season gives only 3-4 leaves. It blooms in the second or third year. Its fruits are large. The seeds of sea tar contain up to 47% fat. Its etiolated shoots can used in food, such as asparagus. To this end, it is cultivated in America. In the Caucasus, its leaves are eating boiled.

Tatar tar (*C. tatarica* Sebeok), a perennial vegetable plant (eaten raw leaves and young shoots). Tatar tar blooms in the second or third year.

Kochi tar (*C. Kotschyana*) is a perennial valuable fodder, honey-bearing, starch-containing plant. *Crambe Kochi* develops a strong root system, drought-resistant, but grows slowly and is damaging by insects. Studies have shown that this type of crambe is of interest as a new starch-containing culture for the desert area. Perennial roots contain from 38.4 to 58.4% of starch and sugars [1, 2].

Tar cordifolia is a perennial winter plant used for green fodder, silage, and grass meal. The nature of growth is bushy, unstable, the shoots fall on each other. Height 140-200 cm. The underground part is representing by a fleshy taproot. Quite a few types of crambe belong to the annual, among them and include crambe Abyssinian and crambe Spanish.

Crambe Spanish (*C. hispanica* L.) is an annual plant up to 80 cm tall. Its stems are solitary or at the base, densely pubescent with stiff prickly hairs. Spanish is more precocious than crambe Abyssinian. Its big disadvantage is the scattering, which significantly prevents its advancement in the field [1].

Crambe Abyssinian (*C. abyssinica* Hochst.) Is an annual herbaceous plant. It is founding in the wild in the North African steppe region of the Abyssinian Highlands

at an altitude of 1900 m above sea level. Grows as a weed under trees and in cultivated fields, usually alone.

Crambe species are less common: pinnate tar (*C. pinnatifida* R. Br.); Litvinov's tar (*Crambe litwinowi* Gross.); Koktebel tar (*C. koktebelica* (Lunge) N. Busch) [1, 3].

Morphological studies of crambe plants indicate that they have a taproot capable of penetrating the soil for more than 1 m. The thickened part of the root is relatively short (25 cm), then the root branches into small roots. The crambe stem can reach a height of 1.0-1.5 m. However, this figure depends on the cultivation techniques and meteorological conditions. In years with wet summers, the height of plants is greater than in dry years [4].

Crambe seedlings resemble seedlings of many other plants of mustard, radish, canola, etc., when germinating seeds crambe makes cotyledons on the soil surface, forming the first pair of pubescent cotyledon leaves

The first true leaves appear on the third - fourth day from the beginning of germination. The first three true leaves have a rounded shape, the subsequent leaves are pinnately dissected and strongly developed upper lobe ovate, the two lower lateral lobes are small. The upper leaves are ovate, small, with long, up to 15 cm petioles, at the top of the stem leaves - linear, sessile. On the stem, the leaves are arranging in a spiral. Petiole of lower leaves from 2.0 to 5.5 cm long, glabrous or slightly pubescent. By the end of flowering leaves in the trunk begins to fall, and by mid-ripening they do not remain at all. In wet years, the leaves are stored until the end of ripening, there is even re-branching and flowering [1, 5].

Inflorescence - loose brush. The flowers are small, with four white petals. Sepals up to 2 mm long, corolla petals slightly larger - from 2.5 to 3.5 mm; stamens in flowers reach 2.0 - 3.5 mm in length; anthers 0.75 mm long, internal stamens have a tooth 0.25 - 0.50 mm long [6]. The fruit is a single nut (abbreviated pod). Fruit diameter from 1.0 to 4.5 mm. The fruits sit on long (1.3 - 1.5 cm) peduncles. The color of the fruit is straw yellow. The weight of 1000 pieces of seeds varies from 4.42 to 6.50 g, fruits - 6.8 to 11.0 g. Inside the fruit is a seed that has a spherical shape. The diameter of the seeds varies from 1.8 to 2.5 mm. The color of the seeds is greenish-brown or

brown. The seed coat is very thin. The lower fruits, which are forming earlier, are larger; fruits that sit on the ends of flowering shoots, much smaller than others flower. On one crambe plant, the average bone is from 500 to 3500 fruits. In some years, there were up to 4,000-5,000 crambe fruits on individual plants. Seed oil content is 34-53% [1, 7, and 8].

Attention to crambe is growing rapidly today, because it is not a whimsical and oil crop of multifaceted use, mainly due to the presence in the seeds of high amounts of low-drying oil with low iodine value (93 - 97) and high erucic acid content (up to 60%). Crambe products are widely used in the food and confectionery industry. The oil itself is light, easily refined and its nutritional qualities resemble white mustard oil. The bitterness in the oil is not felting. As a technical, crambe oil is using in the chemical and paint industries. Crambe oil is using, for example, to increase the tack of rubber and for the preparation of plastic films, as well as for plastics, resins, synthetic fibers and lubricants and as a liquid coolant, coatings and drying oils in the production of plastics, nylon [9 - 13].

With the rapid development of the bioenergy direction, a new promising direction of the use of crambe oil - to obtain environmentally friendly renewable fuel - biodiesel, due to the high content of erucic acid, which has a high heat of combustion up to 38.3 MJ / kg.

The rich composition of Abyssinian mustard oil is widely used in the cosmetics industry. Of particular value is the presence of erucic acid, which belongs to the class of omega - 9: it is introducing into the composition of moisturizing and nourishing creams for face and body. It is very light in its structure, without clogging the pores and leaving no greasy shine, moisturizes.

Abyssinian mustard (or crambe) is a green, herbaceous annual plant. Of particular value are the seeds, being the main source of useful oil in the process of mechanical extraction.

Due to its unique molecular structure and high content of fatty acids, the oil is extremely resistant to oxidative processes. Such as: erucic acid (up to 60%), oleic acid (up to 15%), arachidonic acid (up to 10%), linoleic acid (up to 11%), gadoleic

acid (up to 5.5%), linolenic acid (up to 9%), eicosenic acid (up to 3%), palmitic and behenic acid (up to 2%), stearic acid (up to 1%).

By-products - crambe cake is using as an additive in livestock feed as a component of feed, it contains up to 40% protein and up to 35% carbohydrates. It can using as a fertilizer. A special kind of halva is making from crambe cake and meal.

It is also possible to use aboveground mass, which is a good feed for animals, and since it has a high yield of green mass up to 2.0 - 2.1 t / ha, it can be used for haylage and silage, and can also be used as a green crop [1, 15].

Crambe Abyssinian high yielding, undemanding to soils, drought-resistant culture, with a short growing season. The value of crambe is determined by high seed yield (up to 3.0 t / ha), high oil content in the seeds (up to 46%), quality oil composition and adaptability to agro climatic conditions [1].

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