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МУНДАРИЖА

Биология

Абдусаматов С., Давранов Қ. Буғдой сомонини қайта ишлаш орқали озуқа оқсили тайёрлаш.....
Аманбоева Р., Тўраев О., Кушанов Ф. ДНК-баркодлаш технологияси асосида ғўза навларининг генетик паспортини ишлаб чиқиш.....
Амантурдиев И., Бобоев С., Намазов Ш. Влияние жмыха хлопчатника с различным уровнем(+)-Госсипола на биохимические показатели тушек бройлеров.....
Баев А., Небесная К., Хасанов Ф., Абрамов А. Влияние Альфа-Синуклеина на кальциевую буферную ёмкость митохондрий – связь с патогенезом болезни Паркинсона.....
Боймуродов Х., Бобомуродов З. Сангзор дарёси икки паллали моллюскалари фаунаси биологик хилма-хиллиги.....
Хажиев М., Боймуродов Х., Суяров С. Зарафшон дарёси қуйи оқими каналлари икки паллали моллюскалари фаунаси ва экологик гуруҳлари.....
Dadayev S., Saparov K. Organik olamning hozirgi zamon sistemasi haqida.....
Дусмуратова Ф., Фахриддинова Д., Аллабердиев Р. Тошкент ботаника боғи шароитида ясноткагулдошлар оиласи айрим турларининг биологиясини ўрганиш.....
Еттибоева Л., Абдурахмонова Ў., Матчанов О., Кушиев Х., Кулиев Т. Глицирризин кислотаси ва унинг моноаммонийли тузининг ментол билан супрамолекуляр комплексларини олиш ҳамда уларнинг буғдой (*TRITICUM AESTIVUM L*)нинг униш кўрсаткичларига таъсири.....
Жабборов О. Жиззах вилояти тупроқларининг шўрланиш ҳолати ва унинг динамикаси.....
Зиядов Ш., Аллабердиев Ш., Жабборов З. Турли экологик шароитлардаги ҳудудларда тарқалган суғориладиган тупроқларнинг экологик-мелиоратив, агрокимёвий ва физикавий хоссаларининг илмий таҳлили.....
Ильясова Г., Матчанов А. Анализ состояния внешнего дыхания у подростков, проживающих в экологических условиях республики Каракалпакстан.....
Имамхаджаева А., Рузибаев Х., Курбонов А., Муҳаммадов Й., Кадырова Ш. Верификация популяции биотехнологического сорта хлопчатника на геномы, свободные от селективного маркерного гена.....
Исмонов А., Қаландаров Н., Мамажонова У. Туркистон тоғ тизмаси шимолий қисми тоғ олди ҳудудлари суғориладиган тупроқларида гумус ва озиқа моддаларнинг тарқалиши.....
Kamalova M., Alikarieva D., Adilova D. Biomorphological features of chaenomeles maulei (mast.) in the conditions of the botanical garden.....
Курбанова Н., Исраилов Р., Сиддиков Д., Алимова М. Влияние растительных препаратов на морфологии печени при её остром токсическом поражении.....
Кучкаров Н. *INULA HELENIUM L.* баргининг анатомик тузилиши.....
Кучкарова Л., Рохимова Ш., Сыров В. Аллоксан диабетда туркестерон ва мининилларнинг айрим қон кўрсатгичларига таъсири.....
Рамазонов Б., Кузиев Р. Геологические и геоморфологические условия низовьев Амударьи.....
Кахоров Б., Мардонов Р. Тималин ва Цинк боғламига эга бўлган металлопептид таркибли бирикманинг организмда иммундаволовчи таьсир қилиш хусусиятини ўрганиш.....
Маҳаммадиев С., Сатторов Ж. Минерал ўғитларнинг кузги буғдой навлари ҳосилдорлиги ва дон сифатига таъсири.....
Мирзаев Ж., Кулматов Р. Суғориладиган майдонларидан ҳосил бўлган коллектор дренаж сувларининг миқдор ва сифатини ҳамда улардан фойдаланиш имкониятларини баҳолаш (Жиззах вилояти мисолида).....
Мурадуллаев А., Раҳмонқулов С. Ғўза навлари ва тизмаларида баргнинг ҳужайра шираси концентрациясига юқори ҳаво ҳароратининг таъсири.....
Мусурманов А. Суғориладиган бўз-ўтлоқи тупроқлар агрокимёвий хоссаларининг мулчалаш ва кам ишлов бериш таъсирида ўзгариши.....
Мухаммедова С. Анализ экспрессии генов специфических липолитических ферментов париеталных клеток.
Умаров О., Артикова Ҳ., Ортиков Т., Бафоева З. Бухоро тумани тупроқлари туз режими ва уни яхшилаш йўллари.....
.....
Хамроқулова З., Раббимов С., Бобоев С., Абдукаримов Д., Хонназарова Д. Ўзбекистоннинг шимоли шарқидаги айрим кемирувчилар гельминтофаунасининг хўжайин ёшига ва хўжайин организмининг озиқланиш характерига боғлиқлиги.....
Алимжанова Х., Ташпулатов Й., Ражабова Д. Летний фитопланктон *BACILLARIOPHYTA* и *XANTHOPHYTA* Акдарьинского водохранилища среднего течения реки Зарафшан.....
Рахматуллина Н., Небесная К., Акиншина Н., Азизов А. Оценка устойчивости *ARTEMISIA ANNUA* L., *MATRICARIA CHAMOMILLA* L., *ACHILLEA FILIPENDULINA* L. по уровню малонового диальдегида в естественных условиях произрастания и на искусственных плантациях.....
Рузметов Д. Шеримбетов А. Дуккакли ўсимликларнинг айрим фитопатоген микомецитларини идентификация қилиш ва бионазоратини ишлаб чиқишда *TRICHODERMA* замбуруғининг антагонистик хусусиятларини *IN VITRO* услубида аниқлаш.....

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БИОМОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ *CHAENOMELES MAULEI (MAST.)* В УСЛОВИЯХ БОТАНИЧЕСКОГО САДА

Аннотация

В данной статье изучена цветение, семенообразование и плодообразование интродуцента Chaenomeles Maulei (Mast.) Scheid. При семенном размножение учитывается размер и качество плода и семян. Для размножения растений необходимо создать оптимальные экологические условия: освещенность, влажность и почва богатая гумусом. Проведены биометрические измерения: плодов и семян (длина, ширина), вес плодов и семян, рост и развитие растений, полевые исследования о цветение, плодоношение и размножение растений. Показаны данные по фенологическим наблюдениям за растениями, а также морфометрические параметры цветка.

Ключевые слова: размножение, семена, цветение, плод, гнездо, местообитания, освещенность, влажность, почва, органические вещества.

BOTANIKA BOG‘ I ShAROITIDA *CHAENOMELES MAULEI (MAST.)* O‘SIMLIGINING BIOMORFOLOGIK XUSUSIYATLARI

РЕЗЮМЕ

Maqolada introduktsiya sharoitida o‘stirilgan Chaenomeles Maulei (Mast.) Scheid o‘simligining gullashi, urug‘ va meva hosil bo‘lish jarayoni o‘rganildi. O‘simlikning urug‘i bilan ko‘payishida meva va urug‘ larning hajmi va sifati hisobga olinadi. O‘simliklarning ko‘payishi uchun yorug‘lik, namlik va gumusga boy tuproqni ya’ni maqbul qulay ekologik sharoitlarini yaratish kerak. Meva va urug‘ larning hajmi (uzunligi, kengligi), meva va urug‘ larning og‘irligi, o‘simlikning o‘sishi va rivojlanishi, o‘simlikning gullashi, meva berish va ko‘paytirish bo‘yicha dala sharoitida biometrik o‘lchovlar olib borildi. O‘simliklarning fenologik kuzatuvlari, shuningdek gulning morfometrik parametrlari to‘g‘ risida ma’lumotlar ko‘rsatilgan.

Kalit so‘zlar: ko‘payish, urug‘, gullash, meva, uya, yashash joylari, yorug‘lik, namlik, tuproq, organik moddalar.

BIOMORPHOLOGICAL FEATURES OF CHAENOMELES MAULEI (MAST.) IN THE CONDITIONS OF THE BOTANICAL GARDEN

ABSTRACT

This article considers the flowering, seed formation, and fruit inception of the introduced species of ChaenomelesMaulei (Mast.) Scheid. The size and quality of the fruit and seeds during the seed propagation are taken into account. It is necessary to create optimal environmental conditions for plant propagation such as lighting, humidity, and soil rich in humus.

Biometric measurements of fruits and seeds (length, width), weight of fruits and seeds, plant growth and development, field studies on flowering, fruiting and propagation of plants were carried out. Phenological observation data of plants, as well as morphometric parameters of the flower are given.

Key words: reproduction, seeds, flowering, fruit, nest, habitats, lighting, humidity, soil, organic matter.

INTRODUCTION. *ChaenomelesMaulei (Mast.) Scheid.* is a horticulture crop which belongs to the kind of family *ChaenomelesLindl. exSpach.*, the family of *Rosaceae*. The varieties of *Chaenomeles* are bred, commonly, as ornamental plants. Japanese *Chaenomeles* and *Maulei* are the most promising as the horticulture crops. The fruits of *Chaenomeles* have a number of valuable properties and are characterized with a high content of vitamin C, P-active substances, organic acids, macro and microelements and other useful elements. They are a valuable raw material for processing and foodstuff which are enriched with the important biological active components.

The initial estimation of the *ChaenomelesMaulei (Mast.) Scheid.* successive introduction was made in the Botanical Garden and the ecological condition of the germination was analyzed. *Chaenomeles* is rather cold and drought resistant in the conditions of Uzbekistan.

The value of the crop is its curative and prophylactic properties, but despite this its morpho-biological features, genotypic differences and reaction norms by basic commercially valuable characteristics in the conditions

of the Botanical Garden were not completely analyzed. This complicates the choice of sources for its further selection and its wide introduction into gardening. The estimation of the different kinds of *Chaenomeles* by its separate commercially biological characteristics and their combination, valuable sources for selection is of undeniable scientific and practical interest.

In relation to the above mentioned, the purpose of the research was: the analyzing of seed and fruit forming of the *ChaenomelesMaulei (Mast.) Scheid.* introducent and the creation of the optimal ecological conditions for its breeding.

Species of *Chaenomeles Lindl* are deciders poliever green bushes or small trees, sometimes with thorny branches. leaves with stipules, short - rooted. Flowers are single or in bunch (in shield). They bloom till or after sprouting the leaves. Cup petals-5, corolla petals-5, stamene-20 or more. Fruit is apple-shaped-false multi-seed. These are rather decorative plants, used in green building as tapeworms, in groups, live fences. They breed by seeds, root cuttings, green cuttings. The species includes 4 types from East Asia [3]. For Chaenomeles appropriate actionomorphicity. flowers are usually of both sex, with five divided perianth. Stamens spread around.

Cup petals, petals and stamens are arranged by inside edge evidently, usually glass tubes-hypanthia. The carpel fused with each other and with hypanthia, firming the lover and polilover ovary(5). In flow censes are located throughout the bush or in the center of the bush. Separate shorts located on the south side, which fall into the direct arrangement of light, they bloom profusely. The diameter of the corolla is from 2.5 to 3.5sm. The flowers vary in the shape of the petals and the degree of terry.

Species of Henomeles *Chaenomeles lindl* are entomophilous plants. It’s noted that they don’t have adaptations to various pollination agents. A large amount of pollen is produced, several pieces (6) in short hands or single, but very closely, which subsequently leads to the fact that the fruits are often tightly squeezed with each other.

Literary sources provide vuly fragmentary data or the flowering and fruiting of plants of the species *Chaenomeles Lindl.*

In the works of Chinese researchers (10), basically similar cyaniding derivatives were found in the flowers of the Chinese henomeles species and the proportion of pelargoidine derivatives was minimal and for the diglycosides, there assumed the diglycoside radical to be added and another minor component- cyaniding succinylnorabinoside was found.

Quince fruits contain vitamins E,C,PP,B1,B2,B6, provitamin A, many macro and microelements the compositions also includes K, Na, Mg, Cu, Zn, I and CO, etc. The chemical analysis of quince fruits indicates that the high nitrite benefits of this species are pectin substances (1.34-2.8 %).

The fruit pulp is rich of organic acids (more than 5%), where citric acid prevails, ascorbic acid is 69,3-113,0 mg/ 100 gr, Vitamin C-78,0-98,0 mg/100 gr, the total content of carotenoids is 1,5 mg/100 gr [8]. Fruits are a valuable source of phenolic comprurds (total content of leukoanthocyanins and anthocyanins-740 mg/ 100gr, catechins-316, flavonols-71,8). Fatty oils fin seed are 14,7 to 21,6%, the mucus content in the seed is from 20 to 22,7%. Water in the fruit is 78,9-79,64%, the total acidity (per malic acid) 1,84-2,01%, total amount of sugar is 9,16-10,72%, invert sugar 9,75-8,86%, sucrose 0,41-0,86%, tannins and dyes 0,45-0,70%. It contains sesaquterpinoids(3,9%), including aldchydes (1,4%), acidides (0,8) and esters (0,2), content of 94,6 them monoterpinoids oil (88,3%), carvacrol (62%, lemon (8,0%), P-cumene (4,9%) and y-terpenes (3,2%) [10]. Great potential to increase the physiological significant amount of polyphonologic substances, including up to 450 mg/ 100gr of catechins. The fruit of Japanese quince are characterized by an increased content of acids (5,0-6,8), which was reflected in the sugar-acid index (0,5-1,0) Regardless of the varietal characteristics, the sugar-acid index is low, which course ponds to a very acidic taste.

Useful features of fruits : treats pancreatitis, anemia, sclerosis, hypertension, gastritis, flatulence, tuberculosis, arthritis, a disease of the gastrointestinal tract, cardio vascular system and urinary tract, has on anti-inflammatory, hemostatic effect. The fruits help to produce the interferon, which is responsible for the immune system and protect against viral infections. Seeds are used for gastritis, constipation, diseases of the upper respiratory tract, burns, colitis and eye diseases. Leaves treat diabetes, blood pressure, asthma, stomatitis, etc (9). The fruits of C sinensis (chinese henomeles) are considered to be effective source of substances with antiviral activity (11).

In the conditions of the Botanical garden named after N.F. Rusanov studied of *Henomeles Maulei (low topanese quince)- Chalnomeles Maulei(mast.) Scheid (Cydonia Maulei moore)*. Low deciduous bush with a height of 0.3to 1m. The leaves are oval or obviate, leathery, smooth, dark green, serrated at the edges, 3.5 sm long .The flowers are orange red with a diameters of 2.5-3.5 sm . It blooms in late May, sometimes in early June, depending on climatic conditions. It blooms profusely and for a long times . Fruits are polyspherical, yellow, up to 3sm in diameter. Frost resistant. Freeze only the tips of the shorts (5).

The aim of our works - to study the biomorphological pecularities of the flower and fruiting of Chaenomeles Maulei (mast) sheid (Cydonia Maulei moore) in the conditions of the botanical garden in Tashkent the Republic of Uzbekiston.

Object and subject of research: the object of research was Chaeremeles Maulei (mast) sheid, from the Rosaceae family introduced in the botanical garden.

Subject of study were the uterine bushed and seeds of Chaenomeles Manlei (mast) short, as well as plant ecology.

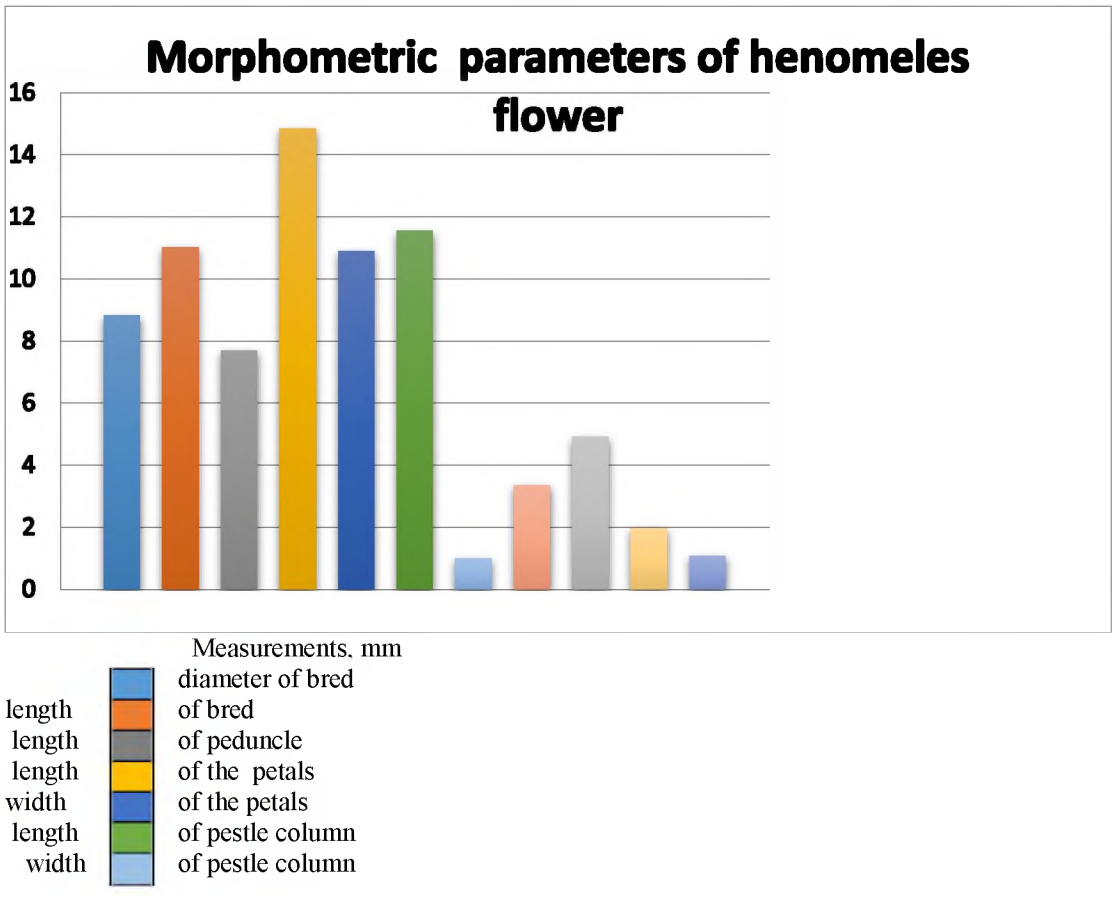
Research Methodology: the quality of seeds was studied according to the methods described in the works as seed breeding of introduced woody plants (1). “ Guidlines for the seed introduction”. Seed productivity was studied by the method of I.V. Vainagiy (2) . For the field observation of flowering during the day used the methodology of V.N.Godina (3). Statistical processing of the actual material was performed by Microsoft Excel programme with generally accepted criteria(4).
Humidity and air temperature were measured with a psychrometer.

Analysis and results.

The experiment to determine the germination of seeds was carried out in four repetitions. The tip seeds of henomeles Maulei were sown in the full and spring. Soil moisture was up to 80% of FFm(full field moisture). To increase the germination, cold stratification was carried out, for which the seeds were kept for 2-3 month, in wet sand at a temperature of 3-5 C. Shoots appear in late April- May Seedlings were germinated for 1-2 years, after they were planted in a permanent place. For observation, 10 model plants were selected in 3 times repetition Biometric measurements were carried out: fruits and seeds (length, width), weight of fruits and seeds, plant growth and development. Growth was determined which was on average 17±0,5 sm per year. It was revealed that the height of six year old plants reaches 126±4,5 sm. Fruits and seeds were counted. Fruit set is 100%. The number of seeds in one inflorescence is 1000 pcs. Laboratory seed germination of 85,3±2.1%. Field seed germination is 75±3,5 %. Phonological observations of plants were carried out. The generative period starts for the third year of life. Henomeles refers to medium flowering i.e. it blooms from April to June. Mass flowering lasts for 15-20 days. One flower of Chaenomeles Maulei (Mast) sheid blooms in 3-7 days. It is typical for henomeles that after the end of mass flowering, during the ripening of the fruits (Sept., Oct.), secondary flowering begin, due to sleeping flower buds. While studying the flower, 2 developmental phases were identified: staminate, pistillate and again stamen. The presence of two circles of stamens, which ripen and crack at the same time, confirms the repetition phase. The maturation of the androecium (stamen phase) consists of the moments of crocking of the anthers and the precipitation of pollen grains from them the pistil phase of the flower is represented by the development of the pestle: exit from the bud maturation of the stigma and fertilization.

Meteorological data on the site showed that the largest member of blooming flowers increases by 19p.m when the relative humidity is 60% and the air temperature reaches 250 C . It is noted that the flowers bloom when the humidity is high and the area has less light.

It was established that depending on the budding phase the flower organs have different morphometric parameters. In the process of growth and development of the bud and opening it into a flower the diameter varies from 4,37± 0,10 to 13,27± 0,25. The length of the bud increases from 4,58±0,006 to 17,45±0,65.



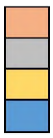


Fig. l. Morphometric indicators of chaenomeles Maulei (Mast) scheid

The fruits were harvested in the fall. The weight of fruits from one bush was an average of 8 kg .The fruit is a fleshy mesocarphy fused with individual separate parts of the flower. The endocarp is dry membranous and surrounds the seed chambers, the exocarp is leathery. Carpels from 5 to 6. The top of the seed is the part of opposite to the base, usually dull. At the top there is a chalase protrusion- this is the place where the seed and the vascular bundle grow from the base of the seed along the ventral side and feed from the mother plant. From the chalase along the dorsal side, the vascular bundle goes to the base of the seed. The shape of the seeds is round-pointed, biowar, pointed nose, the surface is smooth, shiny, brown color.The seed chambers are filled with seeds, the total number of which reaches 40per or more. The harvest of henomeles Manlei was carried out on October 30. Fruits were divided according to size into large medium and small. The large fruit has an average diameter of 4.5sm,an average of 3.5sm and a small 2.6sm. From each of those listed in kind 10 pieces were taken and the weight ratio was determined. On average the mass of large fruits is 31.46+_0.96 in medium and small respectively.

Table 1

Fruit mass (gr)

№	**Fruit groups according to size**		
	Large	medium	Small
1	31.01	21.52	8.49
2	29.09	26.54	9.98
3	29.41	21.67	12.30
4	35.28	22.58	11.16
5	31.81	23.97	9.22
6	29.74	21.77	11.71
7	28.61	21.62	8.65
8	37.10	25.13	10.05
9	32.15	24.79	11.65
10	30.67	26.09	10.46
Open of stand	S=31,49±0.96	S=23,57±0.81	S=10,37±0.67
Variation of coeff.	V= 3,05%	V= 3,44%	V=6,42%

In large fruits the seeds are in 6 nests which contain from 14 to 16 pieces of seeds. Fruits are 4.5 or 6 nesting. It was revealed that in the 5 nesting fruit the number of seeds is small and in some nests there are only 2-3 pieces and a lot of unripe seeds. In 4 nesting fruit in all chambers contains up to 16 pieces full seeds. On small fruits there are 4 nests where up to 14 pieces of seeds (pic. 2, 3).

Fig.2: Seeds quantity from one nest.

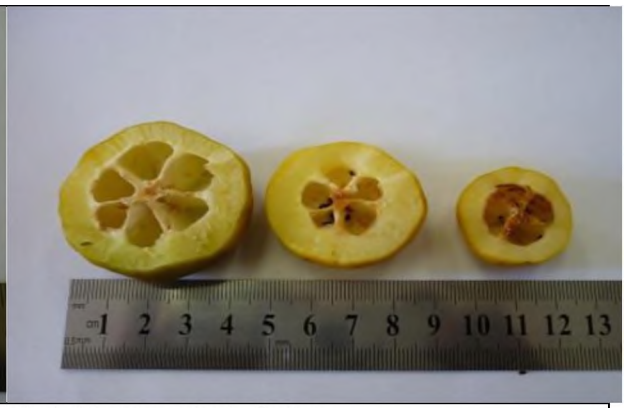


Fig.3: Nest quantity in fruits.

Examining the fruits and seeds of henomeles Maulei revealed that the number of seeds depends on the size of the fruit. It should be noted that environmental conditions also affect the fruit formation and seed formation of plants. Good illumination, soil rich in humus gives a good harvest Shadow negatively affect the growth and development of plants, i.e. is a limiting factor for them.(Table 2)

Table 2

Seeds quantity according the fruits size

№	Seeds quantity in fruits			Mass 1000 per seeds
	Large	medium	small	
1	90.0	48.0	28.0	31.25
2	89.0	39.0	36.0	29.80
3	62.0	55.0	32.0	29.80
4	94.0	45.0	28.0	30.70
5	78.0	65.0	24.0	28.50
6	98.0	40.0	30.0	30.00
7	70.0	38.0	29.0	34.30
8	57.0	36.0	25.0	29.25
9	61.0	45.0	13.0	30.75
10	75.0	50.0	33.0	35.95
Open of stand.	S=77,40±2,22	S=46,10±1,72	S=27,80±1,45	S=31,03±0,88
Variation of coeff.	V= 3,05%	V= 3,44%	V=6,42%	V=2,84%

Conclusion

So, the characteristic peculiarities for plants of the Chaenomeles family are as: uneven distrebution of same-sex and bisexual flower, a long process of fertilization, geytonogamy, entomophilia and dichogamy. Thus, the largest contribution to the seeds of henomeles Maulei is made by large-sized fruits, as well as the number of nests. The fruiting and seed formation is influenced by the ecological environment of the habitat, the key point is light, moisture and soil, rich with organic substances. While determining, it was revealed that good fruiting depends in climatic conditions.

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