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Cytogenetic Analysis of Some Types of Mulberry Geneva Type (M.Alba, M.Rubra) in Iran

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Abstract: *In order to evaluate the cytogenetic, 36 species were collected berries of Iranian natural areas, using squash technique meristem were studied. The study in Nature with 84, 56, 42, 28 diploid chromosomes, tetraploid, triploid and hexaploid and type of metacentric chromosomes, submetacentric and rare Stumble centric and satellites were significant. The average size of the top ten appropriate metaphase chromosome number and karyotype of each sample and standards for the populations M.rubra and Morus alba separately prepared and chromosomes parameters such as length of chromosomes, long arm, short arm, over the short arm completely, the ratio of long to short arm and chromosomal index was measured. The results showed that populations of species, Morus alba and M.rubra the chromosomes in Geneva M.rubra 96/11 Mμ sample types were calculated. Cluster analysis method "Ward" could total 12 species in Euclidean distance to the three groups, the maximum Euclidean distance of M.rubra of Kermanshah scene and the lowest Euclidean distance between Morus alba species in two areas of Tehran province (Kan and Barqan), accordingly species that are in a similar karyotype and are therefore used in crosses interspecific and can also be used to widen the genetic diversity in the gene pool.*

Keywords: Cluster Analysis, Symmetry Index, Karyotype

INTRODUCTION

Today, the most important and most economical way of achieving increased production per unit area of plant varieties with improved yield and higher quality and more consistent crop in limited circumstances such as drought, heat, cold, dirt poor diet, diseases and pests is. In addition to releasing the potential of plant reserves its breakthrough in herbal products for food, agricultural, pharmaceutical, and chemical industries will take place. Berries from the family Moraceae is an important bio-energy plants, in addition to being silk worms are fed, in industry, medicine, aquaculture, agro-forestry and drought prone area development programs are used (Kunjupillin et al., 2003). Cytogenetic studies of initiatives in research performed because the number of chromosomes in the way of important reforms (Javadi et al., 2006). The characterization of chromosomal karyotype Cytogenetic studies in addition to the structure of the plant, methods to examine the variation between different populations of a species. Where it's genome containing genetic information and thus gene expression, expression of phenotypic traits, so the change in the structure and size of chromosomes (which carries genes) are expressed by different phenotypic traits.

Karyotype studies of the population of a species is important in the sense that different populations of a species, each with its own genome compromise with the environment in which they grow show (Munirajppa et al., 1995). In general cytotoxic taxonomy research, in addition to defining the relationship and affinity between the populations and diversity between them, can be valuable information about the gene pool available in the country for use in gene banks provide. So do Cytogenetic studies on plant species as well as their own populations, especially indigenous wild plants, because providing little information on the history of plant evolution, determine relationships between species, characterization of karyological etc., is of paramount importance (Hashemzadeh and Ziaeinassab, 2007). Berries between species diversity of morphology and Curry Happylogy there are more types of berries are diploid with 2n = 28 chromosomes Geneva and very few of them are polyploid in nature (Stebbins, 1947). Later cytology studies have showed diploid chromosomes are diploid strawberry difference in size is also Berry Geneva types triploid and diploid 2n = 42 diploid and tetraploid was 2n = 56 crossed the difference in terms of performance and quality of fruit and leaf numbers are better. Cytology classification of berries in nature representing a confluence between the father and the mother superior of tetraploid and diploid tetraploid and diploid happened in leaf yield and leaf nutritional quality (Sheidai et al., 1994). The aim of the present study aimed to investigate the cytogenetic different populations and species, Morus alba M.rubra collected from different parts of Iran, karyotype analysis was conducted.

Materials and Methods

Cytogenetic analysis required for berry plants through cuttings grown to a length of 20 cm and with four to five buds were planted in pots containing sand and Prlt for rooting. After 45 days, the plant in a pot full of clones out and proceeded to cut and collect one to two cm of the roots. The pre-treatment solution and put 8- hydroxy Kynoleyn were stored in the refrigerator for 5/3 hour. Samples were then washed with running water, washed with distilled water for 48 hours in FAA solution Levitsky (ten per cent formalin solution and chromium oxide One by one per cent) were placed in the refrigerator. Fixative to ensure the removal of debris, roots placed for three hours in running water and 70% ethanol were kept in the refrigerator. The opportunity roots of the ethanol was removed and a normal solution of HCl for 15 to 20 minutes at 60 ° C were hydrolyzed. Then the roots washed with distilled water to paint on the Astvarsyyn 1% for at least 12 hours were tested. After transferring root tips as much as 1 to 2 mm isolated and slide and add a drop of 45% acetic acid were squash. After squash, root tip meristem cells 10-5 mitotic cell area for any review and if five or more cells showed similar chromosome number, the number of genotypes for it were accepted. Cytological features include the length of the chromosomes, long arm length, short arm length, the ratio of long to short arm of chromosome index as an indicator of differentiation was used. Various forms of chromosomal suggested by Lee Vaughan (6). Due to the location of the centromere, respectively. Cytogenetic parameters for measurement and analysis software and karyogram Micromeasure, Excell and SPSS was used.

Results and Discussion

Cytologic examination showed that the population genotypes M.alba and M.rubra diploid, triploid, tetraploid and hexaploid respectively 28, 42, 56 and 84 chromosomes (Table 1). The number of chromosomes and karyotypes of the Geneva types described in the study (Table 1) and the mean and standard deviation obtained from measured characteristics of different samples (Table 2) is shown.

Table 1. Location of collecting, chromosome number and karyotype formula populations of two species Mulberry

ROW	Geneva collected all types of M.rubra and Morus alba	The number of chromosomes	Curry Tipi formula	Mm size range
1	Tehran Province (Mohammad Shahr) Morus alba	28	5M+2st+2sm+5m	13-5.26
2	Tehran Province (Barqan) Morus alba	42	12m+9sm	20.55-5.69
3	Tehran Province (Kan) Morus alba	56	10sm+18m	18.04-6.57
4	Tehran Province Varamin (Azhdang) Morus alba	28	4M+10m	8.87-5.13
5	Tehran Province (Khaledabad) M.rubra	28	3M+11m	5.10-3.10
6	Arak (Ashteyan) Morus alba	56	21m+2st+2M+3sm	12.44-3.94
7	West Azarbaijan (Deire) Morus alba	28	6sm+7m+1st	14.95-7.95
8	Khorasan Razavi (Isaac) Morus alba	56	*2st+16m+9sm+T*	11.67-4.31
9	Kohgiluyeh and Boyer-Ahmad (Gachsaran) Morus alba	28	9m+4sm+1st	12.44-6.33
10	Isfahan M.rubra	56	**15**sm+40m+1st	15.96-4.45
11	Shahrood(Bastam) Morus alba	56	11sm+17m	13.17-4.10
12	Mazandaran (Gangafrooz) M.rubra	56	8sm+20m	17.15-4.29
13	Tehran Province (Saveh) M.rubra	84	11sm+19m+1M	14.73-5.40
14	Hamedan (Barqchin) M.rubra	56	11sm+15m+1M+1st	13.17-4.10
15	Kermanshah (Songhor) M.rubra	56	9sm+18m+1st	11.82-4.09
16	Kermanshah (Sahne) M.rubra	56	11sm+2M+1T+1st+12m	17.77-7.13

Table 2: shows the mean and standard deviation of the measured traits berry samples.

Index percentage of Santermary	The relative length of chromosomes %	Average of long-arm to short arm	The average length of the short arm (mμ)	Average of long arm (mμ)	Total length of the chromosome (mμ)	Society name
0.37	0.62	1.79	2.90	4.90	8.10	Tehran province(Mohammad shahr) *Morus alba*
0.09	0.68	1.63	3.77	5.93	9.71	Tehran province(Barqan) Morus alba
0.39	0.67	1.65	3.58	5.64	9.23	Tehran province(Kan) *Morus alba*
0.36	7.13	0.59	1.83	2.49	4.36	Tehran province-Varamin(Ajdang) *Morus alba*
0.39	2.7	1.56	1.67	2.50	4.18	Tehran province(Khaled Abad) *M.rubra*
0.40	3.54	1.53	2.72	4.04	6.77	Arak(Ashteyan)*Morus alba*
0.39	3.52	1.57	2.84	4.28	7.15	Azarbayjan qarbi(Deire)*Morus alba*
0.37	3.55	1.89	2.69	4.42	7.12	Khorasan Razavi(Isaac)*Morus alba*

0.37	4.37	1.75	3.16	5.15	8.32	*(Kohgiluye and buyer ahmad(Gachsaran) Morus alba*
0.38	1.74	0.64	1.63	2.89	4.75	*Isfahan M.rubra*
0.39	3.56	1.65	2.92	4.53	7.60	Shahrood(Bastam) *M.rubra*
0.42	3.56	0.69	1.57	2.86	4.28	Mazandaran(Gangafrooz)*M.rubra*
0.39	2.37	1.52	3.53	5.27	8.81	Tehran province(Saveh)*M.rubra*
0.39	3.56	1.65	2.90	4.53	7.46	Hamedan Barqchin) *M.rubra*
0.39	3.48	1.61	1.61	2.80	4.26	Kermanshah(Sonqor)*M.rubra*
0.39	3.61	1.74	4.87	7.14	11.96	Kermanshah(Sahne)*M.rubra*

Karyotype analysis results of diploid species

Geneva types of Morus alba species of Tehran province (Mohammad City)

From a total of 14 pairs of chromosomes, 7 pairs are great chromosomes and there is no satellite. (Chromosomes whose length is greater than 1.7 microns were measured large, chromosomes less than 1.7 microns called small). Homologous chromosomes are metacentric chromosomes were submetacentric and others. The average length of the haploid chromosome was 5.02 microns and the average length of long arm to short arm was 2.64 microns. Lenght of the chromosomes from 5.26 to 13 variables were measured. Lenght of the short arm 2.90 microns and long arm 4.97 microns size. The overall percentage (TF) to 34.93 and the amount of the difference between the relative length (DRL), intra-chromosomal asymmetry index (A1), respectively,is 6.33, 22.49 and 0.96, respectively. It was based on the classification Astybnz in class A3.

Geneva types of M.alba of Khaled Abad as suburb of Varamin in Tehran

Has 14 pairs of chromosomes, 9 pairs of small chromosomes and 5 pairs of large chromosomes is observed. Ten homologous chromosomes metacentric and the other were middle metacentric. The average length of long arm to short arm was 1.47 microns. Haploid chromosomes average length of 4.18 microns and the average length of long arm to short arm 1.56 microns was estimated. Lenght the chromosomes from 3.10 to 5.10 microns, respectively.Lenght of long arm 2.43 microns and length of short arm 1.76 was measured. The overall percentage (TF) to 39.95 and the amount of the difference between the relative length (DRL), the relative length of the shortest chromosomes (S) percent, the chromosomal asymmetry index (A1), respectively, 1.29, 66.62, 0.33. It was based on the classification Astybnz in Class A2.

Geneva types of M.alba of Azhdunk Suburb of Varamin in Tehran's province

Has 14 pairs of chromosomes, chromosome 8 pairs of large and 6 pairs were small of chromosomes. Homologous chromosomes metacentric 5,6,7,8,9,10,11,12,13,14 metacentric and the rest between them. During the long arm to short arm was 4.36 microns. Haploid chromosomes average length of 18.4 microns and the average length of long arm to short arm in such 1.83 microns, respectively. Lenght of the chromosomes was from 5.30 to 8.87 microns.Lenght of long arm 3.83 microns and length of short arm 1.83 microns were measured. The overall percentage (TF) was equal to 57.23 and the amount of the difference between the relative length (DRL), the relative length of the shortest chromosomes (S) percentage, the chromosomal asymmetry index (A1), respectively is 3.90, 45.49, 0.419 and 0.43 respectively. It was based on the classification Astybnz in Class A2.

Geneva species of Morus alba types of Deira in West Azerbaijan

A total of 14 pairs of chromosomes, 8 pairs of large chromosome and 6 pairs were small chromosomes.Homologous chromosomes 1,2,3,4,5 submetacentric, the metacentric was No. 6

satellite.Lenght of the long arm to short arm was 1.99 microns. The average length of haploid chromosomes was 9.77 microns and the average length of long arm to short arm of chromosome was from 7.95 to 14.95 microns estimated in varied microns.Lenght of 5.6 microns long arm and short arm length 3.33 microns were measured. The overall percentage (TF) to 51.78 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosome (S percent, asymmetry index into chromosomes (A1), respectively, 7.44 and 26.61, 0.98, respectively. Thus the by category Astybnz was in class A3.

Genotype of Morus alba types Gachsaran in Kohgiluyeh and Boyer Ahmad Province

It is diploid and has 14 pairs of chromosomes. 8 pairs of chromosomes were large and 6 small pairs of chromosomes were small. Homologous chromosomes 10,8,4,5 submetacentric, the rest was metacentric number 7 satellite. The average length of haploid chromosomes 9.77 microns and the average length of long arm to short arm 1.75.Lenght of chromosomes from 6.33 to 12.44 microns was varied.Lenght of long arm was 15.5 microns and short arm length 3.16 microns were measured. The overall amount of chromosomes (TF) was equal to 44.84 and the amount of the difference between the relative length (DRL), the relative length of the shortest chromosome, the chromosome asymmetry index (A1), respectively is 1, 80.36 and 0.96. It is based on Astybnz in class A3 was classified according to its karyotype formula based on Levan et al 9m + 4sm + 1st was determined.

Karyotype analysis results of triploid species

Geneva types of M.alba species in Barqan of Tehran province

pairs of chromosomes is observed that two pairs is large chromosomes and 19 pairs of chromosomes were small. 9 chromosomes are homologous chromosomes Submetacentric and the rest was metacentric were seen. Mean of haploid chromosomes lenght is 10.92 microns and the average length of long arm to short arm was 2.27 microns. Lenght of the chromosomes from 20.55 to 5.69 microns was measured. The overall percentage (TF) to 38.85 and the amount of the difference between the relative length (DRL), symmetry index (SI), the chromosomal asymmetry index (A1), is respectively 7.28, 27.88, 0.419 and 0.62. It was based on the classification Astybnz in Class A2.

karyotype analysis results of tetraploidy species

Geneva species of Morus alba of Tehran province

A total of 28 pairs of chromosomes, 10 pair is big chromosomes: 18 pairs of small chromosomes were observed. Homologous chromosomes were metacentric and the other 8 submetacentric. The average length of haploid chromosomes is 16.13 microns and the average length of long arm to short arm is 1.36. Lenght of chromosome from 5.13 to 8.87 microns is estimated. Lenght of the short arm 1.24 and long arm 4.36 microns was measured. The overall percentage (TF) to 38.72 and the amount of the difference between the relative length (DRL), the relative length of the shortest chromosomes (S) percent, the chromosomal asymmetry index (A1) 34.74 , 11, and 0.62 respectively. It was based on the classification Astybnz in Class A1.

Geneva types of M.alba in suburbs of Arak in Markazi province

A total of 28 pairs of chromosomes, 6 pairs of chromosome is large and 22 pairs of chromosomes were small. Two homologous chromosomes metacentric and the rest of central metacentric, submetacentric and two satellites were observed. Lenght of the long arm to short arm was 1.53 microns. The average length of haploid chromosomes 6.77 microns and the average length of long arm to short arm was 1.53 microns.Lenght of chromosomes from 3.94 to 12.44 microns is varied.Lenght of the long arm 3.90 and short arm length 2.72 microns were measured. The overall percentage (TF) to 67.43 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosomes (S), asymmetry index into chromosomes (A1), respectively was 4.65 and 20.22 and 0.75. It was based on the classification of Astybnz in class B3.

Genotypes of M.rubra species in Isfahan

A total of 28 pairs of chromosomes, 18 pairs of chromosomes was small, 10 pairs was large. Fifteen submetacentric and the rest of the homologous chromosome is metacentric and a satellite is observed. The average length of the haploid chromosome was 5.94 microns and the average length of long arm to short arm 1.24 microns is estimated.Lenght of chromosomes 15.96-4-45 were measured. Lenght of the short arm 1.63 microns and the long arm 2.89 microns was measured. The overall percentage (TF) to 36.93 and the amount of the difference between the relative length (DRL), the relative length of the shortest chromosomes (S), intra-chromosomal asymmetry index (A1) to the 10.08 and 16.48 and 0.71 respectively. It was based on Astybnz classification of C3 class.

Geneva types of M.rubra species of Bastam in Shahrood city

A total of 28 pairs of chromosomes, 11 chromosomes was small, 17 chromosomes was large.11 homologous chromosomes meta-centric and the rest of metacentric and without satellites is observed. The average length of haploid chromosomes is 5.94 microns and the average length of long arm to short arm is 1.24 microns.Lenght of chromosome from 13.17-4.10 were varied. Lenght of the short arm of 2.92 microns and the long arm of 4.53 microns was measured. The overall percentage (TF) is equal to 39.58 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosome (S), asymmetry index into chromosomes (A1), respectively, 5.37 and 64.40 and 0.98, respectively. Thus by category Astybnz was in class B 3.

Geneva types of M.rubra in Gangafrooz of Mazandaran city

A total of 28 pairs of chromosomes, 20 chromosomes were small and 8 was large chromosomes.Eight sub meta-centric homologous chromosomes metacentric and and the rest lacked the satellite. The average length of haploid chromosomes was 7.15 microns and the average length of long arm to short arm in such 1.57 microns.Lenght of chromosomes 17.15-4.29 varied. Lenght of the short arm 1.57 microns and the long arm 2.86 microns was measured. The overall percentage (TF) is equal to 41.14 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosome (S), asymmetry index into chromosomes (A1), respectively, 6.99, 21.01 and 0.97 respectively. Thus by category Astybnz was in grade A3.

Geneva types of M.rubra species of Hamedan Barqchin

A total of 28 pairs of chromosomes, 14 chromosomes was small and 14 chromosomes was large. 12 homologous chromosomes sub metacentric and the rest was meta-centric and a satellite is observed. The average length of haploid chromosomes 6.75 microns and the average length of long arm to short arm was 1.61 microns is estimated. Lenght of chromosome 4.10-13.17 varied. Lenght of the short arm 2.90 microns and the long arm of 4.53 microns was measured. The overall percentage (TF) is equal to 64.40 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosome (S), asymmetry index into chromosomes (A1), respectively, 5.60, 17.32 and 0.97 was calculated. It is based on categorization of Astybnz in class C 3.

Geneva types of M.rubra species of Sonqor city in Kermanshah

A total of 28 pairs of chromosomes, 14 chromosomes were small and 14 were large chromosomes. Twelve homologous chromosomes were sub metacentric and the other is meta-centric and a satellite is observed. The average length of haploid chromosomes 7.24 microns and the average length of long arm to short arm was 1.62 microns.Lenght of chromosomes was 11.82-4.09 varied. Lenght the short arm 1.61 microns and the long arm of 2.80 microns was measured. The overall percentage (TF) was equal to 42.44 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosome (S), asymmetry index into chromosomes (A1), respectively were 6.47, 64.42 and 0.84. It was based on Astybnz categorezation in class B3.

Geneva types of M.rubra species of Sahne city in Kermanshah

A total of 28 pairs of chromosomes, 14 chromosomes were small and 14 were big chromosomes. Twelve homologous chromosomes submetacentric and the other meta-centric and a satellite observed. The average length of haploid chromosomes were 12.17 microns and the average length of long arm to short arm was 1.63 microns. Lenght of chromosome was varied from 7.13-17.77. Lenght of the short arm was 4.87 microns and the long arm was 7.14 microns.The overall percentage (TF) was equal to 35.35 and the amount of difference between the relative length (DRL), asymmetry index into chromosomes (A1) respectively 42.14, 64.5 and 0.65 was calculated. It was based on the classification of Astybnz in class A3.

Geneva types of M.alba species of Isaac city in Khorasan Razavi

A total of 28 pairs of chromosomes, chromosome size were more than 1.7 micron and were great. Seventeen homologous chromosomes were metacentric and the other were submetacentric and a satellites is observed.The average of haploid chromosomes was 7.10 microns and the average length of long arm to short arm was 1.80 microns.Lenght of chromosomes was varied from 4.31 to 11.67. Lenght of the short arm was 2.69 microns and the long arm was 4.42 microns. The overall percentage (TF) was equal to 37.82 and the amount of difference between the relative length (DRL), the relative length of the shortest chromosome (S) percent, asymmetry index into chromosomes (A1), respectively, 7.69, 12.93 and 0.97. The Classification was based on Astybnz in class A2.

The results of Hexa ploid species of karyotype analysis

Geneva types of M.rubra species of Saveh in Tehran province

A total of 42 pairs of chromosomes, 30 chromosomes were small,and 12 chromosomes were large.11 homologous chromosomes sub metacentric and the other were meta-centric and no satellite were observed. The average length of haploid chromosomes was 8.15 microns and the average length of long arm to short arm was 1.51 microns. Lenght of chromosomes was varied from 14.73-5.40. Lenght the short arm was 3.53 microns and the long arm of 5.37 microns. The overall percentage (TF) was equal to 32 and values of the differences in relative length (DRL), the relative length of the shortest chromosomes (S), intra-chromosomal asymmetry index (A1), respectively were 8.84, 36.65, 0.99. It was based on the classification of Astybnz in Class A2.

Considerable diversity in terms of ploidy levels and features white and red currant berry species suggests that karyotype, which it has been subjected to a long evolutionary process and be able to attend and environmental sustainability in a variety of conditions Mybashd.tfavt ploidy level and basic chromosome number X = 2, x = 3, x = 4, x = 6 even in domesticated species confirmed by other reports (Javadi etal., 2006). Crossing between species with breeding purposes is limited to special cases, is consistent.

There are significant differences in traits between species studied chromosomal karyotype diversity is revealed, indicating that cytogenetic studies can be used to determine the evolution and influence of kinship different species. Based on the average length of the short arm and long arm length, there was a large variation between different populations so that the maximum length of the short arm (Mµ77. 3) and long arm length (Mµ93. 5) to M.alba specie is belonged (Barqan).

In terms of the symmetry of the chromosome, according to percentage of the overall shape and symmetry index, M.rubra of Saveh with the lowest TF =%32 and S =36.65 percent in Class A2. And so the asymmetrical type and species M.alba (Barqjyn of Hamadan) with maximum TF =%40.64 and S = 17.32 percent were in grade C 3 and the symmetric enjoyed Karyotype. Stating of M.alba in class 1B of the bilateral Astybnz table (Levan et al., 1965) reflects the extreme variations between chromosomes and chromosomal asymmetry between karyotype species.

Geneva types in the number of chromosomes 2 N = 28 showed that 13 pairs of chromosomes were smaller and larger one pair of chromosomes are diploid berries. Genevatypes showed that the number of types N = 42 chromosomes of sumatic is a triploid genotypes that accumulate in metaphase chromosomal. An unequal chromosome separation during phase one possibility is negligible and equal distribution of the genotypes, genotypes frequency was the Three Valant was eliminated. Which spontaneously in nature, a cross between a x4 tetraploid and a x 2 diploid. Haploid gametes of x x2 and x 3 to form a more united. Triploids are clearly frustrated. The results of this study confirm the findings (Sheidai et al, 1996) is explained.

Berries in general, is propagated through cuttings, but specimens of plant species, especially berries Mulberry in rooting species are very poor and have shown great limitations to the study of plant material. So the best way to propagate mulberry trees, especially blackberries and red berries is through links that link will also reproduce less due to incompatibility and accuracy may sometimes be impossible to understand and research (Masumi and khosravi, 1994).

Based on this classification asymmetry of Stebbins (Levan etal., 1964) The figures in grades A 1 to B 3 occupied the presence of different chromosomes from each parent is different is the fact you should always work to the variation between specimens of species included Karyotypes.

Values above 43 percent indicates that the species berries are symmetric karyotype. This in turn indicates that the relative symmetry type Yu's work. Yoo types are more advanced than symmetric asymmetric karyotypes (Venkatesh and munijappa, 2013). Changes in chromatin symmetry is often associated with loss, but data obtained from the study of symmetry berry species confirms the fact that symmetry with asymmetry karyotypes does not combine necessarily.

As well as berries in the wild diploid or controlled crossing between tetraploid and diploid parents have growth was better than tetraploid and diploid. The research showed that species in the wild berry M.alba and M.rubra with diploid chromosome 28, chromosome 42 were tetraploid frequently in these common, also 56 chromosomes, tetraploid and diploid with 84 chromosomes hexa poloid in nature and is collected research (Basavaiah et al., 1990) correspond. Berry stated lenght chromosomes from different provinces of the 4.18 to 11.96 µM varied that with observations is matched.

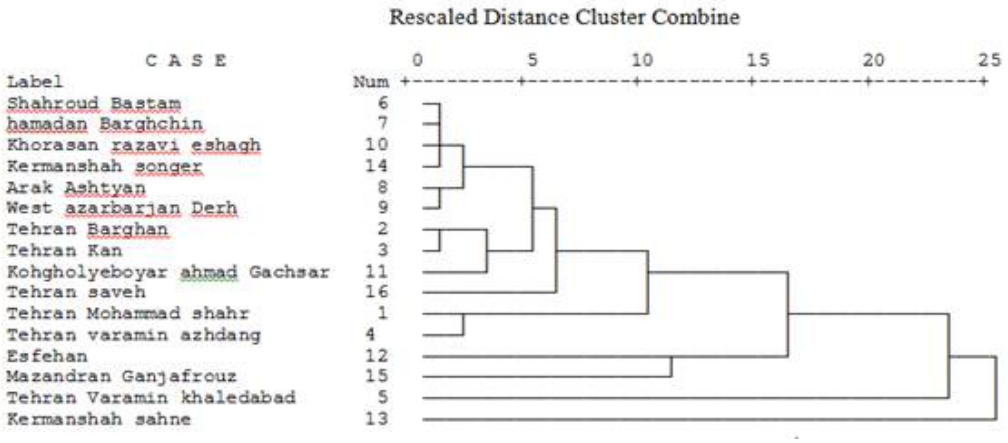

Figure 1. Examples of cluster analysis of M.alba, M.rubra studied based on input method

Although the samples studied in this research are all diploid,triploid and tetraploid and counted chromosome samples obtained in this study according to the method (Khurana et al., 2003) of

metacentric and submetacentric, however, examined the differences in traits such as (the total length of the chromosomes, the average long arm and short arm averages, etc.) caused cluster analysis into three distinct categories of contract. Karyotype symmetry properties of the developmental status of various species by confirming the grouping. As asymmetry parameters showed the lowest index symmetry of the first group of11.34 percent of cluster analysis it can be concluded that according to the Geneva types of M.alba of Bastam (Shahrood), M.rubra of Barqchyn (Hamadan) and M.alba of Isaac (KhorasanRazavi) are symmetric and chromosome of karyotype has more similarity in terms of the types of M.rubra. Also, Genevatypes of Sahne (Kermanshah) has a symmetry index with a value of at least 1.40 was as a result of this work symmetry karyotype at least in the studied species (Figure 1). Ploidy levels and significant diversity in terms of species karyotype features of M.alba, M.rubra suggests that these are subject to a long evolutionary process and were able to attend and environmental sustainability in a variety of situations. The difference in ploidy levels and types of basic chromosome number in Geneva M.alba, M.rubra with reports (Venakatesh, 2007) is consistent. Thus, the size of the chromosome is the only chromosome set as meta-centric and sub meta-centric has been higher in the case. There was no significant difference in chromosome size but big similarity between karyotypes that plays a role in speciation.

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