Patterned Woven Fabrics in Lithuanian Folk Skirts

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In the article 258 Lithuanian folk skirts from National M. K. Čiurlionis Museum of Art and 85 skirts from Lithuanian Open Air Museum are investigated. The weaves and plans of weave of skirts fabrics are made. Also the composing of plans of weave is analysed in aspect of segment, ornament and symmetry group of patterned fabric weave. Also the symmetry groups of Lithuanian folk skirts fabrics and their distribution according to the fabric weave are analysed. The tendencies of symmetry groups and peculiarities of composing of plans of weave can help to recreate the reconstructions of authentic folk fabrics.

Keywords: folk skirts fabric, plan of weave, segment, ornament, symmetry group.

1. INTRODUCTION

Lithuanian folk fabrics are important and valuable part of ethno cultural heritage. Today in Lithuania and in the World to the motifs of ethnic ornamentation, practical and symbolical use of authentical folk fabrics are coming back. Plenty of traditional textile products is concentrated in founds of Lithuanian museums but just small part of this heritage is investigated.

Kazlauskienė, Neverauskienė and Milašius [1] investigated overshot and pick-up folk fabrics. On a basis of Woods and Hann methods, they suggested their own classification system, adapted for woven ornaments and based on different symmetry groups and operations with matrices. Woods [2] states that any ornament can be described by four symmetry operations: shifting, turning, reflection and sliding reflection. All these operations can be carried out acting with matrices. Analysing different ornaments Woods [2] and Hann [3] stated that there are 17 different symmetry groups formed from the dots in parallel lines and these dots can make 5 geometrical shapes: parallelogram, rectangular, square, rhomb or hexagon. Woods suggested the system of two-dimension ornaments and their classification and marking described by geometry rules. Therefore, he introduced finite and one-dimensional ornaments, the structure of which is based on crystallography theory improved by Hann [3]. The scientists' classification system is used by many investigators for analysis, classification and designing of ornaments. The results of analysis by Woods-Hann methods proved the necessity to correct and adapt this system to investigation of woven ornament. The checked ornament structure and stepped line of contour create the peculiarity of woven ornaments and their designing – the symmetry axis and centers of ornaments may be between threads or through thread [4].

Milašius, Neverauskienė, Katunskis, Kazlauskienė [5] presented the adaptation of Woods-Hann classification and system of ornament creation for patterned woven fabrics. They established that 12 from 17 possible symmetry groups are used in Lithuanian woven fabrics. Katunskis, Milašius and Taylor made the software for creation of data basis, by which the analysis of folk woven ornaments, the structure of ornament and its designing method are possible. Zdanavičiūtė, Milašius, Katunskis [6] created the software for preserving and analysis of pick-up sashes and overshot fabrics ornaments, which enabled to analyze peculiarities of ornament symmetry, to look for relationship between the culture's mentality and technologies.

Kumpikaitė and Nėnienė [7 – 10] investigated the weaves and patterns of Lithuanian folk skirts fabrics, their chronological and territorial distribution, the use of colour threads in fancy fabrics, the plans of weave, use of fancy yarns and other peculiarities.

In this article the further investigation of Lithuanian folk skirts the first part of which is described in the article [11] is analysed. The fabrics weaves and their combinations with threads colours are analysed in previous article, but without establishing of peculiarities of fabric ornamentation. It is very important to analyse Lithuanian folk fabrics technological and ornamental peculiarities trying to recreate folk fabrics. Thus, the aim of this article is to establish and analyse the ornaments, weaves and plans of weaves, symmetry groups and peculiarities of creation of Lithuanian folk skirts fabrics.

2. MATERIALS AND METHODS

During the investigation 258 Lithuanian folk skirts from the National M. K. Čiurlionis Museum of Art and 85 skirts from Lithuanian Open Air Museum were analysed. The skirts were weaved in the middle of the 19th century and the first part of the 20th century. The largest amount (27 %) of the skirts from all Museums are weaved in the 19th century – the 3rd decade of the 20th century, and 15 % of skirts are weaved in the 3 – 4 decade of the 20th century, 12 % – in the end of the 19th century and in the beginning of the 20th century. 11 % of skirts were weaved in the 1 – 2 decades of the 20th century, 4 % – in the first

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half of the 20th century. 1 % – 3 % of skirts were weaved in other periods. About 6 % of skirts were rejected because of too late period of their weaving, i. e. the 6th decade of the 20th century – the end of the 20th century. In this period the old traditions were not hold so, and the 343 skirts from both Museums remain for analysis.

The largest number of skirts (48 %) is weaved in Dzūkija, 10 % in Suvalkija, 10 % in Aukštaitija, 9 % in Žemaitija and only 2 % in Klaipėda district. Weaving area of 21 % of skirts is not known because of people and weaving patterns migration between regions and other reasons.

During the investigation the fabric weaves and peculiarities of ornamentation and plans of weave of patterned fabrics of skirts were made. There were used the softwares "Audiniai" and "Ornamentika" created in Department of Textile Technology, Kaunas University of Technology.

When it is talking about establishing of symmetry group, each group is checked by code of four signs (*pyxn*) which specifies conditionally the symmetry operations used for ornament creation. Sign p is common for all symmetry groups; $y = m$, when axis of reflection is vertical; $y = 1$, in other cases; $x = m$, when axis of reflection is horizontal; $x = a$, when axis of reflection is modified; $x = 1$, in other cases; $n = 2$, when two segments are turned; $n = 1$, in other cases.

3. RESULTS AND DISCUSSION

The patterned fabrics in both Museums make up 23 %. Patterned fabrics are the fabrics with a special surface pattern, to which the principles of ornamentation described in former articles can be adapted. This group of fabrics is compiled from the fabrics of such weaves: overshot, diamond twills, broken twills, checked twills, pick-up, mock leno, overlaid, combined, zigzag twills.

Fig. 1 introduces percentile distribution of patterned fabrics according to weaves. It can be seen that the largest amount (32 %) of patterned fabrics is the fabrics of overshot weave. Diamond and broken twills are in second (18 %) and third (17 %) places, respectively. Checked twill fabrics are in fourth place (10 %), pick-up fabrics – in fifth (7 %) and combined – in sixth (3 %) ones. Overlaid weaves and zigzag twills make up 2 % and 1 %, respectively. The weaves are distributed a little different in references [8, 9], but it should be stated that in these references the different groups of fabrics are important, i. e. attention is paid to the twill fabrics, but not to patterned fabrics. Therefore, it can not be stated that the data in the article contradicts to the data in these references.

Fig. 2, a, shows the peculiarities of designing of overshot fabrics pattern LBM-1327, weaved in Dzūkija (weaving time is not known). Making the plan of weave of overshot fabric, the segment of this fabric (Fig. 2, b) was created by software "Ornamentika". In the picture white check shows the places without pattern, black check shows the places with the pattern, and blue check shows the "half-tone", where the ground threads and pattern threads are interlaced evenly. Further, the certain symmetry group is chosen (in the case, there is two-dimensional symmetry group p2mm), the view of fabric ornament with warp and weft matrices (Fig. 2, c) is obtained. The symmetry axes of

pattern go through thread in warp and weft directions. In the plan of weave (Fig. 2, d) the white check shows places, where pattern weft is under the fabric, the black check shows the places, where pattern weft is over the fabric surface, blue check is "half-tone", which is often weaved like warp rep weave, interlacing ground and pattern threads evenly. The ornamentation of overshot fabrics was analysed in references [1, 5, 6] where it is stated that two-dimensional symmetry group p2mm also dominates in Lithuanian folk fabrics, the symmetry group pmm2 is a little bit less popular.
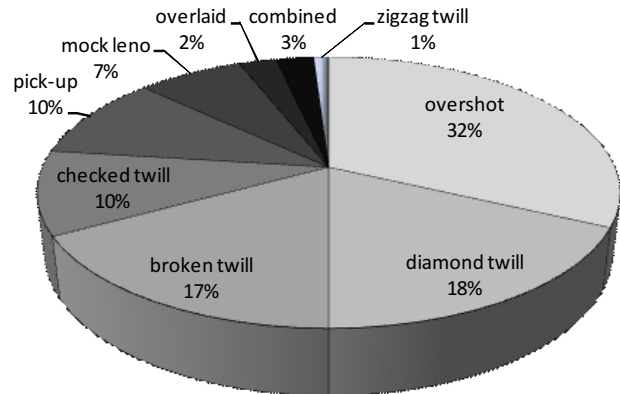

Fig. 1. Distribution of patterned fabrics according to weaves

Different diamond twills are in the second place according to prevalence. In Fig. 3 there is analysed design of fabric NČDM E6409, weaved in Dzūkija in the beginning of the 20th century. The picture of the fabric is presented in Figure 3, a. At first, the segment of weave is made (Fig. 3, b), and the ornament with the warp and weft matrices is received according to two-dimensional symmetry group p2mm (Fig. 3, c). There horizontal and vertical symmetry axes go through thread. In the case of diamond twills ornament and fabric weave are matched because black check correspond warp float and white check – the weft float. Also the picture of ornament with matrices and plan of weave matches where the warp matrix correspond the drawing-in and weft matrix – the order of treadling. Also making of diamond twills and peculiarities of their symmetry analysed in references [8, 9] do not contradict to the investigation results, because the symmetry groups p2mm, pmm2 and p1a1 are characteristic for fabrics of these weaves.

There was found a large amount of broken twills, the design of which is similar to the diamond twills. The symmetry group of these weaves often is pm11 if the twill is broken in weft direction or p1m1 if twill is broken in warp direction.

The checked twills are also spread in skirts. Fig. 4 shows pattern and weave creation of the fabric LBM-12243, weaved in Aukštaitija (the weaving time is not known). The picture of the fabric is showed in Fig. 4, a. At first, fabric pattern segment is drawn (Fig. 4, b). Symmetry group (two-dimensional symmetry p2mm) is established and fabric ornament with warp and weft matrices is made (Fig. 4, c). In the case horizontal and vertical symmetry axes go through thread. The plan of weave (Fig. 4, d) is made by principle of motif where black check shows satin 5/2 weave and white check – sateen weave. The plan of weave is presented just

like a segment (one quarter of weave) because of large warp and weft repeats. Also principles of ornamentation and symmetry can be used for overshot and pick-up fabrics described in references [2, 3]. These principles can be realized by the software described in reference [4].
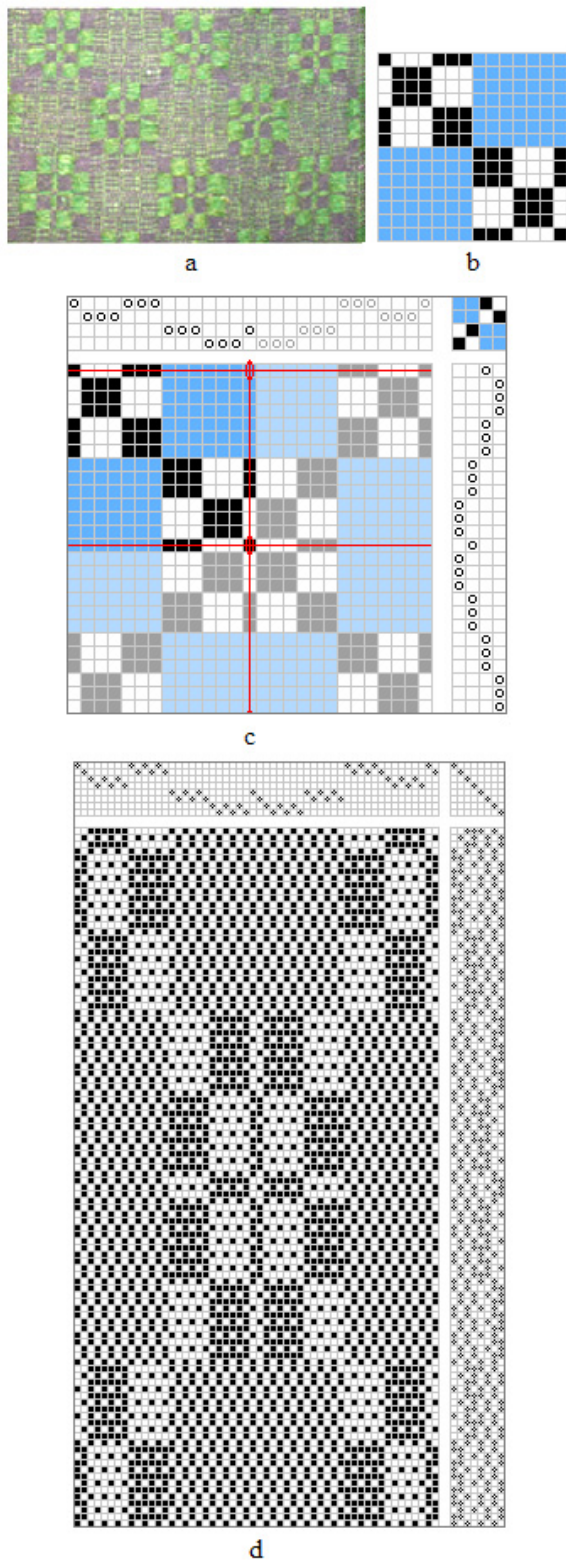

Fig. 2. View of fabric (a), segment of ornament (b), view of ornament with warp and weft matrices (c), the plan of weave (d) of overshot fabric LBM-1327, weaved in Dzūkija (the weaving time is not known)
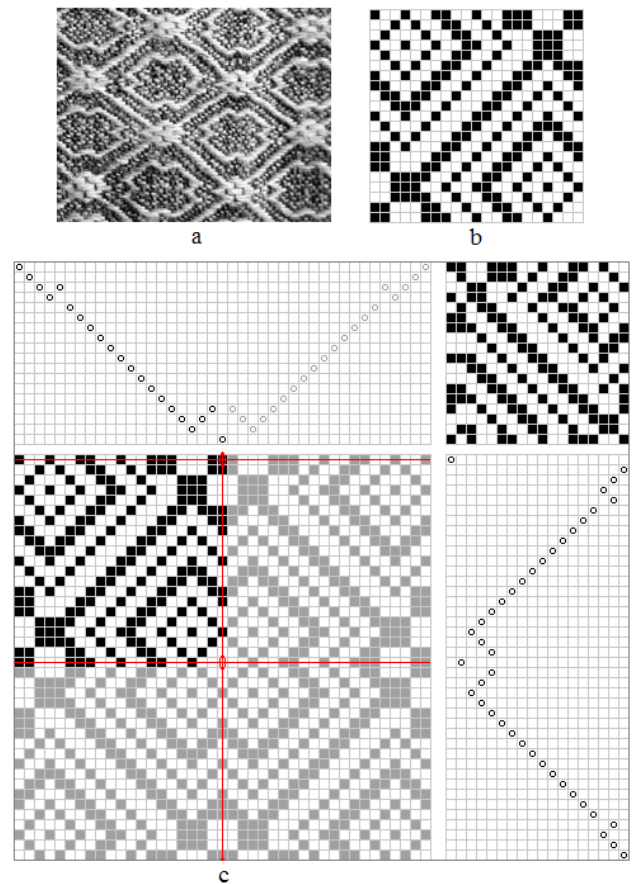

Fig. 3. Fabric view (a), segment of ornament (b), view of ornament with matrices and plan of weave (c) of fabric NČDM E6409, weaved in Dzūkija in the beginning of the XXth century

The pick-up fabrics are widespread in Lithuanian folk skirts. In Fig. 5 there is only analysed designing of pattern of pick-up fabric NČDM E4050, weaved in Suvalkija (the $3^{rd}-4th$ decade of the 20th century) because the pattern of the fabric is picked-up by hand and it is not the part of plan of weave. Thus, Fig. 5, a, shows the view of pick-up fabric, and Fig. 5, b – the segment of pattern. The one-dimensional symmetry group pmm2 is characteristic for the fabric because segment of the fabric is not symmetric. The ornament of this fabric is presented in Fig. 5, c. The black check shows – the pattern threads are under the fabric. Two-dimensional symmetry groups p2mm and p4mm were more popular analysing Lithuanian folk sashes [1, 6]. However, it should be stated that the purpose of fabrics analysed is different (in the article the skirts fabrics are analysed). Because of this reason the other peculiarities of ornamentation are characteristic for these fabrics.

The patterned mock leno fabrics are spread between weaves of Lithuanian folk skirts. In Fig. 6 the making of plan of weave for the fabric NČDM E2922, weaved in Dzūkija about 1900, is shown. Fig. 6, a, presents the view of fabric, the pattern segment of which is shown in Fig. 6, b. The ornament of fabric pattern (Fig. 6, c) is made using two-dimensional symmetry group p2mm, and horizontal and vertical symmetry axes go through thread. The weave and the plan of weave of the fabric (Fig. 6, d) is made by principle of motif where motif corresponds to fabric ornament, black check of ornament corresponds the

element of mock leno weave (Fig. 6, e, weave 1), and white check corresponds the plain weave (Fig. 6, e, weave 2). It is clear that 5 heald shafts are enough for the weaving (fancy draft). The symmetry groups p2mm and pmm2 are the most popular for these and overshot [1] fabrics.
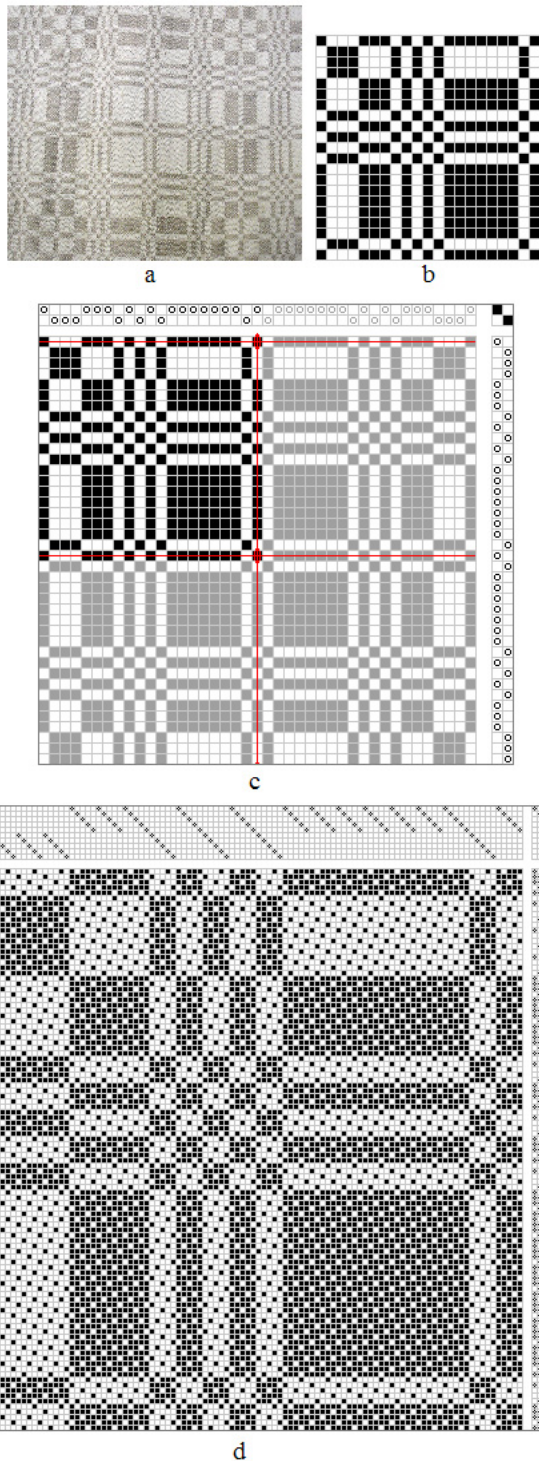

Fig. 4. View of fabric (a), segment (b), ornament of matrices (c), the plan of weave of fabric quarter (d) of fabric LBM-12243, weaved in Aukštaitija (the time of weaving is not known)

Also there are overlaid, combined and zigzag twill weaves patterned fabrics of skirts, but these weaves in skirts fabrics are not spread widely, i. e. all of them make

6 %. For the reason the methods of their designing will not be researched.

It was seen, one- or two-dimensional symmetry groups, the axes of which go through threads, are characteristic of ornaments of patterned fabric. So, in Figure 7 there is analysed distribution of these symmetry groups in different fabrics. In the fabrics 6 pattern symmetry groups were found: 5 – one-dimensional symmetry, 1 – two-dimensional symmetry.

The overshot fabrics have the largest number of symmetry groups because five symmetry groups are characteristic for these fabrics. Also broken and checked twill weaves are rather different; three symmetry groups are characteristic for them. Two symmetry groups are characteristic for such weaves like diamond twill, pick-up, mock leno, overlaid. The fabrics of combined and zigzag twill have the least variety of symmetry groups. The largest amount (22 units) of fabrics was found with symmetry groups p1m1 and p2mm, 17 fabrics – with symmetry group pmm2, 15 fabrics – with pm11, 1 fabric – with p112 and 1 fabric – with p111. This distribution a little differs from the distribution of ornamentation of overshot and pick-up fabrics in reference [6] but the reason of these differences is the purpose of fabrics, i. e. the pick-up sashes and overshot home textile fabrics are analysed in [6] and the skirts fabrics are investigated in this article.
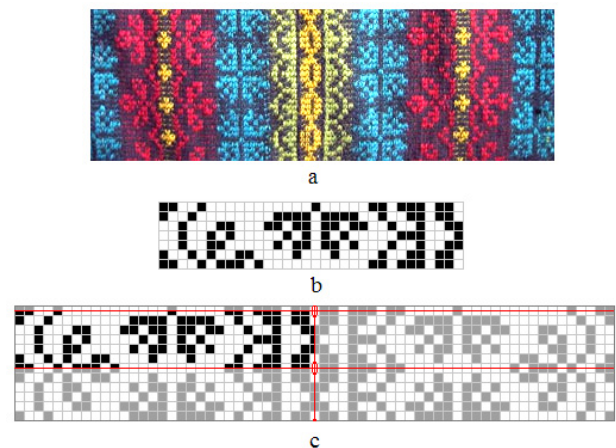

Fig. 5. View of fabric (a), segment of pattern (b) and ornament of fabric pattern (c) of pick-up fabric NČDM E4050, weaved in Suvalkija in the 3rd – 4th decades of the XXth century

Estonian skirts are the most often weaved in weft rib, plain or twill weaves. Skirts weaved in satin weave are spread in islands Saarem and Muchu. There is small amount of multiharness fabrics weaved according to neighboring Latvia [12]. Thus, Estonian patterns are much simpler than Lithuanian ones. Latvian ornaments also differ from Lithuanian patterns. They are more complicated, but their symmetry groups are distributed similar to Lithuanian [13]. Geometrical, vegetable, animal ornaments made in the same symmetry groups are comon to Byelourussian patterned fabrics. So, these fabrics are very similar to the patterns of Lithuanian fabrics [14]. The most patterns of Pennsylvanian Indians fabrics weaved in 19th century are similar to Lithuanian pick-up, checked twill and check satin fabrics patterns [15].
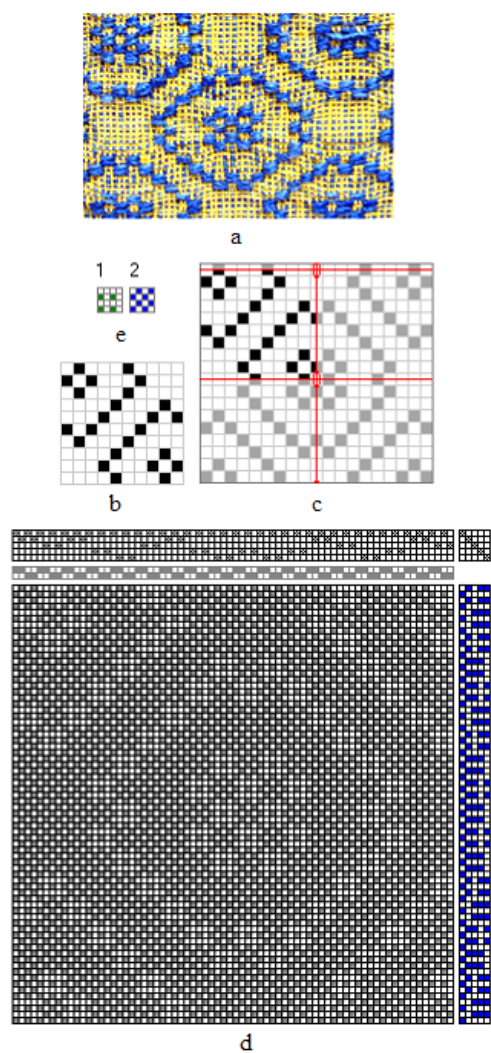
Fig. 6. View of fabric (a), segment of fabric pattern (b), ornament of fabric pattern (c), plan of weave (d), elements of making of fabric weave of fabric NČDM E2922, weaved in Dzūkija about 1900
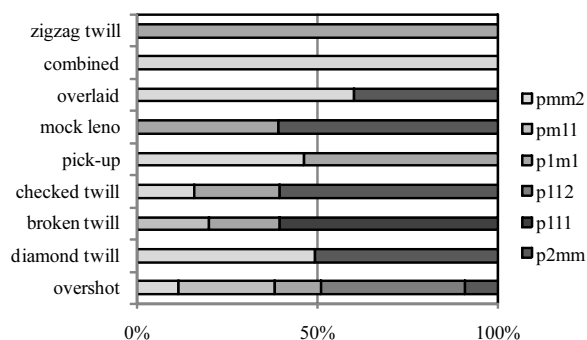

Fig. 7. Distribution of symmetry groups in fabrics of different weaves

4. CONCLUSIONS

It was established that patterned fabrics, the ornaments of which are made from 9 weaves, compile 23 % of folk skirts fabrics. The most widespread patterned fabrics are weaved by overshot (32 %), diamond twill (18 %) and broken twill (17 %) weaves.

The methods of designing of patterned fabrics ornaments, weaves and plans of weaves and their specific for every type of weave permit reconstruction of authentic fabrics creating similar patterns, ornaments and plans of weave.

It was found that there are 6 symmetry groups in patterned fabrics: 5 groups have one-dimensional symmetry and 1 group – two-dimensional symmetry. The largest variety of symmetry groups is characteristic for overshot fabrics, and the most widespread symmetry groups are p1m1 and p2mm.

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