

## **WOOD UTILIZATION PATTERNS CONCERNING VERNACULAR ARCHITECTURE AND FURNITURE IN VÂLCEA, SIBIU AND BUZĂU COUNTIES**

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### **Abstract:**

*Wood can be considered one of the first building materials. So far, it has had a constant and varied utilization concerning built environment with or without a structural role. This aspect is mainly the result of the spread of the wooden material as species around the world, but also due to a series of qualities like: easy processing, light weight and good mechanical characteristics. Even if it can be characterized by a high perish ability linked to multiple factors like vulnerability to fire, it still has a wide utilization range in the present.*

*The main theme of this paper discusses the wooden species utilized in vernacular architecture and furniture and their destination in traditional wooden housing, in a synthetic manner, structuring information in special tables. The role of these tables would be to reflect through a visual method the wood utilization patterns and the variety of wooden species existing in the three analyzed areas: Vâlcea, Sibiu and Buzău Counties.*

*In this way, it is possible to observe evident connections between the structural and spatial evolution of the vernacular house (mainly due to the shift of functional or specific needs) and the utilization patterns of local wooden material that contributed to this architectural, functional and stylistic diversity.*

**Key words:** Romanian vernacular; rural context; local identity; wood utilization.

### **INTRODUCTION**

*"The farmer has a unique sense of space and fits his house just after his material and spiritual needs. Peasants adapt their home to climate and local materials. Farmers have solved the problem of their architecture." (Cantacuzino 1977).*

The vernacular and traditional buildings in a specific rural context are a product of the accumulated experience and practice of many centuries and can provide a continuous source of knowledge. The harmonisation with the local environment and climate (Jiaping 2011), the use of local materials are some of the factors, which contribute to the distinct architectural identity of an area (Oikonomou 2011), cultural heritage being also one of the main factors that influence the vernacular architecture of a location (Zhai 2010).

The specific local building methods, materials and techniques used in each particular rural area turn vernacular architecture into an identity symbol and rich ethnographic evidence concerning rural technologies and ways of life in the countryside (Jose 2010). So, the abandonment of vernacular building methods in the process of building production was first realized by using abundant concrete and reinforced concrete instead of stone and wood which were the vernacular structural materials (Nilhan 2007). We should be aware that vernacular architecture sets an example of harmony between dwellings and the natural landscape (Manoj 2009).

In the future, specialists, designers and architects have to realise the importance of local tradition and building methods using local resources, as the possibility of rejuvenating local cultural identity.

### **OBJECTIVES**

The objective of the study is to approach in a critical and syntehtical manner the properties of the wooden species utilized in vernacular architecture and furniture with the aim of obtaining results that would form the basis of a series of synthetical tables concerning wood utilization patterns regarding species, architecture and furniture joints in the three analysed areas of the country.

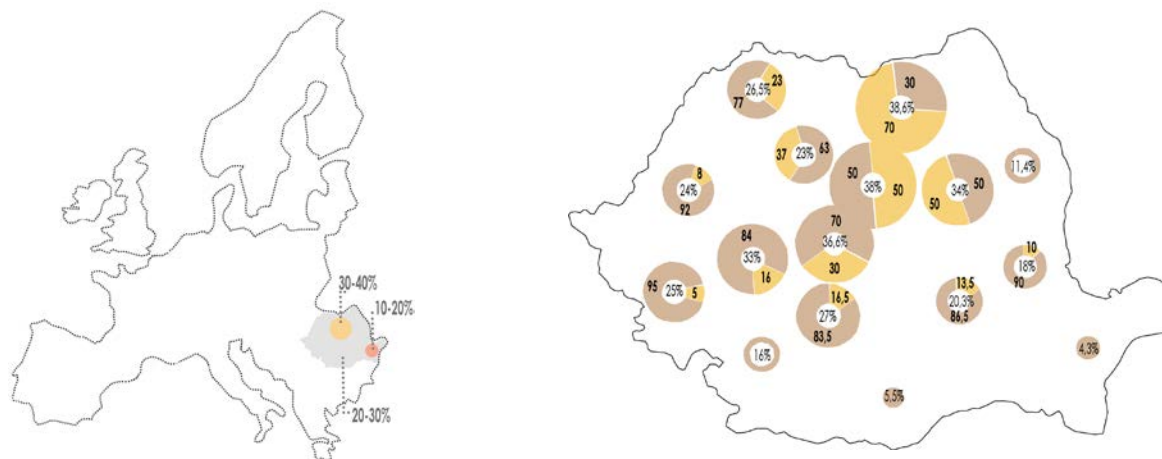
The objectives are clear, measurable and structured in the following phases: **Phase 1** – the analysis of the spread of the wooden species; **Phase 2** - the definition of a series of priorities concerning the research of wood utilisation; **Phase 3** - the identification of the wooden species utilised frequently in the vernacular architecture and furniture; **Phase 4** - formulation of a conclusion containing synthetical tables reflecting wood utilisation patterns in the case of the three chosen areas.

## METHOD

The sources that generated the research can be divided according to the study methods, the dimension of the analysed area, the type of the approach, the research methods and instruments.

The instruments used in the research were varied: critical analysis of literature and research on site, travel, sketches and photographs of study at the Village Museum "Dimitrie Gusti", Bucharest.

This analysis is based on the investigation of the wood species used in vernacular architecture and furniture by researching rural settlements specially chosen for this purpose on the following criteria: presence of specific structures in the construction and furniture, the afferent specific wooden structure, diverse methods of wood usage, the variety of species used in construction, tools and vernacular furniture. The three case studies illustrate and provide some conclusions in this respect but also provide a complementary approach to the theoretical analysis with practical experience through on-site investigation.



**Fig. 1.**

**Main wood species and the percentage of forestation on national and European level, Brown-coniferous species, yellow-deciduous species (after Stănescu 1979).**

### Phase 1 – the analysis of the spread of the wooden species

Framing the country (temperate climate zone) in the context of global forest resources involves identifying three main forest areas: 1) *coniferous forests* (spruce, fir, pine) with the poor presence of deciduous wood species in the South zone of the Eastern and Southern Carpathians, 2) *mixed forests*, coniferous and deciduous species occupying rich soils (hills and plains) 3) *xerophyte forest species*, including shrubs with tough leaves (in Dobrogea, Apuseni Mountains).

The European forest area can be classified according to the criterion of accessibility resulting from the total area of 135600ha 132600ha as accessible and only 3,000ha as inaccessible. This shows that from the total of 28.3% forest / land area 27.5% are accessible. The main species of wood of the country and the percentage of forestation can be seen in the figure above (Stănescu 1979).

### Phase 2 - the definition of a series of priorities concerning the research of wood utilisation

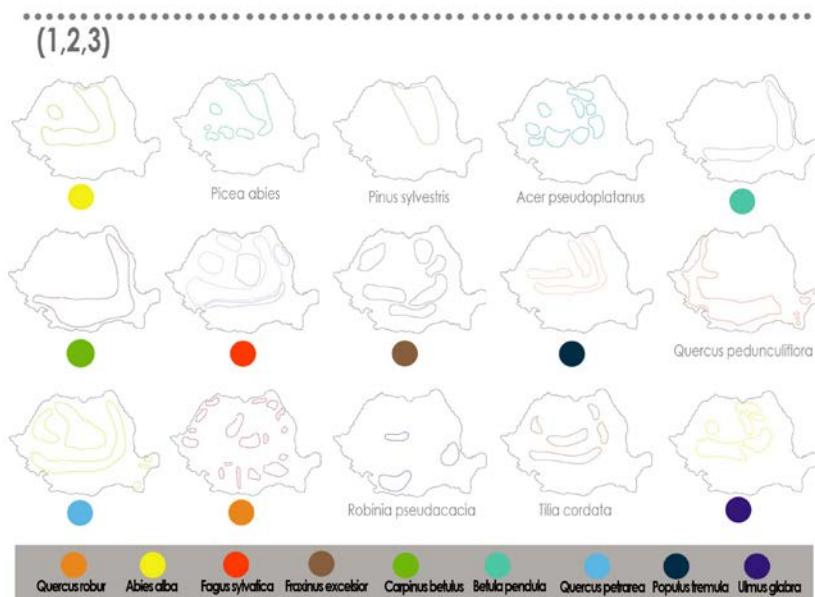
One of the main priorities of the investigation was the identification of the available local wooden resources that determine the utilization patterns of the rural communities existing in the areas that were chosen for the research. Based on this analysis a series of tables were elaborated, reflecting in a visual manner the patterns concerning local wood usage in the Romanian rural context.

### Phase 3 - the identification of the wooden species utilised frequently in the vernacular architecture and furniture regarding Vâlcea, Sibiu and Buzău Counties

The structural resistance of buildings is primarily made of wood species as spruce, fir, and occasionally pine. The naturally most resistant species is larch, but its presence among the wooden species of our country is low. Generally it is recommended that wooden elements should be protected from the weather, or partially exposed to its action. It is preferred to choose a species which naturally has a higher durability, instead of using the chemical protection of wood, due to environmental considerations.

The main coniferous species used in our country are the following: spruce and fir without any outstanding differences between them, the mechanical characteristics being virtually identical; a wide range of structures are made of these species, the main difference between them is that the wooden structure of the fir does not present resin channels and the knots of the tree are generally thicker than those of the spruce, no significant chromatic differences can be observed in cross section concerning the two species;

the *pine* as a wooden species is less common in our country; its mechanical characteristics are different depending on its varieties; the heartwood of the species is easily recognizable by its color and its better resistance to insects and fungi attack, compared with fir and spruce; *larch* is the species with the highest natural durability and superior mechanical characteristics, it grows sporadically in spruce and fir forests; it presents sapwood and heartwood and is successfully used in exterior and interior coatings (Lăzărescu 2010).



**Fig. 2.**  
**National spread of the wooden species utilised in vernacular architecture and furniture concerning Vâlcea, Sibiu and Buzău Counties.**

Softwood is primarily used in the formation of the structural frame concerning vernacular housing which is composed of resistance elements subjected to compression perpendicular to the fibers or parallel to the fibers or elements subject to bending and to a lesser extent to traction. When the predominant load is perpendicular to the fibers, as in the case of foundation pillars placed directly on the ground, oak is used primarily. Fir is also used for coating; spruce and pine can be used for inside and outside, windows, doors, flooring, roofing, and fencing.

The deciduous species used mainly in our country are the following: *oak*, known for its superior resistance to fungi and insects compared to fir and spruce this being one of the main reasons why oak would be more suitable for buildings exposed to weather; as a result of its high natural durability it can be used in building components exposed to weather long period of time; *beech* has a characteristic uniformity concerning late wood and early wood, low natural durability makes it less suitable for interior construction (especially in the construction of soles, wooden mandrels, wooden wedges, stairs, floors, ceilings).

Thus, it can be concluded that in general for the construction elements coniferous species are used. Deciduous species are mainly used for the development of special items such as the soles of the contact pins or wedges also decoration items on stairs, furniture etc.

Utilization forms of wooden material can be of two main types: *round wood* obtained from tree stumps by sectioning; *sawn wood*.

**Method: Participants, Measures, Case study - Utilization methods of wood species concerning the vernacular architecture and furnishings of the studied areas**

The analysis of the wood species used in vernacular architecture and furniture concerning the rural settlements that were chosen was realized through the on-site investigation of approx. 20 households in each county (Vâlcea, Sibiu, Buzău), 80% of which containing objects (wooden furniture, tools) that were relevant for the research and could be classified. Regarding the architectural and structural analysis the features of interest were the following: specific construction details, specific local wooden structure, diverse methods of wood usage, the variety of the wooden species used in construction; whereas in the case of furniture the following features were taken into account: wooden species, design, destination, date of manufacturing, joints.

The conclusion regarding the wood utilization patterns for each area will be presented in a synthetic summarizing table that identifies the existing and used species in each case study.

**Case Study (1) Vâlcea County: villages Titești Bratovești, Boișoara**

From this area comprising three villages in Vâlcea County, it was possible to identify several species with different intensity of frequency. These wooden species are: fir (*Abies alba*), birch (*Betula pendula*), hornbeam (*Carpinus betulus*), beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*), European aspen (*Populus tremula*), Sessile oak (*Quercus petraea*), oak (*Quercus robur*), Black locust (*Robinia pseudacacia*), linden (*Tilia cordata*), elm (*Ulmus glabra*). Wooden species occurring frequently are beech and fir, followed by hornbeam and birch. Ash, oak, mountain elm and linden are quite common, and the oak and aspen are present to a lesser extent.

It should be noted that the presence of hardwoods (cca.70%) is higher than that of conifers (approx. 30%) and the percentage of forestation is about 36% (Stănescu 1979).



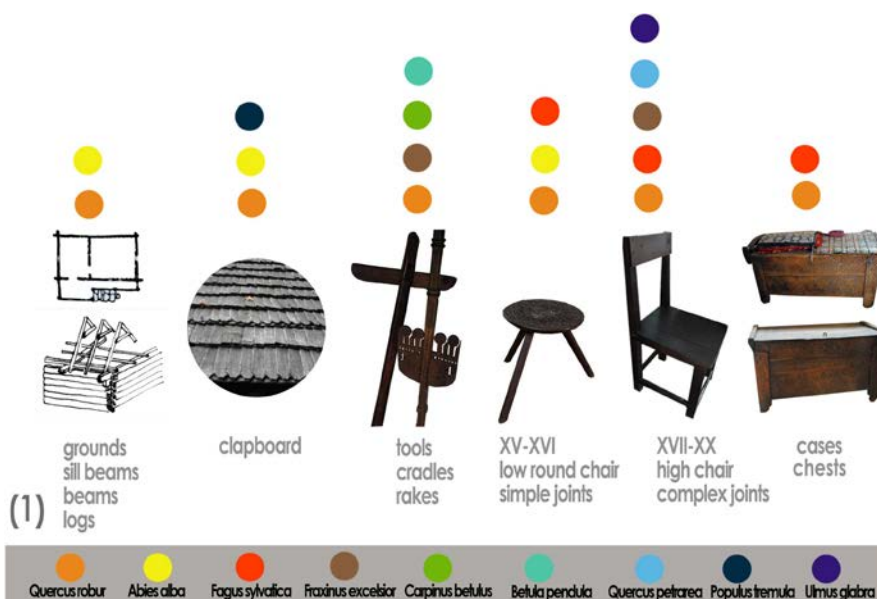
**Fig. 3.**

**Vernacular construction typology with carved horizontal fir logs resting on a plastered river stone base course and local wooden furniture – beech case, low round table with oak legs and beech top table, Vâlcea County.**

Regarding the structure of the building and housing in general, European oak is used frequently (*Quercus robur* or *Quercus pedunculiflora*) to perform grounds. In time, due to the reduction of the geographical spread of this species, it has been replaced by fir (*Abies alba*). Round fir logs also have replaced the oak ones. This type of round fir log structure is very common in this area and has a number of types: horizontal round structure, beam structure with pillars, mixed structures (Pănoiu 1977). For beams oak or fir wood is used mainly, but beech beams are also frequent (*Fagus sylvatica*).

Floors are generally made of fir. Regarding the timber used for protecting and decorating the facade, the range of wooden species is wider, the sieve is made of oak, willow, poplar and softwood (pine or spruce), they were tied in bundles of birch or willow twigs (*Salix viminalis*) (Lăzărescu 2010).

In addition to the species shown earlier in relation to the housing, it is possible to identify a number of species that have been used for tools. In the fabrication process of the the wooden cart wheel, the hub was made of elm (*Ulmus glabra*) and birch (*Betula pendula*) and the spokes of oak, Black locust (*Robinia pseudacacia*), or ash (*Fraxinus excelsior*). The forks were usually made of European aspen (*Populus tremula*), the rakes were often made of ash and for the carts oak or Sessile oak were used frequently.



**Fig. 4.**

**Summarizing table of wood utilization patterns concerning vernacular architecture and furniture of Vâlcea County.**

In the case of older furniture dating from the 15<sup>th</sup> - 16<sup>th</sup> centuries, it can be concluded that the range of the wooden species was limited to beech (*Fagus sylvatica*) and oak (*Quercus robur*). The diversification of wood processing tools caused also a diversification of the wooden species that were used: spruce (*Picea abies*), fir (*Abies alba*), ash (*Fraxinus excelsior*), maple (*Acer platanoides*), linden (*Tilia cordata*), elm (*Ulmus glabra*), plum (*Prunus domestica*), pear (*Pyrus communis*), cherry (*Prunus avium*), walnut (*Juglans regia*) (Olărescu 2012).

**Case study (2) Sibiu County, Rășinari village**

In this area, which includes Rășinari village of Sibiu County, were identified several species with various frequency. These wooden species were: fir (*Abies alba*), beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*), European aspen (*Populus tremula*), Sessile oak (*Quercus petraea*), European oak (*Quercus robur*), linden (*Tilia cordata*), elm (*Ulmus glabra*), maple (*Acer platanoides*).

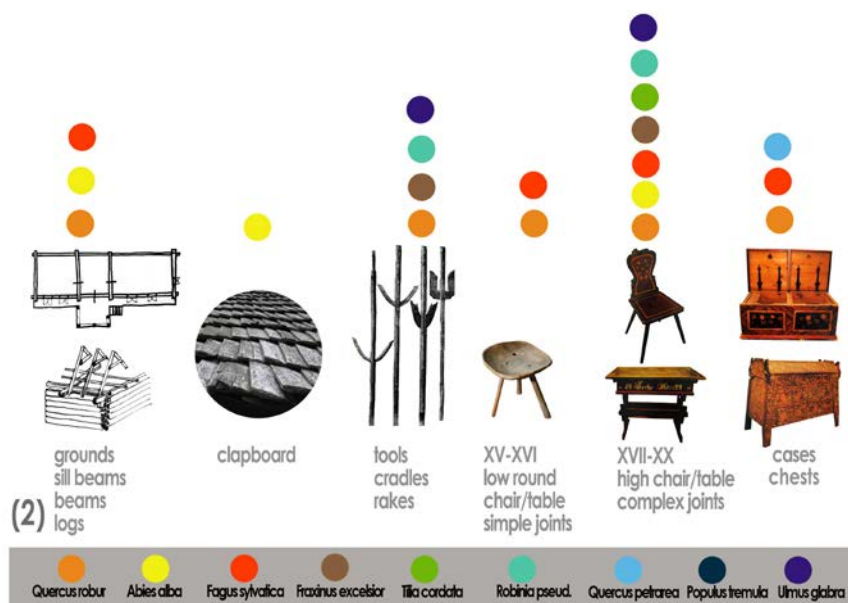


**Fig. 5.**  
**Vernacular construction typology with round fir logs resting on a plastered stone foundation.**

Wooden species occurring with high frequency are beech and fir, followed by maple, oak and aspen. Sessile oak and elm are fairly common, and linden is present to a lesser extent (Filipovici 1965).

It should be noted that the presence of deciduous trees (about 50%) and resinous (about 50%) is balanced and the forestation rate is approx. 38% (Stănescu 1979).

Regarding the construction and housing structure a significant similarity can be observed with the utilization patterns presented in the case of Vâlcea County. These species can be used for tools, but in this case the range is varied and includes species such as elm (*Ulmus glabra*), maple (*Acer platanoides*), and ash (*Fraxinus excelsior*). Cradles deserve a particular attention. "Made from the toughest wood, brushed with butter, to avoid cracking, they were etched afterwards" (Păcală 1915). These tools were usually made of ash and the brooms from birch twigs.



**Fig. 6.**  
**Summarizing table of wood utilization patterns concerning vernacular architecture and furniture of Sibiu County.**

In the case of older furniture, it can be concluded that the range of the wooden species was limited to two: beech (*Fagus sylvatica*) and European oak (*Quercus robur*).

Wooden chests during the 16<sup>th</sup> and 17<sup>th</sup> centuries had simple wooden connections ("stollentruhe") and were distinguished by the length of approx. 1,60m and the unusual width of the legs. The specific wooden joint configuration for that time was the "tongue and groove", and the cover of the crate was uniquely shaped with bevelled edges on the longitudinal axis. At the beginning of the 16<sup>th</sup> century decorative motifs (anthropomorphic, zoomorphic, and geometric) were created by the technique of carving and in the 18<sup>th</sup> century, the painting of wooden cases had begun. The wooden cases survived over time due to their aesthetic and functional role (used for storing clothing and later for cereals), and organization of the vernacular interior space (Malearov 2007).

The diversification of wood processing tools caused a need for more wooden species that were used in vernacular furnishing: spruce (*Picea abies*), fir (*Abies alba*), ash (*Fraxinus excelsior*), maple (*Acer platanoides*), linden (*Tilia cordata*), elm (*Ulmus glabra*), plum (*Prunus domestica*), pear (*Pyrus communis*), cherry (*Prunus avium*), walnut (*Juglans regia*) (Olărescu 2012).

### Case Study (3) Buzău, Chiojdu Mic village

In this area which includes the village Chiojdu Mic – Buzău County, were identified several species as follows: fir (*Abies alba*), birch (*Betula pendula*), hornbeam (*Carpinus betulus*), beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*), Sessile oak (*Quercus petraea*), European oak (*Quercus robur*).

Wooden species occurring with high frequency were beech, fir and hornbeam, followed by ash and birch. Holm and oak were present to a lesser extent (Filipovici 1965).

It should be noted that the presence of deciduous trees (ca. 90%) was significantly higher than the presence of resinous (ca. 10%) and the percentage of forestation reported by Stănescu (1979) was about 18%.

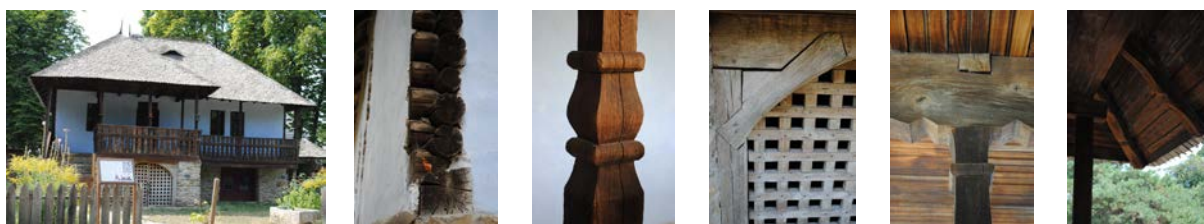


Fig. 7.

**Vernacular construction typology with veranda and round fir logs and a river stone foundation.**

Regarding the construction and vernacular housing structure a significant similarity could be observed concerning the wood utilization patterns described in case 1 and 2.

The wooden species presented in case 1 and 2 can be used for tools, but in this case the range is varied and includes species such as beech (*Fagus sylvatica*), oak (*Quercus robur*), ash (*Fraxinus excelsior*).

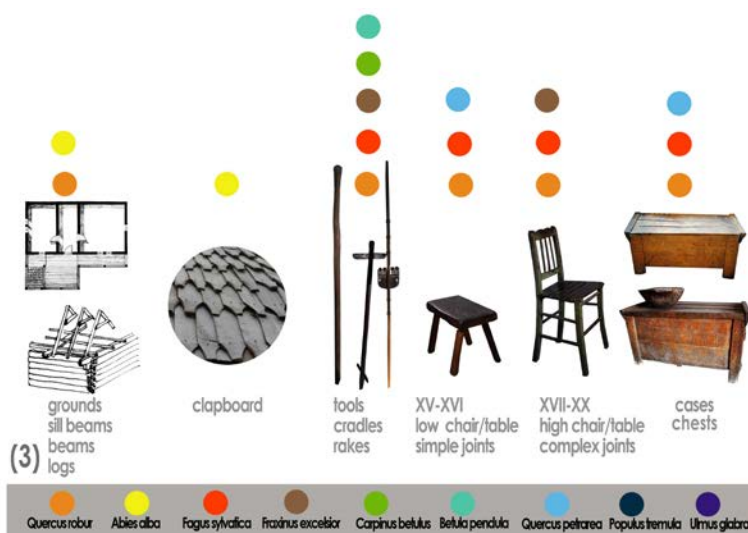


Fig. 8.

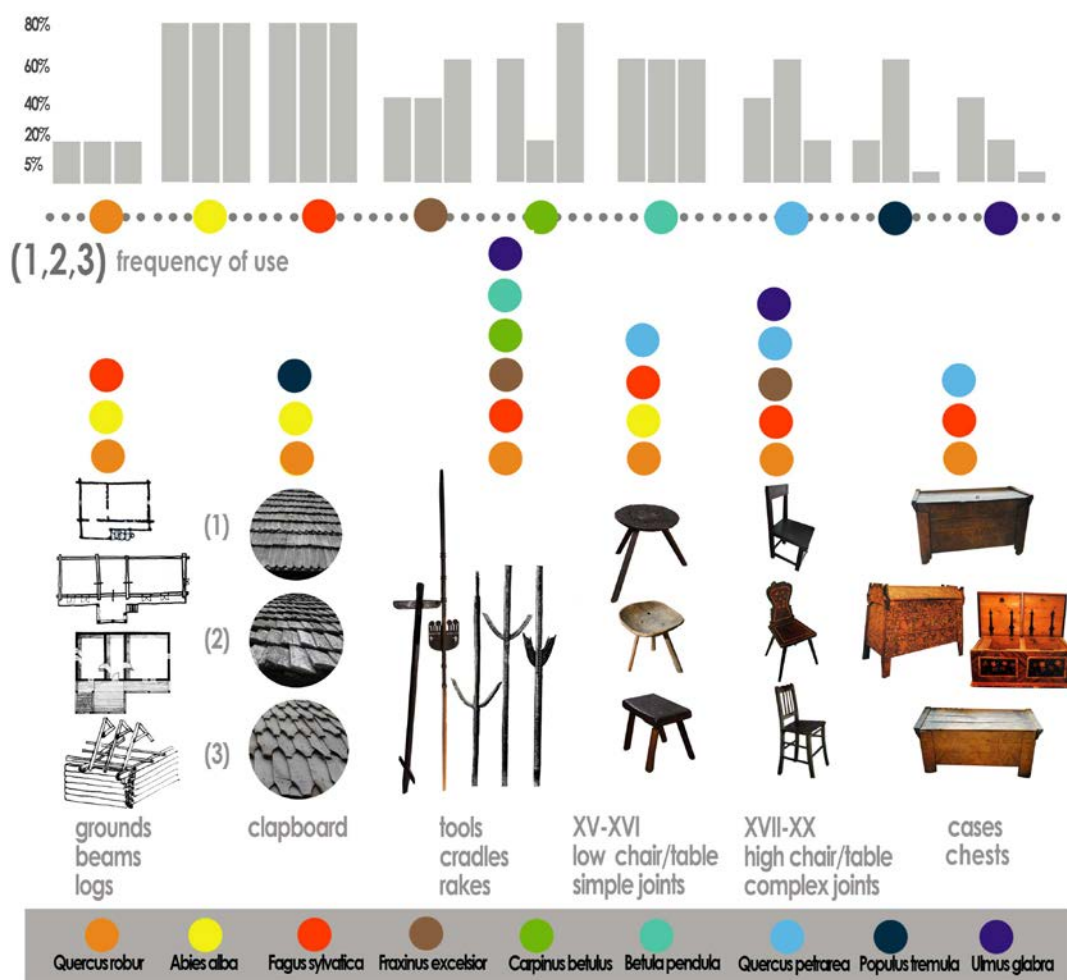
**Summarizing table of wood utilization patterns concerning vernacular architecture and furniture of Buzău County.**

Regarding furniture from the 15<sup>th</sup> -16<sup>th</sup> centuries, it can be stated that the range of the wooden species was limited to beech (*Fagus sylvatica*) and oak (*Quercus robur*). The diversification of wood processing tools beginning with the 17<sup>th</sup> century included the need for more species that were used: spruce (*Picea abies*), fir (*Abies alba*), ash (*Fraxinus excelsior*), cherry (*Prunus avium*), walnut (*Juglans regia*) (Olărescu 2012).

**RESULTS AND DISCUSSIONS**

**Phase 4 - formulation of a conclusion containing synthetical tables reflecting wood utilization patterns in the case of the three chosen areas**

After the analysis of the three selected areas (Vâlcea, Sibiu, Buzău) a summarizing table can be drawn up with the purpose of visualizing the utilization patterns through a graphic method. This table identifies the species used at present and in the past in each case study. It presents a synthesis regarding the wood utilization patterns for each area in a comparative manner.



**Fig. 9.**

**Summarizing table of wood utilization patterns concerning vernacular architecture and furniture of Vâlcea, Sibiu, Buzău County.**

It can be concluded that fir (*Abies alba*) and beech (*Fagus sylvatica*) are frequent choices concerning the structure (beams, wooden pillars, roof structure) of vernacular constructions. Concerning furniture birch (*Betula pendula*), Sessile oak (*Quercus petraea*) and aspen (*Populus tremula*) were used, hornbeam (*Carpinus betulus*) and ash (*Fraxinus excelsior*) representing the main choice concerning tools (cradles, rakes). The frequent utilization of fir and beech is due not only for their suitability but also to the availability of these wood species in the three studied areas.

The table below contains a series of structural elements of a typical wooden vernacular house, indicating their general dimensions and the wooden species utilized in a specific case: it can be clearly seen that beech (*Fagus sylvatica*) and fir (*Abies alba*), followed by Sessile oak (*Quercus petraea*) are the main choices concerning structural components and furniture.

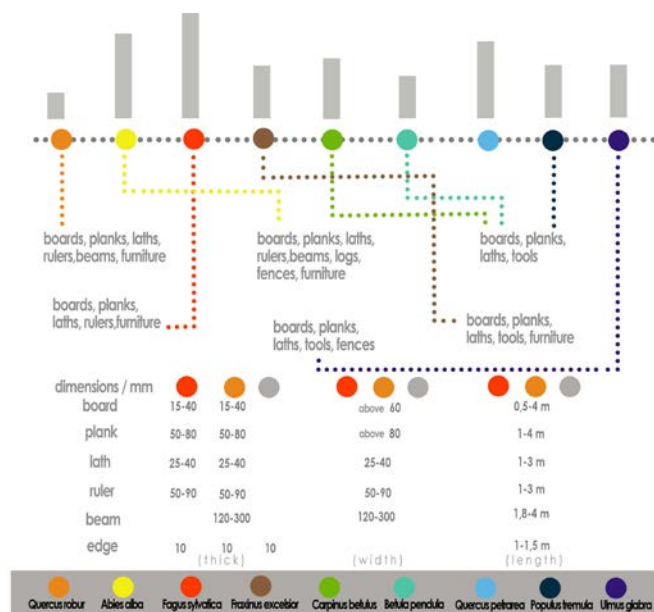


Fig. 10.

**Summarizing table of dimensions and utilization patterns concerning vernacular architecture and furniture of Vâlcea, Sibiu, Buzău County.**

In conclusion, the wood species used in general in construction and furniture in the three study cases (Vâlcea, Sibiu, Buzău Counties) starting with the main components of wooden farmhouses, were: *foundation* - foundation pits are 60-80cm deep, usually are made of the best stone mountain, filled with mortar binder, this rectangular structure is raised ½ - 1m from ground level and coincides with the height of the porch; *grounds or sill beams* - are usually made from hardwoods like oak (*Quercus robur*) and are arranged along the axes of the foundation walls; *beams* - are etched and arranged similar to the ground's longitudinal axis display, are made of oak (*Quercus robur*), fir (*Abies alba*), and "can be carved on two sides and leaning one another with sides unedged" (Păcală 1915).

The ends can be joint in various ways: ex. dovetail or gouges, and the ends will be projecting a cantilever forming an approx. 25cm wide eave); *yoke* (upper beams arranged on the top of the transversal walls, usually a house can have 3-4 yokes based on the number of rooms and these can be of oak or fir, rarely beech); *beams* (usually made of fir with round or rectangular section, or more rarely oak with rectangular section, beech rarely); *header beam* (fir or oak); *secondary beams* (smaller but more robust beams that are arranged between the yokes made of oak trunks); *rafter* (usually sectioned at the bottom to support on eaves, and on the upper side to rest on the ridge and are made of fir); *collar* (horizontal elements connecting the rafters and are made usually of fir) to the *ridge purlin* (it is the top beam of the roof where the rafters meet and are made of fir or oak); *gable* (the triangular closing of the attic is covered with a number of wooden boards, rarely it can have a small opening and it is protected from rainwater by a small guttering made of fir); *clapboard* (oak, willow, poplar and conifers) (Zwenger 2000).

**CONCLUSIONS**

The purpose of this paper is to identify the wooden species utilized in vernacular architecture and furniture and their destination in traditional wooden housing, in a synthetic manner, structuring information in special tables. The reason for structuring the information in special tables was to reflect through a visual method the wood utilization patterns and the variety of wooden species existing in the three analyzed areas: Vâlcea, Sibiu and Buzău Counties.

It can be concluded that the frequent utilization of fir and beech concerning the structure of the vernacular constructions is due not only for their suitability but also to the availability of these wood species in the three studied areas. Regarding furniture in the 15<sup>th</sup>-16<sup>th</sup> centuries, the range of the utilized wooden species was limited to beech and oak. After the 17<sup>th</sup> century, the diversification of wood processing tools caused a need for more wooden species that were used in the furnishing of vernacular interiors: spruce (*Picea abies*), fir (*Abies alba*), ash (*Fraxinus excelsior*), maple (*Acer platanoides*), linden (*Tilia cordata*), elm (*Ulmus glabra*), plum (*Prunus domestica*), pear (*Pyrus communis*), cherry (*Prunus avium*), walnut (*Juglans regia*).

Therefore, the use of more sustainable construction materials and techniques represents a major contribution to the eco-efficiency of the construction industry through a more sustainable development (Niroumand 2013), the re-interpretation of contextual values (Ozgur 2007) and traditional building or



furnishing concepts in a contemporary key in order to assure a condition of visual comfort regarding external/internal spaces (Ruggiero 2009). Vernacular architecture creates structures that are respectful to people and the environment (Baran 2011), tradition being associated with the mass of cultural values (Fei 2011) that can be a clear resource for restoring local cultural identity (Touman 2005) and in the same time represent the main reasons for the success of any project.

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