

# STUDY ON THE FLORA OF THE REGION LAPUS

Aurel ARDELEAN<sup>1</sup>, Amalia ARDELEAN<sup>2</sup>

<sup>1</sup>"Vasile Goldiș" West University, Arad; <sup>2</sup>"Vasile Goldiș" West University, Arad, Baia Mare branch

**ABSTRACT:** The study of the flora of the region, makes an inventory of the species of the plants found in the area of Lapus Country, analyzing the floristic composition also depending on the edafo-climatic main bioforms and geoelements factors. Floristic inventory of Lapus Country is carried out both on the searched area, and on the basis of summary data in the literature. The research carried out in the period 2006-2011, had as a purpose the inventory of flora in this region endeavouring at the presentation of a more complete picture of the flora and vegetation of this territory for broadening the horizon of knowledge of carpet plant in our country.

**KEYWORDS:** climatic factors, bioforms, geoelement, ecological factors, amphotolerant, Lapus Country, floristic inventory.

## INTRODUCTION

The region chosen to be searched is Lapus Country, integrated in Maramures County administration, occupying the southeastern part. Lapus basin having an area of 918 km<sup>2</sup> and stretches the upper and middle basin of the River Lapus, and dug in behind the Preluca Massif. Lapus Country is an area of contact, on the one hand between the Transylvanian Carpathian Basin and the basin, and on the other hand between the Eastern Carpathians and Somesan Plateau. Due to these double contact area has a region of broken tectonic.

Because the impact pressure antropo-zoogena, lead to the endangerment of species or communities, plant taxonomic research, chorological and phytocenologic are undertaken in the area of new information that can be harnessed for sustainable conservation of genetic fund.

## MATERIALS AND METHODS:

The research methods used to investigate the flora of Lapus Country allowed a description of flora and a list of plant species, indicating at the same time where they were found, the quality and abundance of their vegetable coating.

The floristic inventory of the Lapus Country has been realized both on the basis of studies carried out in the area subject to research, and on the basis of summary

data in the literature. The floristic inventory is confined only to a list of taxa identified landscape diversity, we have developed a description of the taxa in the light of environmental behaviours of the species, their geographical origin, adaptative peculiarities.

Thus, in order to draw up the work I rode two stages: the stage on the field and the laboratory stage. In the first stage of work we carried out field trips, at different times of the year, from March 2007 to July 2011, in order to capture the species, in different phenological phases. The laboratory stage involved the determination of plants harvested which could not be identified on the ground. Herbar material collected consists of about 500 sheets.

For the identification of species and taxa below, as well as for the processing the data I used "Flora of Romania" (vol. I-XIII), "Small Illustrated Flora of Romania", "Flora Europaea" (vol. I-V), and other similar works appeared in Romania (Godeanu, 2010). Inventoried plant species have been classified in accordance with the system of life (Ardelean, Mohan, 2006; Ciocârlan, 2009).

## RESULTS and DISCUSSION:

The list of the floristic plant sums up 1.065 taxa belonging to cormophytes (table 1). We have compiled a group of them depending on the species (826), subspecies (176), variety (41), forms (13) and hybrids (9).

Table 1

The statistics of the flora of the Lapus Country

| Ct. No. | Family                 | No. Genera | No. Species | No. Ssp. | No. Var. | No. Forms | No. Hybrids |
|---------|------------------------|------------|-------------|----------|----------|-----------|-------------|
|         | <i>Lycopodiaceae</i>   | 1          | 1           |          |          | 1         |             |
|         | <i>Selaginellaceae</i> | 1          | 1           |          |          |           |             |
|         | <i>Equisetaceae</i>    | 1          | 5           |          |          |           |             |
|         | <i>Polypodiaceae</i>   | 1          | 1           |          |          |           |             |
|         | <i>Blechnaceae</i>     | 1          | 1           |          |          |           |             |
|         | <i>Aspleniaceae</i>    | 2          | 4           | 1        |          |           |             |
|         | <i>Athyriaceae</i>     | 1          | 2           |          |          |           |             |
|         | <i>Aspidiaceae</i>     | 5          | 8           |          | 1        |           |             |

| Ct. No. | Family                  | No. Genera | No. Species | No. Ssp. | No. Var. | No. Forms | No. Hybrids |
|---------|-------------------------|------------|-------------|----------|----------|-----------|-------------|
|         | <i>Hypolepidaceae</i>   | 1          | 1           |          |          |           |             |
|         | <i>Pinaceae</i>         | 4          | 5           | 1        |          |           |             |
|         | <i>Cupressaceae</i>     | 1          | 2           |          | 1        |           |             |
|         | <i>Aristolochiaceae</i> | 1          | 1           |          |          |           |             |
|         | <i>Ranunculaceae</i>    | 15         | 34          | 8        |          |           |             |
|         | <i>Papaveraceae</i>     | 3          | 5           | 2        | 1        |           |             |
|         | <i>Ulmaceae</i>         | 1          | 1           |          |          |           |             |
|         | <i>Cannabaceae</i>      | 1          | 1           |          |          |           |             |
|         | <i>Urticaceae</i>       | 1          | 2           | 1        |          |           |             |
|         | <i>Fagaceae</i>         | 2          | 3           | 1        |          |           |             |
|         | <i>Betulaceae</i>       | 2          | 4           |          |          | 1         |             |
|         | <i>Corylaceae</i>       | 1          | 2           |          |          |           |             |
|         | <i>Portulacaceae</i>    | 1          | 1           |          |          |           |             |
|         | <i>Caryophyllaceae</i>  | 14         | 34          | 13       | 1        |           |             |
|         | <i>Chenopodiaceae</i>   | 3          | 5           |          | 1        |           |             |
|         | <i>Polygonaceae</i>     | 2          | 12          | 3        |          |           |             |
|         | <i>Grossulariaceae</i>  | 1          | 3           |          |          |           |             |
|         | <i>Hypericaceae</i>     | 1          | 3           |          |          |           |             |
|         | <i>Crassulaceae</i>     | 2          | 5           | 1        |          |           |             |
|         | <i>Saxifragaceae</i>    | 2          | 4           |          |          |           |             |
|         | <i>Rosaceae</i>         | 18         | 47          | 9        | 7        | 1         |             |
|         | <i>Fabaceae</i>         | 14         | 42          | 10       | 5        | 3         |             |
|         | <i>Lythraceae</i>       | 1          | 1           |          |          |           |             |
|         | <i>Cucurbitaceae</i>    | 1          | 1           |          |          |           |             |
|         | <i>Onagraceae</i>       | 3          | 7           |          |          |           |             |
|         | <i>Thymelaeaceae</i>    | 1          | 1           |          |          |           |             |
|         | <i>Cornaceae</i>        | 1          | 2           | 1        |          |           |             |
|         | <i>Santalaceae</i>      | 1          | 1           |          |          |           |             |
|         | <i>Euphorbiaceae</i>    | 2          | 6           |          |          |           |             |
|         | <i>Rhamnaceae</i>       | 1          | 1           |          |          |           |             |
|         | <i>Aceraceae</i>        | 1          | 3           | 1        |          |           |             |
|         | <i>Oxalidaceae</i>      | 1          | 1           |          |          |           |             |
|         | <i>Geraniaceae</i>      | 1          | 6           | 1        |          |           |             |
|         | <i>Balsaminaceae</i>    | 1          | 1           |          |          |           |             |
|         | <i>Linaceae</i>         | 1          | 1           | 1        |          |           |             |
|         | <i>Polygalaceae</i>     | 1          | 3           | 2        |          |           |             |
|         | <i>Araliaceae</i>       | 1          | 1           |          |          |           |             |
|         | <i>Apiaceae</i>         | 22         | 32          | 7        | 1        |           |             |
|         | <i>Hypericaceae</i>     | 1          | 4           | 1        |          |           |             |
|         | <i>Tiliaceae</i>        | 1          | 1           |          |          |           |             |
|         | <i>Malvaceae</i>        | 2          | 2           | 2        |          |           |             |
|         | <i>Droseraceae</i>      | 1          | 1           |          |          |           |             |
|         | <i>Violaceae</i>        | 1          | 12          | 3        |          |           |             |
|         | <i>Cistaceae</i>        | 1          | 1           |          |          |           |             |
|         | <i>Tamaricaceae</i>     | 1          | 1           |          |          |           |             |
|         | <i>Brassicaceae</i>     | 24         | 34          | 9        |          |           |             |
|         | <i>Salicaceae</i>       | 2          | 8           | 2        |          |           |             |
|         | <i>Ericaceae</i>        | 5          | 7           |          |          |           |             |
|         | <i>Empetraceae</i>      | 1          | 1           | 1        |          |           |             |
|         | <i>Pyrolaceae</i>       | 3          | 4           |          |          |           |             |
|         | <i>Primulaceae</i>      | 5          | 10          | 4        | 1        |           |             |

| Ct. No.      | Family                  | No. Genera | No. Species | No. Ssp.   | No. Var.  | No. Forms | No. Hybrids |
|--------------|-------------------------|------------|-------------|------------|-----------|-----------|-------------|
|              | <i>Gentianaceae</i>     | 3          | 5           | 1          | 1         |           |             |
|              | <i>Menyanthaceae</i>    | 1          | 1           |            |           |           |             |
|              | <i>Apocynaceae</i>      | 1          | 1           |            |           |           |             |
|              | <i>Asclepiadaceae</i>   | 1          | 1           | 1          |           |           |             |
|              | <i>Oleaceae</i>         | 2          | 2           |            |           |           |             |
|              | <i>Solanaceae</i>       | 5          | 6           |            |           | 1         |             |
|              | <i>Convolvulaceae</i>   | 2          | 2           | 1          |           |           |             |
|              | <i>Cuscutaceae</i>      | 1          | 2           |            |           |           |             |
|              | <i>Boraginaceae</i>     | 9          | 18          | 6          | 1         |           |             |
|              | <i>Verbenaceae</i>      | 1          | 1           |            |           |           |             |
|              | <i>Lamiaceae</i>        | 20         | 43          | 8          | 1         | 1         | 1           |
|              | <i>Plantaginaceae</i>   | 1          | 3           | 1          |           |           |             |
|              | <i>Scrophulariaceae</i> | 12         | 42          | 9          | 1         |           |             |
|              | <i>Campanulaceae</i>    | 2          | 17          | 2          | 4         |           |             |
|              | <i>Rubiaceae</i>        | 3          | 10          | 3          | 1         | 1         |             |
|              | <i>Caprifoliaceae</i>   | 3          | 5           |            |           |           |             |
|              | <i>Valerianaceae</i>    | 2          | 6           | 2          |           |           |             |
|              | <i>Dipsacaceae</i>      | 4          | 6           |            | 2         |           |             |
|              | <i>Asteraceae</i>       | 50         | 124         | 21         | 9         | 4         | 7           |
|              | <i>Alismataceae</i>     | 1          | 1           |            |           |           |             |
|              | <i>Typhaceae</i>        | 1          | 2           |            |           |           |             |
|              | <i>Sparganiaceae</i>    | 1          | 1           | 1          |           |           |             |
|              | <i>Liliaceae</i>        | 12         | 17          | 6          |           |           |             |
|              | <i>Amaryllidaceae</i>   | 3          | 3           | 1          |           |           |             |
|              | <i>Iridaceae</i>        | 3          | 3           | 1          |           |           |             |
|              | <i>Orchidaceae</i>      | 4          | 10          | 5          |           |           |             |
|              | <i>Juncaceae</i>        | 2          | 11          | 4          |           |           |             |
|              | <i>Cyperaceae</i>       | 4          | 27          | 1          |           |           | 1           |
|              | <i>Poaceae</i>          | 35         | 70          | 17         | 2         |           |             |
|              | <i>Araceae</i>          | 1          | 1           |            |           |           |             |
| <b>TOTAL</b> |                         | <b>382</b> | <b>826</b>  | <b>176</b> | <b>41</b> | <b>13</b> | <b>9</b>    |

The identified species were analysed according to their behaviour toward the main edafo-climatic factors: humidity (U), temperature (T) and chemical reaction of soil (R).

These edafo-climatic factors show by their numerical interpretation, spectral, the share of certain species to

the ecological values of U, T, R, and the interpretation of these values has been drawn up in accordance with the information on the natural history and influences of anthropogenic vegetation (Table 2 , figure 1).

**Table 2**

**Statistics of plants grouped by major ecological indices**

| Ecol. ind. |     | 1,0  | 1,5  | 2,0   | 2,5   | 3,0   | 3,5   | 4,0   | 4,5  | 5,0  | 5,5 | 6,0  | 0     |
|------------|-----|------|------|-------|-------|-------|-------|-------|------|------|-----|------|-------|
| U          | Nr. | 8    | 18   | 114   | 98    | 281   | 83    | 106   | 32   | 39   | -   | 6    | 30    |
|            | %   | 0,98 | 2,21 | 13,99 | 12,02 | 34,48 | 10,18 | 13,01 | 3,93 | 4,79 | -   | 0,74 | 3,68  |
| T          | Nr. | 12   | 5    | 93    | 33    | 425   | 57    | 57    | 1    | 6    | -   | -    | 126   |
|            | %   | 1,47 | 0,61 | 11,41 | 4,05  | 52,15 | 6,99  | 6,99  | 0,12 | 0,74 | -   | -    | 15,46 |
| R          | Nr. | 21   | -    | 50    | -     | 227   | -     | 265   | -    | 29   | -   | -    | 223   |
|            | %   | 2,58 | -    | 6,13  | -     | 27,85 | -     | 32,52 | -    | 3,56 | -   | -    | 27,36 |

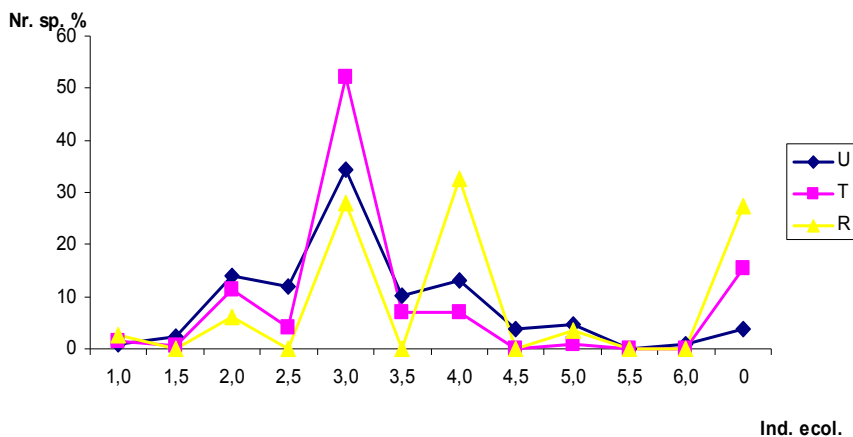


Fig. 1. Range of ecological indices flora Lapus Country

The results obtained are relevant for the ecological character of the flora and its consistency with climate and pedogenetic substrate. So depending on the humidity there is a dominance of the mezophyte species (44,66%), followed by xero-mesophyte (26,01%) and mezohigrophyte (16,94%). In smaller proportions are the higrophyte species (4,79%), amphotolerant (3,68%), xerophyte (3,19) and hydrophyte (0,74%).

Depending on the temperature of the majority of species belong to the category of micro-mezotermie (62,33%), followed by microtermie (15,46%) and amphotolerant (15,46%) species with much lower percentages.

Corresponding to the desired chemical reaction of plants to the soil of the species present in the region, are the dominant plants of the weak acid-neutrophils (32,52%), plus a significant value-acid species neutrophils (27,85%) and eurionice (27,36%).

Ecological indices for the spectrum of the country's flora Lapus analysing the spectrum bioforms (Table 3, figure 2) shows that the highest percentage is shown by hemicriptophyte (55,33%), highlighting abundance of grassy, many of them due to the intervention of secondary origin. These are followed by terophyte (21,80%), which indicates the sequence of certain periods of drought, but mostly anthropogenic influence. Phanerophyte (8,47%) indicate the forests on hillsides, western and eastern nose in the hill and mountain. Identified geofiphyte (9,08%) are in forests and meadows. Camephyte (4,12%) are the fewer weapons in the woods and meadows. The existence of a very small number of the pools and of the lakes explains the presence degradation of helohidatophyte (1,21%).

Table 3

Statistics bioforms

| Bioforms | Ph   | Ch   | H     | G    | T     |      | Hh   |
|----------|------|------|-------|------|-------|------|------|
|          |      |      |       |      | Th    | TH   |      |
| No. sp.  | 70   | 34   | 457   | 75   | 146   | 34   | 10   |
| %        | 8,47 | 4,12 | 55,33 | 9,08 | 17,68 | 4,12 | 1,21 |

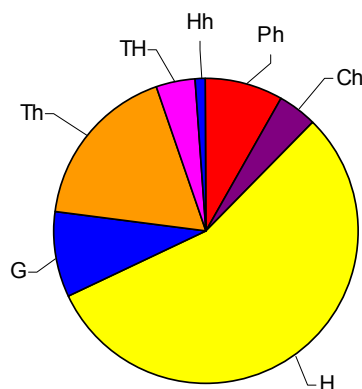


Fig. 2. Bioforms spectrum of Lapus Country

The spectrum of the categories of geoelements (Table 4, figure 3) shows that the floristic eurasian (36,56%) is the dominant vegetation of the herb layer grassy meadows of the forests.

**Table 4**  
**Geoelemente categories of flora Lapus Country**

| Geoelemente | No. sp. | %     |
|-------------|---------|-------|
| Cosm        | 44      | 5,33  |
| Cp          | 90      | 10,89 |
| Eua         | 302     | 36,56 |
| Eua-Cont    | 18      | 2,18  |
| E           | 117     | 14,16 |
| Ec          | 88      | 10,65 |
| P           | 1       | 0,12  |
| Pp          | 4       | 0,48  |
| M           | 7       | 0,85  |
| sM          | 21      | 2,54  |
| Atl-Med     | 10      | 1,21  |
| Mp          | 14      | 1,69  |
| B           | 5       | 0,60  |
| DB          | 26      | 3,15  |
| D           | 1       | 0,12  |
| End-Carp    | 16      | 1,94  |
| Alp-Carp    | 50      | 6,05  |
| Adv         | 12      | 1,45  |

The eurasian is greater with 22,40% compared to the european and 25,91% compared with the central-european participating in the composition of the vegetation. These three categories of geoelements are temperate continental climate expression.

The microclimate in the mountain area of cooler and more humid, on hillsides with the north or west, exhibition and steep valleys and the microclimate of the dark are characteristic of the species present in the circumpolar representatives 10,69%, for example: *Equisetum*

*pratense*, *Juniperus communis*, *Caltha palustris*, *Rubus idaeus*, *Geum alepicum*, *Drosera rotundifolia*, *Draba nemorosa*, *Vaccinium myrtillus*, *Pyrola minor*, *Galium aparine*, *Sambucus racemosa*, *Aster alpinus*, *Gnaphalium sylvaticum*, *Hieracium alpinum*, *Juncus trifidus*, *Luzula alpinopilosa*, *Luzula multiflora*, *Carex remota*, *Carex curta*, *Festuca rubra*, *Agrostis capillaris* etc.

The alpine element is present in a proportion of 6,05%, a percentage corresponding to the vegetation of the mountain area of the Lapus Country. The species characteristic of this geoelement are: *Aconitum variegatum*, *Alnus alnobetula*, *Silene pusilla*, *Rumex alpinus*, *Potentilla aurea*, *Geum montanum*, *Rhododendron myrtifolium*, *Ligusticum mutellinoides*, *Laserpitium krapfii*, *Viola alpina*, *Campanula alpina*, *Doronicum carpathicum*, *Carex sempervirens*, *Festuca picta*.

At the completion of the vegetation in this zone and is dynamically adds elements of daco-romanian (3,15%): *Doronicum columnae*, *Saxifraga carpathica*, *Pulmonaria rubra*, *Campanula transsilvanica*, *Achillea ligulata*, *Hieracium transsilvanicum*, *Crocus vernus*.

On the hillsides with southern exhibition, in dry and sunny locations vegetate the thermophilic south-mediterranean species (2,54%), mediterranean-pontus (1,69%), mediteranee (0,85%), and ponto-pannonians (0,48%) of: *Sedum hispanicum*, *Cornus mas*, *Polygala major*, *Ferulago sylvatica*, *Odontites luteus*, *Lolium multiflorum* etc.

A smaller number encountered in the study, were eurasia-continental elements (2,18%), atlantic-mediterranean (1,21%), balkan (0,60%), pannonian (0,12%), dacian (0,12%).

The cosmopolitan (5,33%) and the adventiv elements (1,45%) have representatives among species and species of ruderal wetlands. Some adventiv species are: *Erigeron canadensis*, *Erigeron annuus*, *Xanthium spinosum*, *Galinsoga parviflora*.

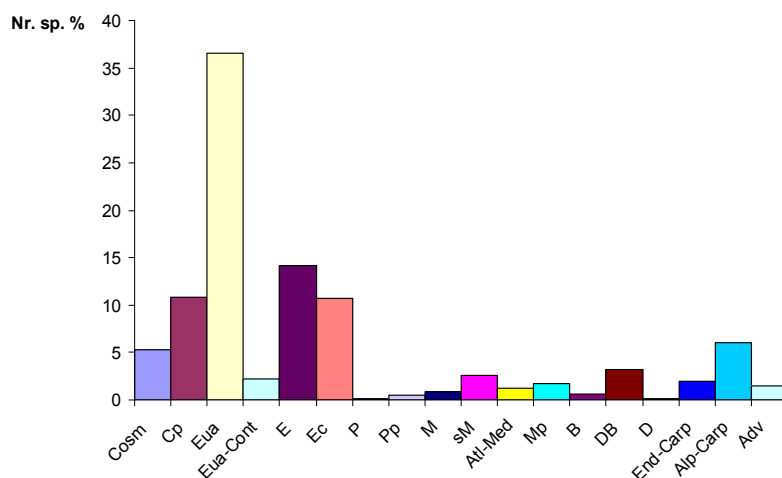


Fig. 3. Geoelemente spectrum of Lapus Country



## CONCLUSIONS

The identified taxa belong to 382 genera and 89 families. From all of the collected and identified plants a number of 139 species are referred to by the us for the first time, as being present in Lapus Country. Most families are well represented: *Asteraceae* (124 specii), *Poaceae* (70 specii), *Rosaceae* (47 specii), *Lamiaceae* (43 specii), *Fabaceae* (42 specii), *Scrophulariaceae* (42 specii), and the genera: *Ranunculus*, *Rosa*, *Rubus*, *Vicia*, *Veronica*, *Centaurea*, *Carex*.

Depending on the distribution of the geoelements and division of floristics of the Romanian territory, drawn up by Al. Borza (1965) and V. Ciocârlan (2000), and taking into account the criterion of floristic geographical criterion, the criterion of pedo-climatic, ecological and geomorphological severe Lapus territory belongs to the Central European landscape of the region, Provoncia Carpatica, Subprovincia Carpatica, district of Central-North.

As an element of novelty a number of 139 species have been reported for the first time as present on the Country Lapus. Of all the taxa of 13 are listed on the red list of cormophytes of Romania, being thus necessary protection measures for them together with the housing biotopes.

The ecological analysis of the flora in the studied region evidence its micro-mezofil character and mezoterm-weak acidic neutrofil according to the local pedoclimatic conditions.

The percentage and the ratio of bioforms present in the regional flora confirms the presence of forests and grasslands, plant formations and the zone of azonal phytocenosis as well in this region.

Last but not least, an inventory and analysis of vegetation in the region deserves protection, the conservation and protection of natural ecosystems, especially those in danger and those containing taxa which are in danger.

## REFERENCES:

- Ardelean, A., Mohan, Gh., 2006, Flora medicinală a României, Ed. ALL, București
- Ardelean, A., Mohan, Gh., 2006, Botanică sistematică, Ed. „Vasile Goldiș” University Press, Arad
- Ciocârlan, V., 2000-2009, Flora ilustrată a României, Ed. Ceres, București
- Ciocârlan, V., 2000, Flora ilustrată a României – *Pteridophyta* et *Spermatophyta*, Ed. Ceres, București
- Ciocârlan, V., 1996, Împărțirea fitogeografică a teritoriului României. Provinciile floristice, St. Cercet. Biol., seria Biol. Veg., 48
- Dihoru. Gh., Negrean, G., 2009, Cartea roșie a plantelor vasculare din România, Ed. Academiei Române, București
- Godeanu, S. P., 2010, Dererminator ilustrat al florei și faunei României, Ed. „Vasile Goldiș” University Press, Arad
- Pârva C., 2002, Enciclopedia plantelor - plantele din flora României, vol. I – II, Ed. Tehnică, București
- Tutin T., G. (Red.), 1993, Flora Europaea, Vol. 1, Ed. II, Cambridge University Press
- \*\*\* 1952 - 1976, *Flora R.P.R și R.S.R.*, Volumele I – XIII, Ed. Academiei Române