CLUSTERING TECHNIQUE – APPLICATIONS WITHIN BIOLOGY AND HORTICULTURE LESSONS

TEHNICA CLUSTERING – APLICAȚII LA LECȚIILE DE BIOLOGIE ŞI HORTICULTURĂ

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Abstract. *For any didactical activity, the teacher select from the methodological register only those methods considered to be, at a certain moment, the most efficient for reaching the aim and established objectives. Taking into consideration that not every type of learning is efficient for the formation of the school children personality, in the present time is thought that the active and interactive learning, specific to the modern instruction, is favouring the formation of intelectual and action abilities, which are preserved during the entire life. One of the techniques which can be used for interactive teaching-learning Biology and Horticulture is the clustering technique. During the lesson, the teacher can combine the clustering technique with other methods, allowing the school children to actively participate for gaining knowledge.*

Rezumat. *Pentru orice activitate didactică, profesorul selecționează din registrul metodologic doar acele metode pe care le consideră, la un moment dat, a fi cele mai eficiente pentru atingerea scopului şi obiectivelor stabilite. Având în vedere că nu orice tip de învățare este eficientă pentru formarea personalității elevilor, în prezent se consideră că învățarea activă şi interactivă, specifice instruirii moderne, favorizează formarea unor capacități intelectuale şi acționale, care se păstrează pe tot parcursul vieții. Una dintre tehnicile ce poate fi folosită în predarea-învățarea interactivă a Biologiei şi Horticulturii este tehnica Clustering. În desfăşurarea lecției, profesorul poate combina tehnica Clustering şi cu alte metode, astfel încât elevii să participe activ, la însuşirea cunoştințelor.*

”The only certain thing we can transmit to our students and which will be certainly useful for them in the future is to teach them to learn, as an attitude for their entire life. This is the most general habit which the modern education should form at them” (Cerghit, I., 2006) .

The didactical method is “an essential way for carrying out an instructive action”, showing “*how should* to proceed, *how* to teach and *how* to learn, *how* to teach other people to learn (Cerghit, I., 2006).

Within didactical activity, by a certain method, the teacher hold a dialogue with the school children, establishing certain relations with them, which are influencing the nature and effects of learning. By selecting and using of a certain didactical method within a lesson, the teacher should take into consideration not only the direct and immediate results obtained by the school children by learning, but also the indirect effects which this is producing, namely practising and development of certain superior intelectual processes, abilities and skills, which are necessary to the individual for all the rest of life.

Based on these reasons, it is considered at present that is more important the use of certain methods, which are aiming at the development of capacity to observe and explain, to explore and discover things and nature phenomena, to make assumptions, to investige independently, to inventand test, to apply, etc., rather than methods by which is intended

the acquiring by the school children of a consistent volume of knowledge, offered "ready-made" by the teacher.

The teacher's option for certain didactical methods, in order to reach the aim and objectives of a didactical activity, depends by "its competence, capacity of pedagogical reflection and analysis of the situation at a certain moment", because "there are no good and bed methods, but adequate methods properly or unproperly used" (Cerghit, I., 2006). For assuring the success of learning for the school children, the teacher should to select the methods and content of the theme which must be teached in a lesson, the abstractization level of the new knowledge, the available teaching tools, the psychosociology of the individuals forming the class, as well as the individual and age particularities of the school children, necessity of their active participation to learning and their willingness to cooperate for this.

The new orientation in the educational practice are aiming at promoting the active-participating and interactive methods, increasing the importance of learning by discovery, promoters of the heuristic methods and those of learning by discovery, as well as at giving strength of the pragmatical orientation of the methodology, with a greater importance given to the use on large scale of the practical-applicative methods.

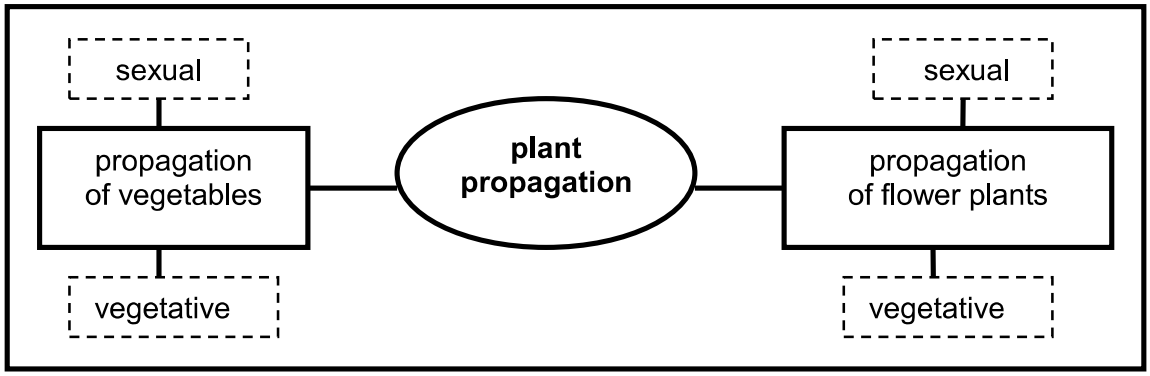

Fig. 1 - "Cluster" – Methods for propagation of vegetables and flower plants

Taking into consideration that not any type of learning is efficient in formation of the personality of school children, at present, the modern education is carried out by the use of the active-participative methods, which are creating the necessary conditions for an individual active learning, as well as by the use of interactive methods, which favor an interactive or interdependent learning. The interactive methods are those which "contribute to creation of some situation of learning focused on the school children disponibility and willingness to cooperate and share each other the ideas, personal views, experiences with opening to all the others" (Bacoş, M., 2002; Cerghit, I., 2006). These methods stimulates the mechanism of thinking, inteligence, imagination and creativity, contributing to the development of creative thinking, sharp biting wit and school children's independence.

One of the interactive techniques which can be used in teaching-learning horticulture and biology is the clustering technique. This technique contribute to the formation of the ability of school children "to structure, systematize, classify, and form overall visions" and also of their ability "to pass from the general to particular and viceversa"(Lozovanu, S., 2001).

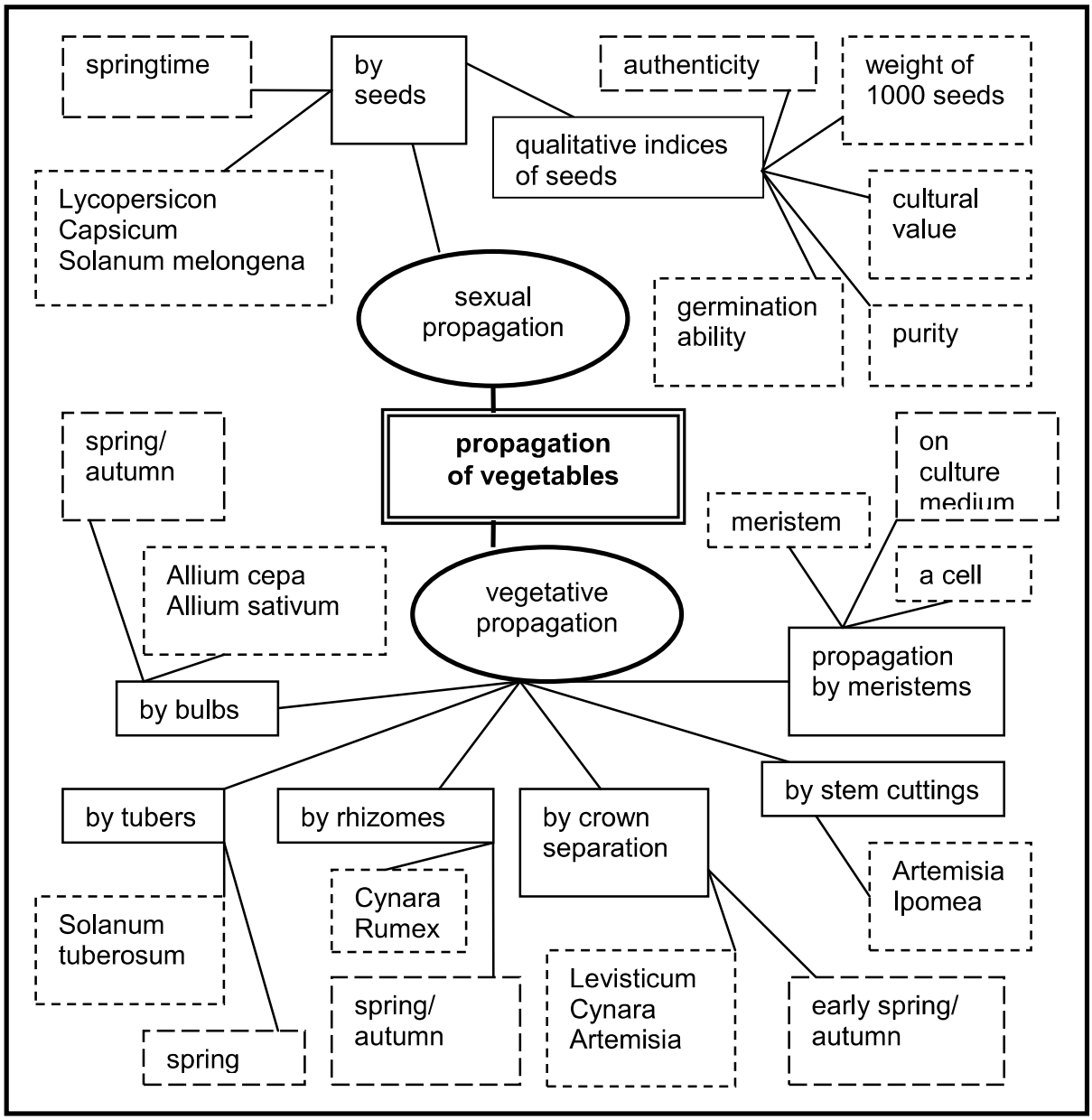

Fig. 2 - "Cluster" – Propagation of vegetables

This technique can be used successfully within recapitulation lessons, at the end of a chapter or school year, for systematizing knowledge already acquired by the school children. For exemplification we have selected the presentation of theme "Propagation of vegetables and flower plants", from the chapter "Cultivation of horticultural plants", 11th class, recapitulation theme at the end of the chapter. Starting from the discussion of the notion of plant propagation, the teacher elaborates, together with the school children, the begining of a cluster (Fig.1), in which the two ways of propagation will be mentioned: sexual (generative) propagation and asexual (vegetative) propagation.

Further on, the activity with the school children can be realized as follows:

a) If the teacher choose for combining the activity within groups with that of frontal activity, then the class will be subdivided in four groups (A, B, C, and D), each of them with 6 school children. Three school children from each group, who will form subgroup 1, will have to complete the data concerning to the propagation of vegetables,

and the other 3 school children, who will form the subgroup 2, will carry out the "cluster" for the flower plant. Remain the choice of the school children which data will be used for constructing the cluster.

By using the different sources of information, they should be able to mention many other plant species for the different types of propagation. For exemple, a possibility for completing the cluster with data concerning the propagation of vegetables and flower plants, is presented in Figures 2 and 3, respectively. Then, by the effort of all the members of each group, the schemes carried out by the subgroups 1 and 2 will be assembled, resulting the final "cluster". After the posting of posters carried out by the use of "clustering" technique, the activity can be continued with the application of the "gallery tour" technique, in which the school children from the groups A and B, respectively C and D, analyze the posters realized by their colleagues. At the end of lesson, by frontal activity, will be carried out on the blackboard another "cluster", starting from the organs of a flowering plant, which will include data concerning to: organs of sexual propagation, organs of vegetative propagation, methods applied for propagation, in general, and exemples of plants for the different modes of propagation.

Another possibility to continue the activity carried out within groups, after the realization of posters by using the clustering technique, and discussion of their content, can consist in realization of a practical work on vegetative propagation, either by a representative of each group, in the front of class, or by each member of the group. It can be realized the propagation of either pelargonium, begonia, or sinningia by cuttings, the propagation of calla by rhizomes, propagation of african violets or lovage by crown separation, propagation of potato by tubers, or the propagation of roses by grafting. At the end of lesson, in the stage of reflection, is applied the "five minutes essay", in which the school children are asked to write a thing they learned from the lesson, and to formulate questions concerning the discussed subject, to which the teacher will answer within the next lesson.

b) If the activity is carried out frontally and individually, the "cluster" will be completed by a few school children on the blackboard, based on the answers given at the questions addressed by the teacher to whole the class. At the end of lesson, by using the Venn diagram, the school children will compare the methods of vegetative propagation of vegetables and flower plants, discovering the similarities and dissimilarities between them.

In Biology, at the 10th class, the clustering technique can be used in a recapitulation lesson on the functions of nutrition in higher plants. At the begining of the lesson, will be elaborated an outset of cluster, establishing that foor each vegetative organ the school children will have to fill in: types, external organization, internal organization and functions. The class will be divided in two groups (A and B), each group being subdivided in 3 subgroups. Subgroups A1 and B1 will complete the cluster with data about the root, subgroups A2 and B2, with data about the stem, and subgroups C1 and C2, with data about the leaf. By assembling the schemes realized by each subgroup will result the final "cluster". The two posters realized by groups will be posted and presented by a member of each group. At the end of lesson, by frontal activity, will be realized on the blackboard a "cluster", taking into consideration the processes involved in plant nutrition (Fig. 4).

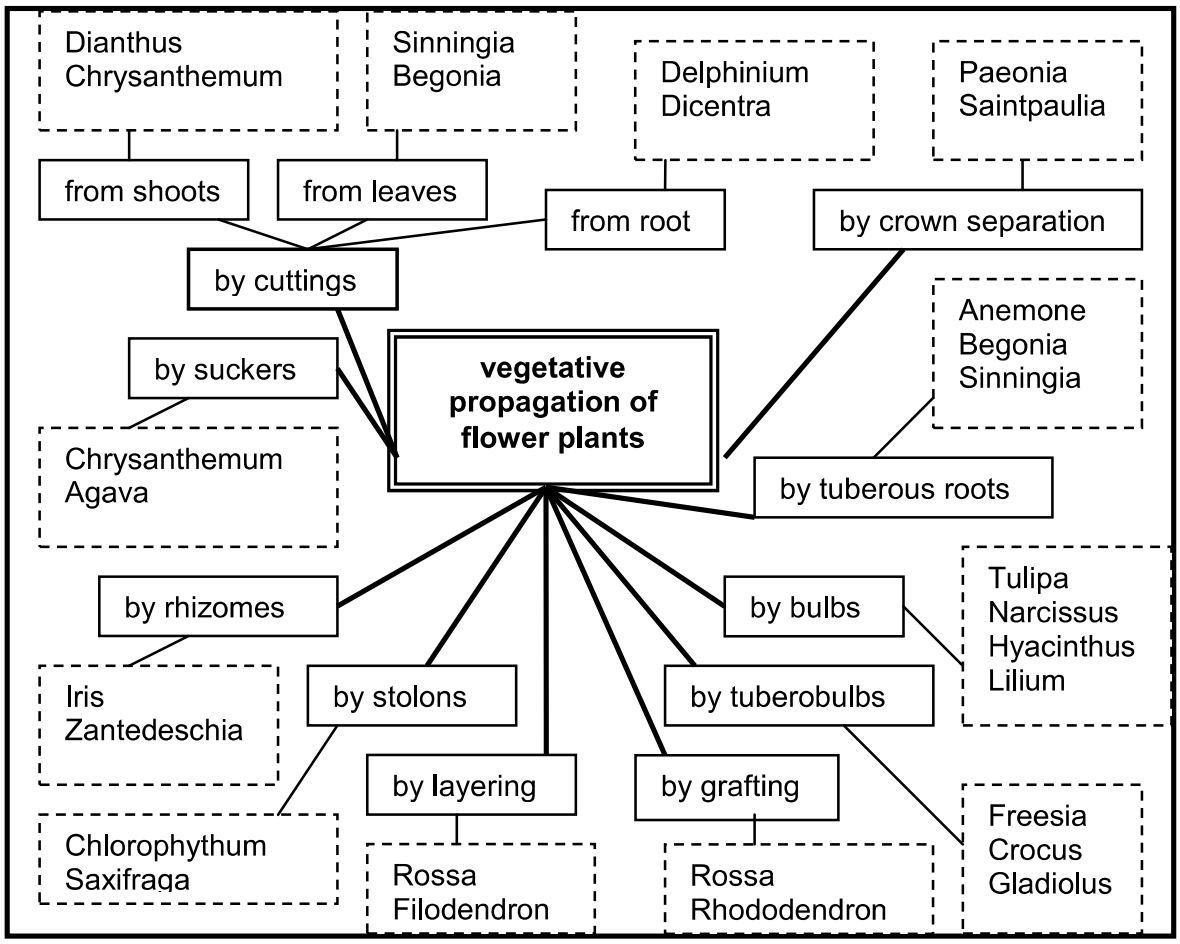

Fig. 3 - "Cluster" – Vegetative propagation of flower plants

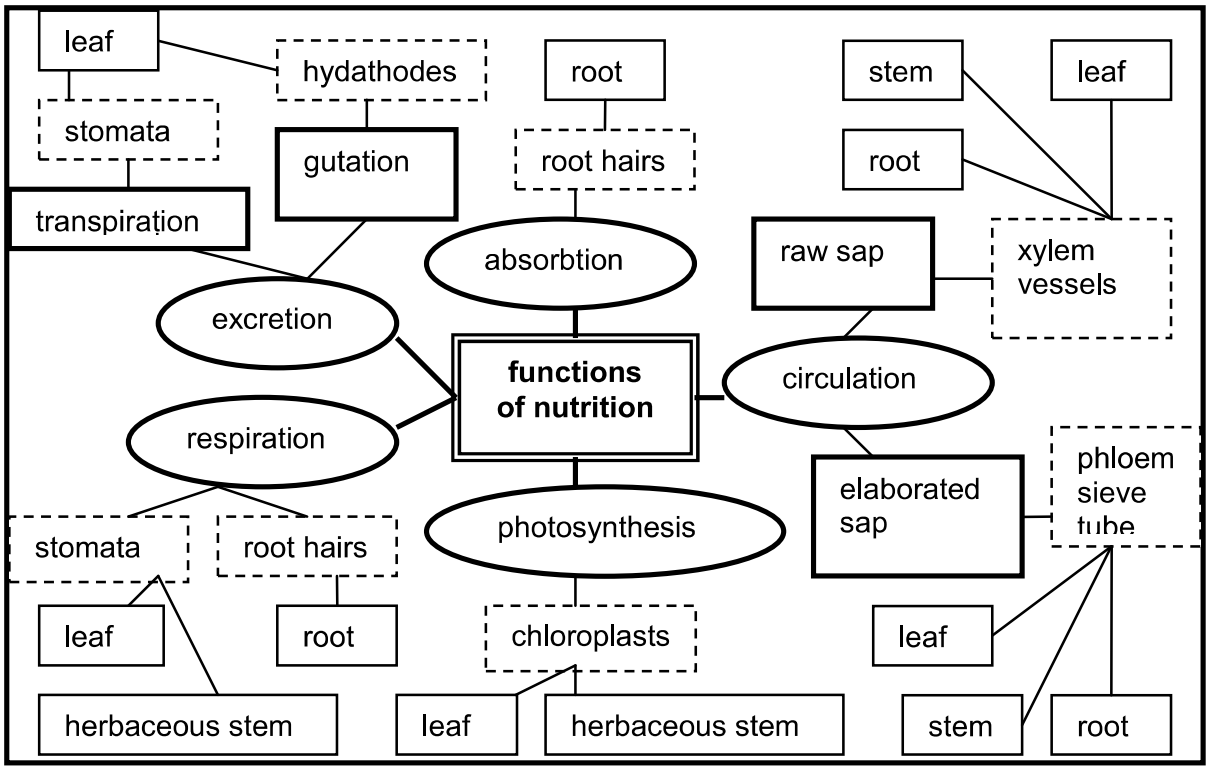

Fig. 4 - "Cluster" – Processes involved in plant nutrition

The clustering technique can be used not only within the recapitulation lessons, but also in the stage of reflection and those of evocation of lesson. For exemple, in the stage of reflection on the lesson "Obtaining of planting material for small fruits", from the chapter Cultivation of horticultural plants, 11th class, the school children can be asked to realize a "cluster" in which to systematize the knowledge on the studied methods of vegetative propagation (Fig. 5).

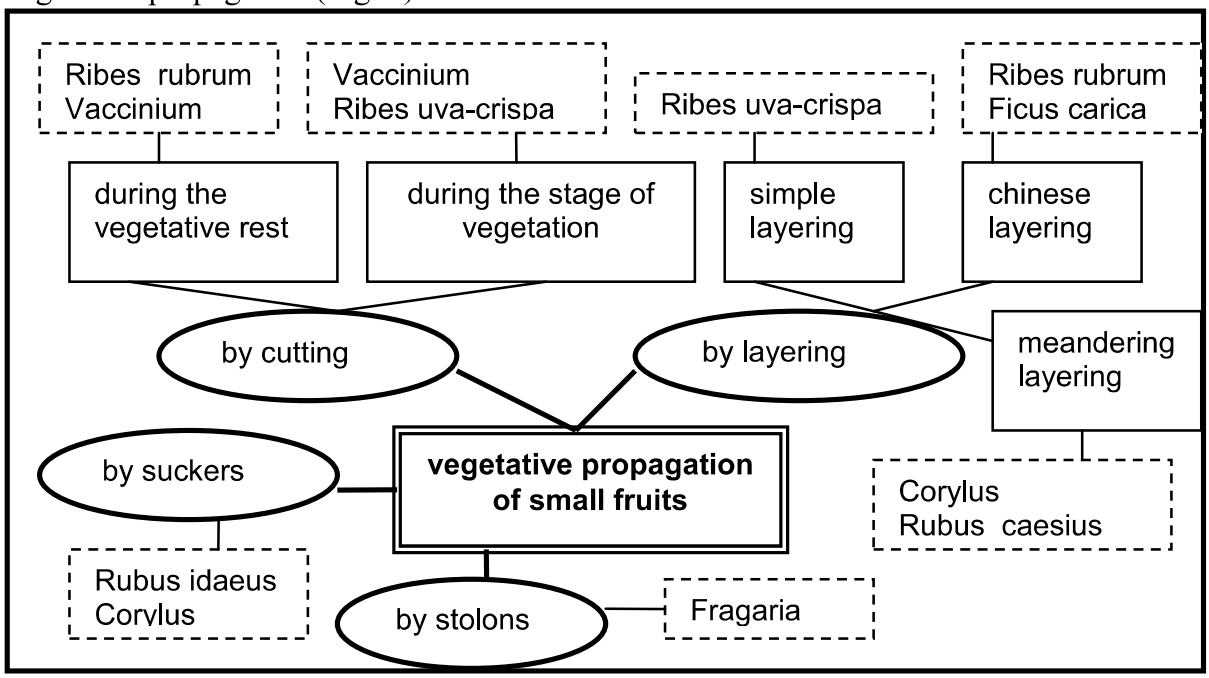

Fig. 5 - "Cluster" – Vegetative propagation of small fruits

Clustering technique, as can be observed from the given exemples, "allows the possibility to the school children to think critically, to systematize the knowledge, to create new links between acquired information, as well as to present graphically the information" (Petruța, 2008).

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