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# A short survey on some aspects of Egres Theory

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**Abstract**

The problems in the area of Egres Theory have been extensively studied in culinary sciences, but only recently have they been subject to systematic mathematical research. The present survey attempts to give an overview of these recent results, paying special attention to the remarkable progress made in the realm of algorithmic and combinatorial Egres Theory.

**Keywords:** Egres; Pöszméte; Piszke; Büszke

## 1 Introduction

As one of the important branches of Berry Sciences, Egres Theory has always been a well-studied research area. It is a well-known fact, extensively discussed in previous survey-type works like [5], that egres is actually equivalent to *pöszméte*, *piszke* and *köszméte*. To cite a less known, but equally significant result, it can be shown [2] that egres can be locally equivalent to *büszke*. In the light of such a broad field of applications, it is surprising that mathematicians were not involved in this area until recently.

**Definition 1.1.** *Egres* belongs to the family of berries. Its two species are *American egres* (ribes hirtellum) and *European egres* (ribes grossularia). An egres may be green, white (gray-green), yellow, or shades of red from pink to purple to almost black. Fruits of the European egres may be very large, like a small plum, but are usually 1 inch long, less in width. American egres fruits are smaller (to $\frac{1}{2}$ inch), perfectly round, all becoming pink to wine-red at maturity. Skin color is most intense in full sunlight. Berries generally drop when overripe. The fruit has a flavor all its own, the best dessert cultivars as luscious as the best apple, strawberry or grape. Egres likes morning sun, afternoon part-shade and buoyant air circulation; it grows best in summer humid, cool regions with great winter chilling.

To show how genuine new results can be obtained by simple mathematical methods, we start with a lemma that is an easy consequence of the definition:

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**Lemma 1.2.** *Egres is more productive in Hungary than in Congo.*

*Proof.* For a country $x$, let $p(x)$ denote the productivity of egres in $x$, and let $r(x)$ be the proportion of summer humid, cool regions with great winter chilling in $x$. Let $\mathcal{E}$ denote the countries of Europe, and $\mathcal{A}$ denote the countries of America. The definition clearly implies that if $x_1 \in \mathcal{E} \cup \mathcal{A}$, $x_2 \notin \mathcal{E} \cup \mathcal{A}$, and

$$r(x_1) > r(x_2),$$

then

$$p(x_1) > p(x_2). \qquad (1)$$

The proof is completed by applying (1) with $x_1 =$ Hungary and $x_2 =$ Congo. □

In Hungary, three different types of egres can be distinguished: the *Szentendrei fehér* (Szentendre white), the *Gyöngyösi piros* (Gyöngyös red), and the *Zöld óriás* (Green giant). Their main characteristics can be seen on Figure 1.

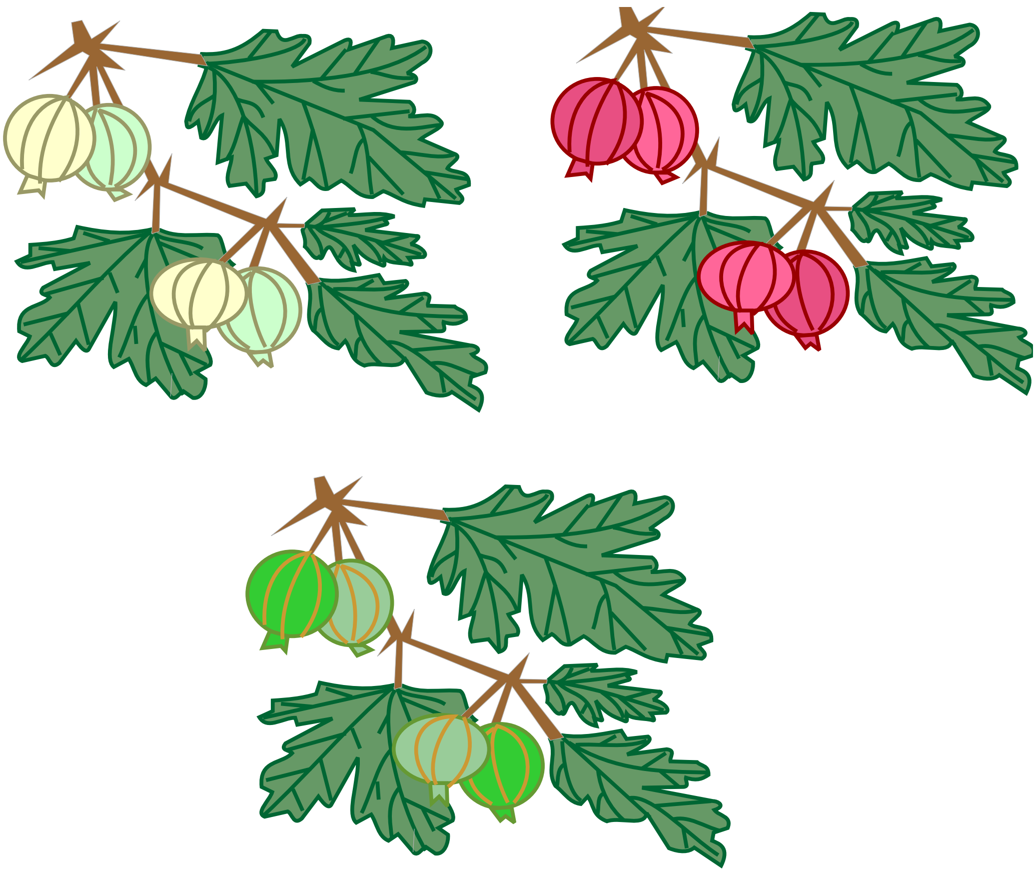

Figure 1: Egreses in Hungary

To show why these characteristics make egreses particularly suitable for combinatorial purposes, consider the following nice example of Combinatorial Egres Theory:

**Problem 1.3.** Given $n$ szentendrei fehér egreses and $n$ gyöngyösi piros egreses, we arrange them in every possible order, and we count the number of colour changes in the row for every ordering. Let $f(i)$ denote the number of orderings where there are $i$ colour changes. Prove that

$$f(n-k) = f(n+k) \quad (2)$$

for any $k < n$.

# 2 Main theorem

After this brief introduction, we turn our attention to the main Theorem of the paper, which is one of the key foundations of successful egres research:

**Theorem 2.1.** Egres *is the Hungarian word for* gooseberry.

*Proof.* The exposition of the full proof is beyond the scope of this short survey, so the reader is referred to [1]. □

The theorem has far-going consequences, of which only a few representative examples are presented here. Consider for example the following beautiful corollary:

**Corollary 2.2.** Pöszméte *is equivalent to* Uva Spina.

*Proof.* It is easy to see that *gooseberry* is equivalent to *uva spina*. Thus Theorem 2.1 implies the claim. □

An even more significant fact is that the theorem makes it possible to apply the results of [3] in Egres Theory:

**Proposition 2.3.** *Egreses have a high requirement for potassium and a moderate need for nitrogen, although excessive amounts of nitrogen promote disease, especially mildew. Between four and eight ounces of actual nitrogen per square yard strikes a good balance between growth and disease tolerance. The symptom of potassium deficiency is scorching of leaf margins. Deficiency can be avoided with an annual dressing of half an ounce of potassium per square yard. Egres plants also have a fairly high requirement for magnesium, so if the soil is very acidic and needs lime, use dolomitic limestone, which supplies magnesium as well as calcium.* □

# 3 Algorithmic consequences

Thanks to Theorem 2.1, there is fast growing interest in egres algorithms all over the world, which of course has a beneficial effect on the availability and quality of such algorithms. Here we cite a few algorithms described in [4].

**Algorithm 1.** Hot Egres Soufflé
**Input:** 1/4 c Egres puree, thick and sweetened
6 tb Butter
1/2 c Flour
1 c Milk
3 lg Eggs, separated
**Output:** 5-cup dish of soufflé
**Running time:** 1 hour

In a heavy pan, melt the butter over low heat. As the butter melts, stir in the flour. Stir until smooth and blended, then gradually add the milk, stirring all the time so that the mixture remains smooth. Bring to the boiling point, still stirring, and cook for three minutes. Add the egres puree and stir until thoroughly mixed.
Beat the egg yolks until they are light and combine them with the egres mixture. Beat the whites until they are stiff (this means that you can turn the bowl upside down without any ill effect), and use a metal spoon to gently fold the whites into the egres mixture.
Lightly oil a 5-cup soufflé dish. Turn the mixture into the soufflé dish and bake on the middle shelf of a preheated 375-degreeF oven for about 45 minutes. By this time the soufflé should be crisp on the outside and still creamy on the inside. (For a more creamy result, bake the soufflé in a water bath: Stand the soufflé dish in a pan and pour enough hot water into the pan to cover the sides of the dish by about 2 inches.)

**Algorithm 2.** Apple Egres Preserves
**Input:** 2 c Chopped granny smith apples peeled
2 c Egreses
2 tb Lemon juice
2 1/2 c Granulated sugar (to 3 cups)
**Output:** 5 or 6 half-pint jars of preserves

Wash 6 half-pint jars. Keep hot until needed. Prepare lids as manufacturer directs.
Chop the apples fine, or crush them in a food processor. Add the apples and egreses to a large, heavy, non-aluminum pot and stir in the lemon juice and sugar; mix thoroughly. Bring to a rolling boil, stirring constantly. Reduce the heat to a gentle boil and let the mixture cook, stirring occasionally, until the preserves turn transparent and reach the jelling point and has reached the jelly stage (220 degrees F), stirring constantly.
Remove the preserves from heat, skim away any foam that has formed, and let the mixture sit for 5 minutes. Ladle the hot preserves into one hot jar at a time, leaving 1/4-inch head space. Attach lid. Fill and close remaining jars. Process in a boiling water canner for 10 minutes.

**Algorithm 3.** Egres Burnt Creams
**Input:** 1 lb Tart green egreses
4 oz Caster sugar (or more)
5 oz Granulated sugar
1/2 lb Fromage blanc or quark -OR- creamy Greek yoghurt
1/2 pt Double cream
**Output:** Burnt creams

Choose a heavy-based saucepan with a large surface area. Put the topped and tailed egreses into it, still moistened by the water in which they have been rinsed. Cover and cook over very low heat until the fruit is perfectly tender. (It does not matter if the berries collapse in cooking here as they will be crushed to a pulp for serving.)
Crush the cooked fruit with a potato masher and cook for several minutes more, without the lid but just stirring occasionally, until most of the juices have evaporated leaving a thick fruit puree. Add caster sugar to taste and stir until melted. Spoon the puree into 8 individual cocotte dishes and leave until cold.
Beat the fromage blanc, quark or yoghurt into the cream until smoothly mixed then whisk until fairly stiff. Spoon the creamy mixture over the cold puree and level the tops. Cover and chill in the freezer for about 45 minutes until the cream firms up.
Dissolve the granulated sugar in 1 tablespoon warm water in a pan placed over low heat. Then turn the heat up and cook until the sugar carmelises to a rich shade of gold. Quickly pour the burnt sugar evenly over the chilled creams and set aside for 20 minutes or so until the caramel sets in thin brittle sheets of gold.

## References

[1] László Országh, *Magyar-Angol Kéziszótár*, Akadémiai Kiadó, Budapest, 1971.

[2] Zoltán Király, oral communication.

[3] *Fruit Facts*, `http://www.crfg.org/pubs/ff`.

[4] *Just Berry Recipes*, `http://www.melborponsti.com/berry/gooseber`.

[5] Lajos Kádas, *Gyümölcsök*, Búvár Zsebkönyvek, Móra Ferenc Könyvkiadó, 1978.