SUMMARY

The modern viticulture close to the biological (integrated) model has in view to assure the maximization of the productivity quantity and quality, the benefit through productivity costs minimizing the conditions of habitat preservation eliminating the disturbing factors.

In future, it is predicted to develop viticulture in areas with maximum favourability by respecting the viticulture biological (ecological) requests in getting high quality healthy products.

The concept of ,,the integrated fertilizing system" taken as an association of techniques in order to get a high biological benefit provides possibilities of re-constructing it from technological point of view for an ecological viticulture. Through this system, the bio-technologies remodeling are promoting the resources of the biological exploration and biological products that are to be obtained.

The integrated fertilizing system proposes the incorporation of the organic fertilizers in viticulture techniques. This one stimulates the pedo-genetic processes and provides the conditions required to obtain an ecological viticulture.

In a contemporary society, the organic fertilizers don't cover the agriculture needs entirely, therefore, the use of the mineral fertilizers besides the organic ones are an imperious necessity.

The chemical fertilizers constantly administrated induce the mineral nutrition balancing depending on their rhythm of absorption by the plant and the balance of the nutritive elements from the soil. Depending on the soil optimum level of supply and the global consume of N, P_2O_5, K_2O, the chemical fertilizers are differently administrated.

The concept of integrated fertilization is also provided by the use of foliar fertilizers. The foliar fertilization is a modern and efficient way of increasing and improving the quality and the quantity of grapes productivity. The foliar fertilizers have in their composition macro and micro elements as well as organic substances, active from biological and physiological point of view, depending on the hormones and vitamins that determine the stimulation of the plants photosynthesis.

The foliar fertilizing may assure high increases in crops without soil or productivity

residual pollution, contributing therefore to the energetic and photosynthetic output increase of the foliar equipment.

The vine fertilization as a bio-technological link has to provide conditions the ecological exploration of the existing resources and the acquirement of a biological benefit. The fertilizer assortments, the doses, the periods of fertilizing as well as the methods that will be applied are chosen depending on the soil nutritive contribution and the vine possibilities of supply with environmental elements.

The preservation of a healthy environment and the high quality of vine – wine making goods are achieved through the correlation of the soil nutritive resources (the preponderantly organic fertilization and the limitation of the chemical one) providing the minimization of the anthropic aggressions.

Having in view the importance of practicing the integrated fertilizing system that focuses on the maintenance and the improvement of the soil agro-productive potential, the habitat preservation against pollution and the rational use of fertilizers, the chemical ones especially, with a positive involvement in a qualitative and quantitative productivity, we consider this paper which is juxtaposing these interests to be just what we need.

In this respect, the present study has in view the applicability of the foliar fertilizers (chemical and organic ones) which provide a faster nutrition in nutritive elements and high increases in productivity on two agrofunds - one agrofund unfertilized from mineral point of view and another one which is fertilized in ecological doses ($N_{50}P_{25}K_{90}$) for practicing and promoting a durable agriculture.

In order to draw up this paper, in 2005, in autumn, a bi factorial experimentation was performed in randomized blocs within the Copou –Iaşi vineyard, belonging to Vini-Fruit farm. The land, this experimentation was founded on, is displaying a S, S-W laying with a 6-7% slope inclination.

The biological material was in such a way selected so that it should be as representative and prospective as possible in order to fulfill the aims and objectives we have in view. So, the assortment which has been chosen – Petit Sauvignon – possesses within the area under study a great amount, high quality wines having been obtained of. The plants have been displayed on the land at a 2 / 1, 4 distance from one another, allotting to the vine a 45 loops / leaf buds loading at cutting. The leading form of the vine in plantation is the bilateral cord on the semi – stem and the cutting system is the mixed one made up of knobs of two leaf buds / loops and 4-6 eye tendrils (Cazenave).

The main objectives of this study materialized in the results which have been obtained,

enroll this theme in the sphere of present preoccupations, being widely practiced in order to increase the grapes productivity per unit of area by practicing a modern viticulture as close as possible to the ecological system.

The paper structured in **10 chapters** has had in view a judicious plan. In the *first 4 chapters* general issues are developed, the following *4 chapters* include issues related to own researches and the *last 2 chapters* are dealing with the economic efficiency, the conclusions being drawn as well.

In order to set out the differentiated signification of the experimental variants, the limit differences for transgression probabilities of 5%, 1% şi 0, 1% were calculated.

The **first** *chapter* contains appreciations related to the vine importance and the spread ness in the world and in Romania as well and according to OIV/IOV (the International Office of Vine and Wine) from 2008, the main countries which cultivate and produce vine are displayed.

In the **second** *chapter* there are drawn up the results and the conclusions related to the setting up of the vine fertilizing system at national and international level, reporting the issues related to nutrition particularities and the influence of the eco –climatic and eco-pedologic factors on the mineral nutrition and on the vine metabolism; methods and techniques of testing the soil fertility and of controlling the vine nutrition; doses, forms , periods and methods of administrating fertilizers in viticulture plantations targeting the physiologic characteristics and the vine growth and bearing, etc.

The **third** *chapter* characterizes the natural conditions the researches related to geographical position, geomorphology, hydrology, climatic conditions and soil and vegetation have been developed in. Taking into account the average annual temperature and the sum of the annual precipitations from the three years of research, we might characterize them as it follows: the agricultural year 2005-2006 was considered a normal year, favorable for vine culture bearing with the following values 9,6°C and 772,5 mm, the year 2006-2007 was an arid year with high temperatures and 12,5°C and 427,6 mm as values and the year 2007-2008 had an excessive humidity and 10,7°C and 863,0 mm as values.

In the **4th** *chapter,* aspects referring to the research objectives, the experiments methodology, the soil cultivating and its agro-chemical analysis within the experimental area as well as a series of characteristics related to the foliar and radicular fertilizers which were used were drawn out.

Chapter **5** includes researches referring to the evolution of the total forms of the nutritive elements within the plant, evolution which depends on the applicable type of fertilizer. The most significant quantities of azoth and phosphor in the three pheno phases (disburdening, blossoming

and grapes ripening were accumulated in the last year of research 2007/2008 followed by the first agricultural year 2005/2006 and at last by the year 2006/2007 and the accumulations of potassium from the plant increased in the order of the years of research 2005/2006, 2006/2007 and 2007/2008 respectively. The variants fertilized in foliar and mineral complex have accumulated in leaves the most important quantities of macro-elements followed by the variant where only the mineral agrofund has been provided to and followed then by the unilateral foliar fertilized variants. The Poly –Feed foliar and green Kristalon assortments have increased most significantly the quantities of NPK from the plant both in their applicability on the unfertilized agrofund and mainly on the mineral fertilized agrofund in ecological doses.

In *chapter* **6,** researches carried out in 2006-2008 and referring to the influence of the foliar fertilization within the complex and the mineral agrofund upon the issues of fertility and vine productivity were drawn up. The values of the relative and absolute fertility coefficient at the unilaterally foliar fertilized variants were influenced to a great extend by the climatic conditions of the researching years , most significant being the first year (comprised between 0,79-1,1 to Cfr and between 1,14-1,36 to Cfa) and the last year (between 0,6-1,0 to Cfr and between 1,11-1,4 to Cfa) comparatively with the second year of research 2006/2007 (between 0,5-1,0 to Cfr and between 1-1,3 to Cfa). For the variants fertilized in mineral and foliar complex, the most significant values of these coefficients were obtained in the last agricultural year (comprised between 1,13-1,38 to Cfr and between 1,35-1,72 to Cfa) having been revealed the importance and the efficiency of the assiduous applicability of the yearly fertilizers, at the radicular level especially. As for the variant where only the mineral agrofund has been provided to, variant with average values of the relative fertility coefficient of 1,03 to Cfr and Cfa of 1,29, is placed above the unilaterally foliar fertilized variants and the variants fertilized in mineral and foliar complex.

Chapter **7** includes the researches referring to the influence of foliar fertilization within the complex and the mineral agrofund impact on vine main physiological characteristics. Therefore, the highest average values of the annual growths and those of the foliar area were registered on the whole in the last year of research 2007/2008 then in the first agricultural year 2005/2006 and at last in the year 2006/2007, the quantity of precipitations of the first and the last year of research mostly having a contribution as well. The length of the twig at the unilaterally foliar fertilized variants varied in 2006 – 2008 between 146, 9-155 cm (with differences given a witness comprised between 7, 9-16, 0 cm), and between 160-167,5 cm to variants fertilized in complex (with differences given a witness comprised between 21,0-28,5 cm), and an average of 157,4 cm registering the variant referring to the mineral fertilization at radicular level (with a surplus given the witness of 18,4 cm). The average values regarding the influence of the foliar

fertilization on the foliar areas for the three years of research oscillated between 110,2-128,4 cm^2 with differences given a witness comprised between 14,4-30,4 cm^2. The fertilization performed in complex has led to the increase of the foliar area comprised between 38,2-51,6 cm^2 and the mineral agofund has increased the foliar area with 35$cm^{2.}$

In *chapter* **8**, the results of the vine experiments referring to the quantitative and qualitative productivity of grapes that were performed between 2006-2008 are presented. Analyzing the data related to the productivities of grapes that have been obtained, we notice that these ones were differently influenced depending on the fertilizing type and on the climatic conditions of the three years of research.

During the agricultural year 2005 /2006, the extra radicular fertilized variant had increases of productivity given the witness comprised between 320-780 kg / ha, more significant productivities having been registered at the variants F_1 (Folisof F_{221}) – 6,68 t / ha and F_5 (Poly-Feed) – 6,61 t / ha; at the variants fertilized in complex the increases of productivity varied between 1080- 2150 kg/ha, higher productivities having been registered at the variants NPK+ F_1 (Folisof F221) – 8,05 / ha and NPK+F_2 (Folvifer) – 7,91 t /ha and the variant which benefited of the mineral agrofund only increased the productivity with 900 kg / ha.

During the agricultural year 2006 /2007, the productivity of grapes varied between 6,1 - 6,6 kg / ha in foliar fertilization, between 6,90 – 7,80 kg / ha at variants fertilized in complex and a productivity of 6,7 t /ha registered the variant fertilized at radicular level with differences given the witness comprised between 370-2070 kg/ha. More significant productivities were obtained at the following variants: NPK+ F_1 (Folisof F_{221}) – 7,80 t/ha, NPK+F_2 (Folvifer) – 7,62 t/ha, NPK+F_4 (green Kristalon) – 7,60 t/ha and NPK+F_5 (Poly-Feed) – 7,52 t/ha.

In the last year of research 2007 /2008, the highest productivity of grapes was obtained, these ones varying on the whole between 6,35-8,19 t/ha, being higher in the case of mineral and foliar fertilized variants with differences given a witness comprised between 350-2190 t / ha. Poly-Feed and green Kristalon foliar assortments got the highest productivities in both agro-funds that is 7,16 t/ ha 7,10 t/ha respectively at the unfertilized agrofund and 8,19 t/ha, 8,15 t/ha respectively at the fertilized agrofund in ecologic doses.

During the agricultural year 2006/2008, the average productivities obtained at the foliar fertilization varied between 6, 22-6, 72 t/ha, between 7,10-7,86 at the fertilization in complex and an average of 6,92 t/ha was registered at the mineral variant. The most significant average productivities were obtained at the variants: NPK+F_4 (green Kristalon) – 7,86 t/ha and NPK+F_5 (Poly-Feed) and NPK+ F_1 (Folisof F_{221}) with the same average productivity of 7,82 t/ha.

During 2006/2008, the quantities of sugars found in musts increased given the witness at the foliar fertilized variant with 4,6 g/up to 22,3 g/l depending on the assortment which was used

and at the mineral and foliar fertilized variants the increase was of 28,1 g/l up to 43,6 g/l. Maxiroot and Biostar foliar organic assortments applied to both agro – funds led to the accumulation of the highest quantities of sugars in must. The fertilization performed only at the radicular/soil cultivating level increased with 198,3 g/l the quantities of sugars found in must composition.

Analyzing during the three years of research the average values of the must total acidity , it is found out at Sauvignon assortment that no matter the foliar assortments used in mineral agrofund especially, these ones lead to a surplus of acidity, however remaining balanced with values comprised between 4,61-5,29 g/l H_2SO_4.

In *chapter* **9,** aspects related to the economic efficiency of using foliar fertilizers in mineral and foliar complex and that of the mineral agrofund used during 2006-2008, are described. We notice that the higher the doses of mineral and / or foliar fertilizers are used, the higher the expenses are per the unit of area and the higher the grapes productivities are registered as well. Therefore, the foliar and the fertilized variants at radicular / soil cultivating level as well as the mineral agrofund, differentiated then by foliar unilateral fertilized variants, proved to be the most profitable variants.

The present paper displays a high scientific approach carried out by the value of the experimental results which have been obtained and their putting into practice that led to the increase and improvement of the grapes productivity.

In the *last* chapter, *chapter* **10,** the conclusions referring to the influence of applying foliar fertilizers with or without mineral support at radicular / soil cultivating level and the use of the mineral agrofund with impact on the quantitative and qualitative productivity of grapes are drawn out. The results obtained in the three years of research are applied at a great extend regarding the choice of the fertilizing type in order to get increases in productivity by practicing a viticulture as close as possible to the ecological system, having in view the habitat preservation against the soil and environment pollution.