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STUDY ON THE EVOLUTION OF PRODUCTION AND SURFACES OF FRUIT TREE PLANTATIONS IN THE PERIOD 1988-2018 AND THE IMPORTANCE OF FRUIT PRODUCTION FOR HOUSEHOLDS AND AGRITOURISTIC FARMS IN ROMANIA

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Abstract

The paper aims to draw attention to the need, importance and efficiency of obtaining high quality fruits both in terms of taste and food, by cultivating them in the classic system in households and agritouristic farms. It was also considered very important to promote this traditional way of producing fruit, applying environmentally friendly natural and built cultivation technology, as the effects of climate change are increasingly felt, even if some important states of the world no longer recognize this. We support this mode of cultivation even if it is known that the productions obtained in intensive and super-intensive cultivation system are much higher, but from the research carried out in over 25 years of activity in the field of agrotourism we found that the production obtained in agrotourism capitalized on a higher price, by selling "directly from the farm" as organic products or by serving tourists as fresh fruit or as culinary preparations in a local cuisine specific to the area, households or agritouristic farms. Fruits obtained in this type of crop are generally much tastier and must not contain any chemical residues, as the amount of inputs such as pesticides, insecticides and herbicides applied to crops is much lower or even absent, pensioners must to be very responsible, as they have the obligation to ensure the health and food safety of the guests who visit the tourist reception structure.

Key words**:** *agritourism, agritouristic households, fruits, taste quality, food safety, chemical residues*

INTRODUCTION

The constant interest shown by tourism organizations in the country and abroad in identifying new holiday formulas, which represent as accurately as possible the preferences of tourists, has led to the emergence of an alternative form of tourism that tends to become a mass phenomenon. meaning rural tourism or agrotourism [15, 22]. The new unknown places, the clean air, the human ambiance different from the one of the places of origin, the different urban framework, correspond to the modern tourism. Holiday villages, especially "tourist villages" with a stay on farms and agro-tourist households have recently established themselves both as a necessity and as a "tourist fashion", along with combined holidays mountain-sea, sea-mountain, spa treatment, trips [27, 4].

An interesting aspect of contemporary tourism is the specific tourist behavior, which in turn involves a set of appropriate motivations. It is about the ever-increasing demand for tourism in rural areas, the reorientation of some aspirations, tastes, traditions and rural way of life, folklore, purity of nature etc. [31, 18].

First of all, in carrying out this research we started from the motivations and tourist needs related to the rural area such as: return to unaltered nature which is the result of the need for conservation, health, physical and spiritual comfort for all ages, sex, socio-professional, social status [26]. This motivation demonstrates that modern man cannot break away from the original framework of life, his contact with the rustic environment, having wide echoes in the mechanism of functional balance; accession and temporary knowledge of specific groups belonging to rural areas such as: patriarchal family, local community, work group, folk

group [32]; knowledge, understanding, inventory and elaboration - rustic holidays can turn into a real process of assimilating new and numerous knowledge, acquiring skills, by initiating local crafts and traditional occupations, tourists can manifest their own creative skills [28]; aesthetic motivations derive from the need for naturalness, purity, harmony, order, the need for beauty. Tourists who come into contact with their villages and neighborhoods can be considered privileged due to the possibility to visit attractive places through their picturesqueness and charm [16]; curiosity about popular hospitality, gastronomic habits, village rituals, determines wide categories of tourists to know on the spot and to keep lasting memories from unique holidays [2, 22]; rest, the cure of air and fruit, the consumption of fresh and ecological food, the occupational therapy that those who take care of their health on holiday want to benefit, meet har regime offered by the resorts spa [13, 8].

The Romanian village through its natural, ethnographic, cultural-historical and socio-economic qualities can become a "tourist product" of great originality, representative of Romanian tourism. In order to imprint the real image of the Romanian rural space, with its ancestral spirituality, it is necessary to promote rural tourism and agrotourism as tourist offers, in the context of the “tourist village” and the ethnographic area in which it is integrated [10]. Rural tourism in Western Europe, in the post-war conditions, has evolved in an interesting way, appearing as a necessity with prospects of expansion in the following years, because the tourist demand has surpassed the possibilities of the existing hotel units. The search for the rural environment for rest and recreation is a general trend in the world practice of tourism [7].

Also, to motivate the need for research, the advantages of this form of tourism were taken into account, which are highlighted in the literature by:

- capitalizing on the rural potential;
- source of jobs and income;
- improving the standard of living;
-saving investments for the creation of accommodation capacities, public catering, leisure;
- reduction of serving staff;
- decongestion of overcrowded tourist areas [1].

At the same time, based on these advantages and specific conditions identified at local level, we found that among the 7 types of tourist villages discovered in our country were noted with outstanding results in rural tourism and agrotourism so-called tourist villages - where the characteristic their predominance is the cultivation of fruit trees and vines, the tourist activity being possible throughout the year, both during the harvest and after [6]. It offers fruits, grapes and their preparations, fruit-based dietary preparations. Comforting and refreshing fruit-based drinks and wine tastings can be sources of attraction and income. Among the representative villages we list: Lerești (Argeș), Agapia (Neamț), Recaș and Giarmata (Timiș), Polovragi (Gorj) Leleasca (Vâlcea) Voinești (Dâmbovița) and others [5].

The research aims to establish an assortment, which is suitable for cultivation in households and farms, respectively those that are not demanding of climatic conditions and have increased resistance to disease and pests [9, 17].

To achieve the goal, the following **research objectives** were proposed:

(i)Presentation of the main assortments of fruit trees that can be cultivated in our country;

(ii)Highlighting the positive characters of the assortment of varieties that can be cultivated in the agritouristic households of the population.

MATERIALS AND METHODS

Ways to obtain processed data and information

For the aspects related to the activities of rural tourism and agrotourism data were collected from the National Association of Rural, Ecological and Cultural Tourism, from the owners of boarding houses, the staff employed and from tourists method used by

[12, 33]. Following our own research, we obtained a series of fairly complete data on the physical and economic side of rural tourism and agrotourism in the area. In order to characterize rural tourism from an economic, natural and social point of view, bibliographic sources such as geography studies, monographs, local public administration publications, web pages were used [21]. The normative acts and laws in force elaborated by the relevant Ministry were studied, as well as numerous works from the country and abroad that refer to rural tourism, quality management and forms of organization in rural tourism and agrotourism [25, 24].

Statistical monograph. For its realization, information was obtained from National Institute of Statistics (NIS) and from discussions with "actors" who participate in the entire rural tourism activity (tourists, pension owners, ANTREC members, local authorities, etc.), observing directly tourist reception structures, localities in the vicinity or researching informative materials (leaflets, tourist guides, magazines, etc.) [20]. *Selective surveys* were conducted both in tourist guesthouses and in places frequented by tourists only for landscapes. Statistical reports.

The statistical reports made by the A.N.T.R.E.C. Data collected by total registration, from all staff employed in several tourist reception structures, or by partial registration were used [29, 23].

From the point of view of the activities related to fruit production, the researches aimed at following some varieties of trees grown in our country, in order to reconsider and promote these crops, in conditions of high productivity and superior fruit quality, for its efficiency.

Aim of the research work

The research covered a period between 1988-2018, as agrotourism and rural tourism emerged as specific forms of tourism in our country after 1989, and several materials were studied in both electronic and listed form. The biological material used in this paper is represented by several species of fruit trees, which tried to highlight the positive characters, so that they can be recommended for cultivation in the agrotouristic households of the population [3]. They were targeted both at the positive characteristics of the tree (precocity, growth force, type of fruiting, resistance to the main diseases and pests specific to each species, ecological plasticity, affinity for grafting, production capacity, or other specific characteristics), and the characteristics positive effects of the fruit (fruit size, fruit color, pulp characteristics, taste, fruit quality, time of harvest) [11].

RESULTS AND DISCUSSIONS

The research starts from the consideration that fruit is one of the indispensable components of rational human nutrition. With few exceptions, due to the balance and harmony between their different elements (shapes, sizes, colors, flavors, fragrances, tastes, physico-chemical components, etc.), fruits are almost the only food ready in nature, which can be eaten fresh without no addition or any processing [19].

The first objective of the research is to highlight their taste quality and nutritional value, because when tourists arrive at a farmhouse or even an agritourism farm want to eat fresh fruit with a very good taste quality and high nutritional value, healthy and free of any chemical residues.

The nutritional value is due to their chemical components and forms easily accessible to the human body, to which are added various olfactory, visual and gustatory stimulants, which make the fruits highly acceptable in consumption and to be enjoyed with pleasure.

Table 1 shows that the fruit contains water and dry matter (organic matter and mineral substances). The content of fresh fruit in water varies depending on the species, within wide limits: 78.7% for plums, 80.4% for cherries, 83.7% for cherries. 84.2% for apples, 85.3% for apricots and 89.1% for peaches (Table 1). The juice extracted from the fruit, in addition to the components of the dry matter, is mostly water, is the best regulator of metabolism, helping to restore the water regime in the body, and by the contribution of other components, to comfort it. Sugars form the main mass of the dry matter components in fruits (about 90%). The most common are monosaccharides (glucose, fructose,

sorbose), disaccharides (sucrose) and polysaccharides (cellulose, starch and pectin). Their total content in fresh fruits also varies with the species within wide limits, from 3.4% in gooseberries to 16.72% in apples [11, 13].

Table 1. The nutritional value of the main fresh fruits

Components	Plums	Apricots	Cherries	Cherry	Peaches	Apples
Water (%)	78.7	85.3	80.4	83.7	89.1	84.2
Protein (g%)	0.8	1.0	1.3	1.2	0.6	0.2
Fats (g%)	0.2	0.2	0.3	0.3	0.1	0.6
Carbohydrates (g%)	19.7	12.8	17.4	14.3	9.7	14.1
Ash (g%)	0.6	0.7	0.6	0.5	0.5	0.2
Energy (cal.)	75	51	70	58	38	56
Mineral substances						
Ca (mg%)	12	27	22	22	9	7.6
P (mg%)	18	23	19	19	19	10.6
Fe (mg%)	0.5	0.5	0.4	0.4	0.5	0.3
Na (mg%)	0.1	1.0	2.0	2.0	2.0	1.0
K	170	281	191	191	202	110
Vitamins						
A (U.I)	300	2,700	110	1,000	1,330	94
B1 (mg%)	0.03	0.03	0.05	0.05	0.2	0.03
B2 (mg%)	0.03	0.04	0.06	0.06	0.05	0.02
B3 (mg%)	0.05	0.6	0.4	0.4	1.0	0.1
B6 (mg%)	0.05	0.07	0.05	0.06	0.02	0.03
Panthotenic acid	0.19	0.24	0.26	0.14	0.17	0.10
Ascorbic acid (mg%)	4	10	10	10	7	7

Source: after [11], 1991.

Cellulose, contained in larger or smaller quantities in all fruits, plays an important mechanical role, in the sense that it stimulates intestinal peristalsis and promotes the elimination of residues from digestion; it also causes a laxative action when large quantities of nuts are consumed. Laxative properties have especially pears and quinces, fruits rich in pectin and cellulose. Mineral substances are found in the form of compounds (oxides) of the main metals (K, Na, Ca, Fe, etc.) or salts of phosphoric, hydrochloric, carbonic, sulfuric acids, etc. The content in mineral salts varies from one species to another, depending on the variety, but also on the pedological conditions, climate, applied technologies, etc. (Table 1) [11]. Consumption of 100 g of dried apricots per day contributes to the formation of 1.8 g of hemoglobin, the same amount of prunes provides 1.6 g of hemoglobin, while 100 g of poultry or beef gives only 0.7 g and 0.5 g of hemoglobin, respectively [30, 3]. At the same time, the more or less pronounced potential alkalinity, specific to all fruits, has a favorable influence on the body's alkaline reserve. Expressed in cm^3 of normal alkali solution per 100 g, the potential alkalinity varies between 0.81 and 12.38. The daily need of the body in salts depends on age, sex, body weight, etc., being 4-5 g of sodium, 2-4 g of potassium, 0.5-0.7 g of calcium, 0.5 g magnesium, 0.9-2.2 g phosphorus [11, 30, 3]. The fruit content in organic acids is directly related to the genetic character of the species and varieties, but it is also dependent on the degree of fruit ripeness, ranging between 0.29% for pears and 2.32% for currants, expressed in citric acid [30]. Acids imprint the sour taste of the fruit, but the ratios in which they are found towards the sugary substances ensure the harmony of the taste and the degree of sweet or sour. The acidity of some fruits is the result of the presence of several acids: malic, citric, tartaric, succinic, etc. They are found free or in the form of salts or esters [11, 33, 3].

Protein, although in small amounts, is present in all fruits. Being nitrogenous substances, they mainly fulfill a plastic role in the constitution of different tissues and as a reserve substance with high biological activity. The main components of proteins are amino acids, of which more than 25 have been identified in fruits. Like protein, fats are found in small amounts in fruits (between 0.1–1.0%) except for almonds, hazelnuts and walnuts where the content is between 50-75%. Also, the lipid content is much higher in the seeds and seeds of fruits (8-42%) [11, 33, 3].

The nutritional value of fruits, in addition to their content in carbohydrates, salts, fats, etc., is mainly due to the significant amounts of vitamins they synthesize. Vitamins are biocatalysts of vital processes, indispensable

for life, their lack in the body causing serious functional disorders of metabolism. The human body, with certain exceptions, is unable to synthesize the necessary vitamins. Of the vitamins absolutely necessary for the proper functioning and development of the human body (A, B1, C, D, E, F, K, PP) most are found in fruits, in different quantities, depending on the genetic nature of species and varieties (Table 1) [11].

The second major objective of the research is **the production obtained per unit area** as a determining factor of the profit that can be obtained from them, as well as the possibility to ensure tourists a regular consumption of fresh fruit throughout their stay and throughout the year. World fruit crops have grown continuously, initially as the area under cultivation has grown, and in recent decades due to increased yields per unit area. thus, from a production of 393,724 thousand tons in 1988, it reached in 2018 a production of 867,774 thousand tons (about 3.5 times higher) (Table 2). It is found that of the total world fruit production, about 20% is the fruits of the temperate zone (apples, pears, plums, quinces, apricots, peaches and nectarines, strawberries, cherries, cherries, chestnuts, hazelnuts, currants, raspberries), in while the difference of 80% is represented by the fruits from the tropical area (oranges, bananas, coconut, mango, tangerines and clementine's, lemons and limes, pineapple, olives, grapefruit and pomelo, dates, papaya, cocoa, tea, kiwi). In the temperate zone, the largest share of production, at the species level, is found in apple (9.92%), followed by peach and nectarine (2.81%) and hair (2.73%).

Table 2. Evolution of world production and areas for the main fruits in the temperate area in the last three decades

Species	Production – thousands of tones					Surface – thousands of hectares				
	1988	1998	2008	2018	% of production word	1988	1998	2008	2018	% of surface word
Apples	42,688	54,929	69,041	86,142	9.92	5,162	5,736	4,669	4,904	7.20
Pears	10,211	14,849	21,138	23,733	2.73	1,103	1,444	1,564	1,381	2.02
Quince	334	395	480	688	0.08	53	42	59	82	0.12
Plums	6,579	7,402	10,167	12,608	1.45	1,424	2,042	2,433	2,649	3.89
Apricots	2,221	2,500	3,685	3,838	0.44	395	512	548	1,532	2.25
Peaches and nectarines	8,662	11,479	19,723	24,453	2.81	1,324	1,232	1,502	1,712	2.51
Strawberries	2,383	3,873	5,978	8,337	0.96	209	274	322	372	0.54
Cherries	1,459	1,636	1,856	2,547	0.29	289	327	378	432	0.54
Cherry	953	994	1,220	1,529	0.17	197	227	226	215	0.31
Chestnuts	497	833	1,796	2,353	0.27	246	325	502	612	0.89
Hazelnuts	609	802	1,068	863	0.10	452	498	590	966	1.41
Currants	115	158	314	682	0.09	35	49	74	109	0.16
Raspberries	381	377	523	870	0.10	73	74	98	124	0.18
Total world	**393,724**	**524,126**	**707,618**	**867,774**	**-**	**44,074**	**51,808**	**58,897**	**68,047**	**-**

Source: after processing Faostat.org, 2020 [14].

Analyzing the evolution of cultivated areas with the main species of temperate climate, it is found that in the last 3 decades, worldwide, significant increases in areas have been achieved with apple, hair, plum, apricot, peach and nectarine, cherry, hazelnut, chestnut and currant (Table 2). As in the case of fruit production, the share of the area occupied by temperate species worldwide is about 22% of the total area.

Table 3. The evolution of production and areas in fruit crops in Romania in the last three decades

Species	Production – thousands of tones					Surface – thousands of hectares				
	1988	1998	2008	2018	% of production 2018	1988	1998	2008	2018	% of surface 2018
Apples	609	364	459	643	18.40	81	79.5	54.70	54.0	16.07
Pears	97	64	52	60	1.71	9.9	6.5	4.6	3.11	0.92
Quince	14	7	6	6	0.17	2.85	1.0	0.92	0.87	0.25
Plums	534	404	475	842	24.09	91	99.2	75.3	66.0	19.63
Apricots	35	36	32	35	1.00	8	5.5	2.93	2.0	0.58
Peaches and nectarines	57	17	16	22	0.63	8.50	5.0	1.61	1.7	0.50
Strawberries	39	11	21	26	0.74	5.60	1.45	2.6	3.3	0.98
Cherries	79	77	67	90	2.57	18	12.0	7.65	7.1	2.10
Total on the country	**3,202**	**2,581**	**2,717**	**3,493**	**-**	**476.35**	**509.38**	**369.0**	**335.6**	**-**

Source: after processing Faostat.org, 2020 [14].

In Romania, trees are successfully cultivated throughout the territory, except for the alpine area and part of the coniferous area. And economically, the conditions for the development of fruit growing are particularly favorable. Due to its geographical position, our country can export fruits to both southern countries, deficient in apples, pears, plums, and the Nordic countries, deficient in peaches, apricots, nuts and other fruits. In addition to fruit for fresh consumption or export, fruit growing provides raw materials for the processing industry. The assortments in which the fruits can be transformed and the derivatives in which they are used are more and more diversified: concentrated natural juices, nectar, jams, jams, candies, ice cream, dehydrated, frozen, candied fruits, etc. All these products are made from the raw material provided to the food industry by the fruit sector.

Fruit production in Romania increased from 401 thousand tons in 1950, until 1986, when it recorded the maximum value of 4028 thousand tons. During the study period, fruit production increased from 3,202 thousand tons in 1988 to over 3,494 thousand tons in 2018 (Table 3), even though the cultivated area decreased from 476.35 thousand hectares, in 1988, to 335.60 thousand hectares, in 2018.

Another very important component regarding the determination of the efficiency and profit that can be achieved from the cultivation of fruit plants in our farms and agro-tourist households in the country is the production obtained per unit area.

As can be seen from Table 4, world production increased significantly compared to 1988, when it was only 8.93 t/ha, in 2018 reaching 12.75 t/ha, which indicates that the technology of applied culture was a modern one, which allowed to obtain a very high yield per unit area. Also, from this table it is found that the highest production was obtained for strawberries 22.41 t/ha, followed by apples with 17.56 t/ha, and the lowest production was obtained for hazelnuts, of only 0.89 t/ha.

Table 4. Evolution of world production per unit area of the main fruits of temperate zone in the last three decades - tons/ hectare

Species	**1988**	**1998**	**2008**	**2018**	**% of world production/ 2018**
Apples	8.3	9.57	14.79	17.56	9.92
Pears	9.26	10.28	13.51	17.18	2.73
Quince	6.3	9.40	8.13	8.39	0.08
Plums	4.62	3.62	4.17	4.75	1.45
Apricots	5.62	4.88	6.42	2.50	0.44
Peaches and nectarines	6.54	9.32	13.13	14.28	2.81
Strawberries	11.34	14.13	18.56	22.41	0.96
Cherries	5.05	5.0	4.91	5.89	0.29
Cherry	4.84	4.38	5.40	7.11	0.17
Chestnuts	2.02	2.56	3.58	3.84	0.27
Hazelnuts	1.35	1.61	1.82	0.89	0.10
Currants	3.29	3.22	4.24	6.25	0.09
Raspberries	5.22	5.10	5.33	7.01	0.10
Total world	**8.93**	**10.12**	**12.01**	**12.75**	**-**

Source: after processing Faostat.org, 2020 [14].

Table 5. The evolution of production per unit area in fruit crops in Romania in last three decades - tons/hectare

Species	**1988**	**1998**	**2008**	**2018**	**% of world production/ 2018**
Apples	7.52	4.58	8.4	11.9	18.40
Pears	9.80	9.85	11.3	19.9	1.71
Quince	4.92	7.0	6.52	6.9	0.17
Plums	5.87	4.1	6.31	12.76	24.09
Apricots	4.37	6.55	10.92	17.5	1.00
Peaches and nectarines	6.70	3.4	9.94	12.9	0.63
Strawberries	6.84	7.58	8.1	7.8	0.74
Cherries	4.38	6.42	8.76	12.7	2.57
Total	**6.72**	**5.07**	**7.36**	**10.41**	**-**

Source: after processing Faostat.org, 2020 [14].

Regarding the production per unit area obtained in our country during the study period (Table 5), it is observed that it is comparable to that obtained worldwide in the temperate zone, the best results being obtained in pears 19.9 t/ha and for plums 12.76 t/ha, and the lowest production was for quince 6.9 t/ha and for strawberries with only 7.9 t/ha, a crop that was achieved worldwide the highest production of 22.41 t/ha (Tables 4 and 5).

From those presented in Tables 4 and 5 it is observed that both globally and nationally, large and quality fruit production can be obtained per unit area, which confirms the fact that their use in households and agritouristic farms in the South-West Oltenia development region, as well as at national level, can bring a considerable profit compared to other field crops or vegetables and can be an attractive factor for tourists eager to consume quality and tasty fresh fruit, or who want to carry out the so-called "occupational therapy" by participating in some work or picking fruit from the orchard.

At present, the strategy for the development of fruit growing in the European Union must be oriented towards sustainable development, which involves optimizing commercial fruit farms, direct support to producers through subsidies to ensure efficient production and very good food and taste quality. This can be ensured by:

- shortening the production time of the planting material, the use of high yielding varieties, low vigor rootstocks, fast fruiting, very high yields and good quality;
-use of virus-free propagating material (Virus Free);
- increasing the share of worldwide organic (organic) production through the use of disease and pest resistant varieties that do not require pesticide treatments;
- reducing production costs and streamlining fruit production for all species.

CONCLUSIONS

First of all, the research approached a topic with new objectives that perfectly adapts to the evolution trend of modern agriculture, towards the production of high-quality products with a special taste quality, which do not contain any chemical residues, applying a friendly technology. with natural or even built environment. It is absolutely imperative in the current conditions in which climate change is increasingly evident, even if some important countries of the world no longer recognize them, that agricultural production be directed towards a technology with as few jobs as possible, as well as with a number very low chemical treatments whose remnant is not found in the fruits consumed and including in the soil and the environment in which the crop is grown.

World and national fruit production must follow the same trends as all agricultural production, with a substantial reduction in inputs that are harmful to the natural and built environment and to humans. Therefore, the specialists who conducted the research focused on the need, importance and impact of obtaining high quality fruit in households and farms, which have the so-called taste of the past, "the taste of fruit in the garden of grandparents."It is known that in households and agritouristic farms there is a much lower production than in intensive or super-intensive farms, but by their superior capitalization, by selling organic products, directly from the farm at a higher price or by serving them. at the table to tourists in fresh form or transformed into homemade dishes. The proposed capitalization can greatly increase the economic efficiency and profit obtained from the practice of this new form of cultivation of fruit plants, which in addition to the productive character can also have a psychic character of recreation on the guests who visit us, as they can participate directly to some works in the orchards or to the collection of fresh fruits, which they can consume or buy for home.

From the point of view of fruit crops, it was found that the assortment of varieties grown in our country includes both foreign and native varieties (predominantly native varieties, newly created varieties, which generally have immunity or are very resistant to disease and specific pests). The proposed assortment must have a number of positive

characteristics, both in terms of the tree (early fruiting, growth vigor, type of fruiting, resistance to specific diseases and pests, ecological plasticity, affinity for grafting, rusticity) and fruit (size, color, characteristics of the pulp, taste, quality of the fruit, time of harvest). It is also proposed for agritouristic households an assortment that can offer the consumption of fresh fruit for as long as possible, but also fruits that can be industrialized in various forms (juice, syrup, nectar, jam, pulp, compote, dehydrated, etc.) and which are as resistant as possible to the attack of specific diseases and pests, so as to be as easy to maintain as possible (small number of phytosanitary treatments), with large fruits, pleasant-looking, tasty and capable of be consumed with great pleasure by tourists.

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