ENVRIplus Scientific Game Award Ceremony

ENVRIplus wants to challenge young students to think about the Grand Challenges our planet is facing. We therefore organize a scientific game for secondary school students in Europe.

These are the results of the winning schools in the annual ENVRIplus scientific research competition. Schools all over Europe can participate in this competition that consists of the setup, execution. and reporting of a scientific experiment, and an online quiz.

A jury judges the reports from the scientific experiments and together with the scores from the online game this determines the winners.

In 2018, 15 schools participated, from 5 countries, in 2 categories: Junior and Senior. Awards are given to the winning school in each category, and a prize for most innovative scientific project.

In this document, the winning schools present a short report of their projects.

2nd Lyceum of Corfu, Greece

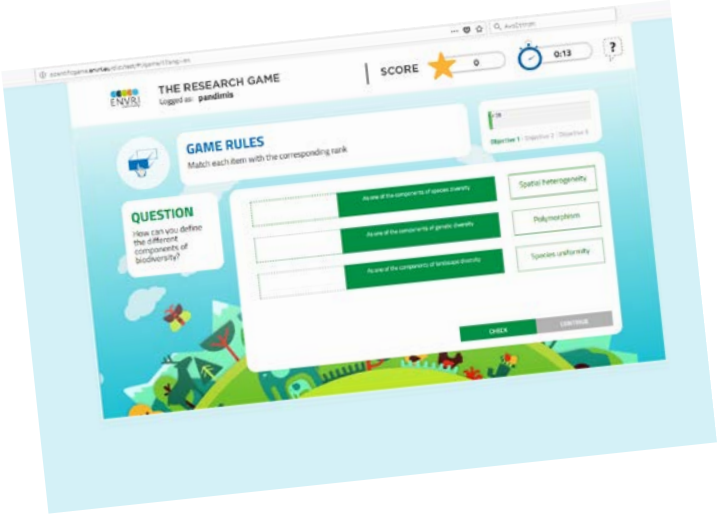
"Calculating the Ecological Footprint"

The metric that measures how much nature we have and how much nature we use

The school also participated in a national environmental school network, which develops a project from 2017 to 2020 about the environmental awareness, the Renewable Energy Sources. Students have attended some seminars in our school about the R.E.S. The "Ecological Footprint", the ecological reserve and deficit were new terms for the students.
They also visited a photovoltaic power station at the countryside of the island.

We used an app. relevant to the Ecological footprint, which was available by the national environmental network to measure how many "global hectares" are needed for each person to support his/her way of living and how many "Earths" would be needed if all people on Earth do live this way!
94 students to use the app. and we imported the results in an excel file to calculate averages and make statistics.

The average results were a) global hectares for each person 3.9 and b) 2,2 Earths.



Concerning the Scientific game day, there were 2 teams of 3 students each participating in the Schools Informatics Lab. Subjects "Biodiversity and Ecosystems".
The students' participation had surely positive results for them, despite the Biology curriculum of their class was not relevant much to it. They also managed to have a good result in points and time

BIODIVERSITY IN THE MARKET

SCIENTISTS...IN PROGRESS - I.C. LEONARDO DA VINCI - CAVALLINO - LECCE - ITALIA

1. INTRODUCTION

Biodiversity represents the variation in which ecosystems, species and individuals introduce themselves. It is an important value and, according to many scientists, it increases the ability of ecosystems to stand up to stress (such as climate disturbance, thermic stress, invasions of parasites). In the market we can observe that there are many different type of apples and we can recognize them for the colour: in the market we can see red, pink, yellow, green apples.

2. QUESTION

Are there differences about taste, qualities of pulp in the different varieties of apples?

3. NULL HYPOTESIS

Apple are different only for colour

4. METHOD

We built a heterogeneous sample by colour.
Then we tasted the different varieties of apple
and we annoted shape,taste qualities and pulp qualities for each apple. We collected also data for heigh and price . Finally we found data in letterature for the habitat and time to ripen.

5. RESULTS

VARIETY	SHAPE	COLOUR	TASTE QUALITIES	PULP QUALITIES
STARK	Round	bright red and shiny	Sweet and sugary	Compact and not very juicy
GALA	Round and small	from light red to dark	Sweet and slightly sour	Crispy and not very juicy
PINOVA	Small, round with a pointed base	yellow-green with red streaks	Sweet and sour	Compact and very crispy
GRANNY SMITH	round	intense green .	slightly sour	Compact, very juicy and crispy
GOLDEN DELICIOUS	Round, generally big	bright and shiny	sugary and perfumed	consistent and juicy,
RED DELICIOUS	Generally big, round with a pointed base	yellow	sweet	not very crispy and juicy
ANNURCA	Very small, round and flattened	Dark red	Sweet and slightly sour	not very crispy and juicy
FUJI	Round, generally not very big	Dark red	sweet, slightly sour	Compact, crunchy and juicy
PINK LADY	round with a pointed base	from light red to dark, mottled with yellow-green	Sweet, sugary and perfumed	Compact and not very crispy
EVELINA	elongated and not very big	light red or pink	sweet and sour	Compact, very crispy qnd very juicy
RENETTA	Round and flattened	between intense orange and bright red.	not very sweet and slightly sour	Little crispy and little juicy

VARIETÀ	RIPEN TIME	HABITAT	WEIGHT (W)	ΔW	SOURNESS g/l (S)	ΔS.	CONSISTENCY Kg/cm3
GALA	august	plain	170	13%	4	0.2	7.9
		hill *	199		4.1		8.2
		montain	192		3.8		7.9
RED DELICIOUS	settember	plain	225	19%	2.9	0.4	6.5
		hill	244		3.2		5.6
		montain *	268		3.3		6.7
PINOVA	First half of settember	plain	202	7%	5.5	1	6.5
		hill	215		6.5		7
		montain *	217		6.4		6.9
GOLDEN	Second half of settember	plain	219	6%	4.9	0.5	6.5
		hill	220		5.4		7
		montain *	233		5		6.9
FUJI	october	plain	234	14%	8.4	0.3	7.1
		hill *	244		8.5		7.1
		montain	214		8.7		6.8
GRANNY	First half of october	plain	245	18%	2.9	0.9	7.6
		hill *	251		3.8		7.3
		montain	213		3.7		7.5
ANNURCA	end of settember	plain *	178	27%	6.5	1	7.8
		hill	140		6		6.5
		montain	160		5.5		8
PINK LADY	End of october	plain	189	12%	7.3	2.9	8.6
		hill *	212		10.1		8
		montain	203		7.2		

variety	Average weigh	Average price	variety	Average weigh	Average price
STARK	218	1.99	ANNURCA	170	2.1
PINOVA	200	2.42	FUJI	200	2.18
GRANNY SMITH	220	1.80	PINK LADY	210	2.47
GOLDEN DELICIOUS	225	1.82	EVELINA	207	2.4
RED DELICIOUS	230	2.05	RENETTA	205	2.4
ROYAL GALA	200	2.34			

6. CONCLUSION

There are some differences between different varieties of apples for several qualitative parameters like taste, or pulp, but also for quantitative parameters, like weight or price. Even if in the past we have a higher biodiversity, actually we can observe some effetcs of biodiversity in the apples. According to these experimental results, we can say that our null hypothesis can be rejected.

The effect of the soil on the growth process of fungi on blueberries

Charlotte ter Heide, Inez Heinhuis, Ida Konijn, Lotte Nijman, Chricher Thiel

Preface

Blueberries *(Cyanococcus Vaccinium)* are plants with indigo-coloured berries that originated from North America. Blueberries can bear fruit from May to August, varying by location.
Most blueberries are grown in America.
Smaller blueberries that grow low to the ground are called low-bush blueberries or wild blueberries, these are the most common.
Bigger blueberries are called highbush blueberries and grow higher in the air *(Ruppenthal, 2018)*.

The primary decomposers of litter in many ecosystems are fungi. Most fungi grow as a network of hyphae. A hypha *(Plural hyphae)* is a long, branching stringy structure of a fungi. In most fungi, hyphae are the main mode of vegetative growth, and are collectively called a mycelium. Fungi decompose organic material by letting enzymes out to break down the decaying material. After that they absorb the nutrients *(Roza, 2018)*.

Hypothesis

Our hypothesis is that the blueberries that are located on the grass, close to the groves, will grow mold the quickest. There is a lot of precipitation in the Netherlands, that is why this particular area is very humid and moist. Humidity is crucial for the growth of fungi, the nutrients are also of great importance. You can find plenty of these nutrients in this area, close to the groves and by the grass *(Malefijt, 2017)*.

Materials and methods

In total we distributed fifteen blueberries over three different places. Five blueberries are located on the grass, five on stone (outside) and five indoors. On the grass the berries are protected by a plastic tray. We use this to protect the berries from outside factors like birds and other vermin.
The berries on stone are protected in the same way. Indoors the berries don't have to be protected and are placed on a disposable plate.

To accurately measure what happens, we are going to take a picture of the berries every afternoon. We are going to keep doing this for twelve days. The expected results are mentioned in the hypothesis.
The experiment will last for twelve days and we need the following things:

- 15 Blueberries
- Three disposable plates
- A mobile phone
- A humid location outside
- A warm location indoors
- A location on stone
- Two plastic trays

Results

The surface of one blueberry is around 315 mm^2. Fungi grow in circles (if they don't, frame it and

calculate), so you can calculate the surface of the circle to know the surface of the mold. We made photo's of the blueberries every day. We would see the progress of how the fungi grows and by calculating the average surface of the mold we would place it in a chart.
Unfortunately, no fungi grew on the blueberries. On the contrary, the blueberries did wrinkle after a few days, and some of the blueberries that were outside on the grass were halfeaten by snails

(picture 1 and 2).

1. *Halfeaten blueberry with snail*

2. The blueberries on the first(left) and last(right) day of checking

Discussion

Before the experiment was completed, we expected the blueberries on the grass to grow fungi the fastest. We expected that the soil would stimulate the growth of the fungi the best. This however, didn't happen. None of all the blueberries grew fungi. The blueberries on the grass did partially get digested by the animals that live there: decomposers. We also believe that by protecting the blueberries with a plastic tray had negative effects on the planting of the hyphae on the top of the berries. Our hypothesis was therefore incorrect, the locations should have been more humid. If these were the circumstances the berries would most likely have grown fungi, because humidity is stimulating the fungi.

Sources

Malefijt, A. D. (2017, November 14). Beschimmeling. Website: Wikipedia: https://nl.wikipedia.org/wiki/Beschimmeling
Roza, G. (2018, April 3). Decomposers. Website: Wikipedia: https://en.m.wikipedia.org/wiki/Decomposer
Ruppenthal, R. J. (2018, March 23). Blueberry. Website: Wikipedia: https://en.wikipedia.org/wiki/Blueberry

Monitoring Marine Litter and their perception

Students from High School "Lorenzo Costa": Giada Durando, Elisa Fiorenza, Chiara Ponzanelli, Luca Valdellora

Tutors: Antonietta Rizzo and Maria Fiore (from High School "Lorenzo Costa"), Marina Locritani (from Istituto Nazionale di Geofisica e Vulcanologia)

Our project consists in analyzing the percentage of marine litter in a beach of our local coast, focusing on the plastic litter percentage, and evaluating the perception of marine plastic pollution by reporting the differences between students from a small seaside village (Le Grazie) and from the city of La Spezia which is involved in port business.

Costa students cleaning the beach of Le Grazie

Classifying litter

The monitoring phase:

We followed the protocol used in SEACleaner Project: we cleaned all the beach, classified all picked up litter, and then we elaborated data with Microsoft Excel.

The survey phase:

We elaborate the **questionnaire** in order to evaluate the marine litter problem perception in the middle school students.

The anonymous questionnaire is divided in 27 questions divided in 6 different topics:
- **Personal information;**
- **Awareness and concerns;**
- **Perceived proportion and kinds of waste;**
- **Perceived impacts;**
- **Perceived causes;**
- **Ways to reduce marine litter problem**.

37 students were surveyed of a small village seaside (middle school of Le Grazie) and 51 students of the city of La Spezia (middle school of Piazza Verdi, far from the coast).

About our survey:
The marine litter monitoring shown a larger amount of plastic material (72,6%) followed by cigarettes (12,8%) and multi-material (3,7%). As to problem perception below there are some achievements: Consciousness of the consequences that wastes have on sea environment is 74% for Students of piazza Verdi and 56% for Students of Le Grazie; Collaboration in trying to reduce the problem is 37,8% for Le Grazie and 21,6% for Piazza Verdi. They both are informed about permanence and degradation of marine litter and its dangerousness for fauna and fishing activities.