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Three days at school with FAST

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ABSTRACT "Three days at school with FAST" is the name of the environmental education project included within the FAST (Fight Alien Species Transborder), Project Interreg Italy-Malta. The FAST Project aims to record the entry and spread of non-native animal and plant species; and even more so those invasive species capable of reducing biodiversity in the islands of Sicily and Malta, located in the center of the Mediterranean basin. Furthermore, an important part of the project concerns dissemination, raising awareness among the community about alien species, the problems associated with them and the protection of biodiversity. Environmental education in schools (today considered an important form of dissemination of good practices) is the focus of the three days at school with FAST. An attempt was made to give the youngest elementary and middle school students tangible experiences, to teach them useful practices for the protection of nature by explaining, for the purposes of greater knowledge and awareness, environmental issues and problems linked to the most well-known and widespread alien species in Sicily. Thanks to the game and the experiences proposed in the three scheduled meetings, the aim is to enhance and at the same time learn to protect local environmental resources.

KEY WORDS Alien species; environmental education at school; FAST Project; safeguard biodiversity.

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INTRODUCTION

The Mediterranean Basin is in one the areas of the planet with the most intense international transit of goods and people and this rapid and often uncontrollable development affects natural ecosystems with a loss of local biodiversity. In this context the accidental introduction of alien animal and plants species is one of the most worrying phenomena, with negative effects on the quality of natural environments, on the survival of some species at risk, and also on human behaviors and the management of urban areas. The "FAST" (Fight Alien Species Transborder), Project Interreg Italia-Malta 201–4 2020, aims to safeguard the biodiversity of Sicily and Malta located in the center of the Mediterranean, focusing on the problem of biological animal and plant invasions (D'Urso et al., 2022).

The Invasive Alien Species (IAS), are today one of the main drivers of biodiversity loss and alteration of ecosystem services. The Convention on Biological Diversity (CBD) is the international legal instrument for "*id lacigoloib fo noitavresnoc eht dna stnenopmoc sti fo esu elbaniatsus eht ,ytisrev gnisira stifeneb eht fo gnirahs elbatiuqe dna riaf eht secruoser citeneg fo noitazilitu eht fo tuo*" (Official CBD webside) that has been in place since 1992 and has been ratified by 196 nations. In article 8 paragraph h, this convention invites the contracting parties to control, eradicate or prevent the introduction of those alien species which threaten ecosystems, habitats or species.

Lack of awareness, lack of knowledge and general public disinterest in biological invasions and alien species are among the main factors that limit efforts to prevent new introductions and mitigate the effects of IAS already present or about to arrive. A key role is to spread knowledge about invasive alien species with the ultimate aim of making the public aware of the problems they cause for biodiversity, the economy and our health and encouraging responsible behavior. Activities such as the reporting or eradication of alien species, especially if carried out in a park or reserve, contribute to create in citizens an identity bond with the physical place and the natural elements present here, a sense of responsibility towards them and an internal disposition to take care of it. An added value is the possibility of enhancing specific skills of some parts of the population, for example with the collection of naturalistic data or participation in communication, dissemination and environmental education activities (Carotenuto & Monaco, 2018), with the aim of stimulating children's curiosity towards the nature that surrounds them and raising their awareness of the value of the environment (Angelini & Pizzuto, 2007).

Today, younger people spend little time outdoors and the spaces they have available to play, which are increasingly artificial, offer them little motor, sensory or creative stimulation. Not having the opportunity to experience one's senses (especially in the age range from the first months to 7 years) has negative consequences, which manifest themselves in physical health, learning, and even in social relationships. In contact with nature, children develop interest, curiosity, inner security, and empathy. They have the opportunity to play in complete freedom, go for walks, build small objects, draw, model, listen and invent stories. The green space surrounding schools is often underused, instead it would be appropriate to redevelop it as it is a source of undoubted value from an aesthetic and ethical point of view, furthermore it develops a certain degree of sensitivity towards the beauty of the environment (Sofo & Napoleone, 2013).

A change of direction is urgent and its strength and effectiveness lie in the synergistic action in different but interconnected fields of intervention: environment, society, culture, and economy. The thesis we want to support is that the change of direction towards a safer, fairer, and more responsible future is possible, but requires the correlated work of three macro tools: conservation and protection of the environment, sustainable development, and environmental education (Angelini & Pizzuto, 2007).

MATERIAL AND METHODS

Greater attention has been paid to important issues related to biological invasions of invasive alien species (IAS), animals and plants, which threaten biodiversity; but which are far from being perceived by society. For this purpose, the most striking IAS case studies were discussed and explained: the possible pathways of introduction of these species into our territory, any damage caused by their naturalization, and possible methods of control and eradication. Thanks to this project, we try to make young participants adopt eco-compatible attitudes and responsibility towards the protection of biodiversity, highlighting what alien species, and especially IAS, cause. At the end of the project, the young participants will be more informed, more responsible and inclined to assume, perpetuate, and promote some small, but important, daily precautions, which not only enhance respect for their environment but also the acquisition of an "eco-friendly" mentality, which makes them aware of the fact that in safeguarding the environment there is also the future of humanity.

The "Three days at school with FAST" is a project that involves third, fourth, fifth primary and middle school students. A maximum number of 30 students at a time will be instructed and guided by at least two, or better three, operators: an expert zoologist for the part concerning the animals, an expert botanist for the part concerning plants, and a third assistant operator. The project can be divided into three phases or days:

Phase 1: initial and welcome meeting with the individual classes in a classroom of the school they belong to. The total duration of this first meeting will be three/four hours, which will be divided between two main activities: the theoretical one, concerning the presentation and a brief summary of the FAST project, through the display of an explanatory power point; the second practical part, with the cre-

ation of a poster regarding animals and plants presented as IAS.

Phase 2: guided visits to the Sicilian Garden, the Botanical Garden and the Zoology Museum of the University of Catania which will pay greater attention to the invasions of the IAS in Sicily and to the problems of safeguarding local biodiversity.

Phase 3: excursion or nature walk with a total duration of approximately 3/4 hours. This activity will preferably take place in spring or alternatively at the beginning of autumn You will be able to choose also particularly interesting green areas included in urban environments. The destination and departure-arrival times will be pre-established from time to time and agreed with the school concerned.

Obviously, the language and contents used are adapted to the learning level of the class of engaged students.

RESULTS AND DISCUSSION

During the theoretical part of the first meeting, the operators illustrate some basic ecological concepts, such as: what is biodiversity, the levels that define it, the importance of its protection. Furthermore, the main differences between living and non-living beings, between plants and animals are explained, as well as the main roles that these have in their environments. The concepts of species, indigenous species, alien species and invasive aliens species are also discussed (with hints on some interspecific relationships). The educational materials are presented through short video projections, which tell the most striking and characteristic case studies of alien species in Sicily, both animal and plant. As regards the animal species, the following are presented and commented: Red palm weevil, *Rhynchophorus ferrugineus* (Olivier, 1790); Tiger mosquito, *Aedes albopictus* (Skuse, 1894); American pond turtle, *Trachemys scripta* (Thunberg in Schoepff, 1792); with mention also of other species, including the goldfish, *Carassius auratus* (Linnaeus, 1758) and the Rose-ringed parakeet, *Psittacula krameri* (Scopoli, 1769). Regarding plants, the following species are examined: Eland surfing (Hottentot fig), *Carpobrotus acinaciformis* (L.) L. Bolus; Indian fig, *Opuntia ficus-indica* (L.) Mill.; Tree of heaven, *Ailanthus altissima* (Mill.) Swingle; also mentioning other cases, such as that of the African fountain grass, *Cenchrus setaceus* (Forssk.) Chiov. and of the Castor oil plant, *Ricinus communis* L.

The young students are encouraged to participate by interacting by raising their hands, thus becoming active parts of the explanations, intervening and asking questions to the operators; they are also asked by the operators to answer some questions, expressing their opinions.

During the theoretical part of the meeting, the students are invited by the operators to write down some concepts and notions, which will later be used to compete in an "Alien Species Quiz-Game" with prizes; this challenge will take place during the final part of the third and final day of the scheduled meetings.

Following the theoretical part, we move on to the practical one, concerning the individual creativity of the students, in a group work context, in order to offer them some entertainment and lighten their minds from the lesson presented previously; to have some fun creating, everyone doing something useful. First, an operator divides the students into two work groups to have them create two halves of a final cardboard poster. The operators will make the materials available to the students for the realization of this work: cardboard, brushes, rounded scissors, fresh or dried plant material, vinyl glue, prints, markers, pencil colors, wax crayons, watercolors, tempera and acrylic colors. Guided by operators, one half of the poster is created by the group of students who will deal with alien animal species while the other half one will be created by the group of students who deal wi.seiceps tnalp neila ht

The creation of the poster will be able to make use of several different artistic techniques, which will range from freehand drawing to painting, from writing to collage, to better represent a sort of final collage/painting, with also concepts relating to biodiversity, half based on species alien animals, and the other half on vegetal ones. The two halves of the poster were finally joined with adhesive tape, in order to then hang the large final poster in the classroom, as a useful memorandum, on the alien animal and plant species treated with also some advice and daily behaviors useful for safeguarding the biodiversity.

The second day of the meeting is dedicated to guided "tours of biodiversity". The first visit (from

approximately 09.30 to 11.00) begins at the entrance to the Sicilian Garden, inside the Botanical Garden (Department of Biological, Geological and Environmental Sciences of the University of Catania); here a botanical operator/guide welcomes students, teachers and any companions. After briefly presenting the host structure, the operator begins a walk with the students in the Sicilian Garden (about 30 students max, with also teachers and any companions) and will give explanations regarding plant biodiversity and the characteristic habitats of Sicily while also providing brief notes on the evolution and phylogeny of plants, on the physiological and morphological adaptations of Mediterranean vegetation, always paying greater attention to alien species and the problems that arise from them.

The second visit is scheduled to the nearby Zoology Museum of the Animal Biology section (Department of Biological, Geological and Environmental Sciences of the University of Catania), easily reachable on foot. It will take place from approximately 12.00 am to 1.30 pm. Here a zoological operator/guide welcomes the participants with a brief presentation of the host facility; then the operator begins the visit of the museum, always having greater regard for the animal biodiversity typical of the Sicilian Mediterranean environments, providing notes on the ecology and ethology of the most significant species. The guide will focus on the most peculiar issues concerning some alien animal species on display in a specially equipped educational showcase.

In both structures visited, "FAST / Italy-Malta stations" are set up, clearly visible and recognizable by visitors; a station set up in a classroom or in an external space of the Botanical Garden is dedicated to the botanical part of the project, with display of educational material regarding alien plant species; another station set up in a classroom or an outdoor space adjacent to the Zoology Museum is dedicated to the zoological part of the project and displays educational material regarding alien animal species.

In both stations there will be on display live or prepared specimens belonging to the alien species presented during the power point projection in the theoretical part of the first meeting; Furthermore, information sheets on the most representative alien species, specific brochures and educational pamphlets will be free for the students, who will also have instruments for microscopic observation at their disposal, for example, microscopes capable of projecting images onto monitors, and enlargement with built-in lighting to always be used with the assistance of the operator on duty.

The third and final day includes a field excursion. The feasibility and details of the field trip will be agreed with the individual participating schools; for example, the rental of a bus for the excursion, which involves participation costs or the choice of the destination to reach which may be more or less close to the school headquarters. Among the proposed destinations are the R.N.O. of Fiume Fiumefreddo or the R.N.O. Simeto Oasis which are reserves of interest to FAST/Italy-Malta Project. Destinations more easily reachable by students of schools in Catania, may be some public parks in the city of Catania, such as Parco Gioeni, Parco Gandhi, Parco Madre Teresa di Calcutta, Boschetto della Plaia. As a last alternative, any green areas of the schools themselves could also be used.

The field excursion is aimed at implementing, in natural or semi-natural contexts, the right behaviors illustrated in previous meetings, e.g. not making noise or shouting so as not to disturb the animals, not to damage flora and fauna, etc. The field trip will be important to learn the right spirit of direct observation of biodiversity. The topics and examples presented will be consequent to the naturalistic-ecological aspect of the chosen itinerary.

Two operators will be involved with each a group of 15 students plus accompanying teachers. While walking, each operator is followed by their own group and while explaining, they will encourage direct observation of what is encountered along the way. Students will participate personally in activities related to the study of the environment: from the creation of a small herbarium, to direct observation or photography of some animal and plant species.

The young students will be able to carry out activities related to the protection and respect of the environment, such as the collection of any waste present. Each operator will be equipped with gloves and bags for the collection of any waste that is not excessively bulky, such as paper and plastic bottles, thus inviting the students to take note of it and not leave others out. As far as animals are concerned, we thought about doing activities such as: listening to animal sounds; or search for animal traces left in the area (footprints, feathers, feces, nests, burrows);

as well as direct observations of the fauna present; or maybe explain e.g. sampling flying insects with a net, or visually collecting insects with entomological tweezers, or using a field notebook. The botanical operators, however, in addition to explaining some peculiarities of the vegetation present, instruct the participants on how to create a small herbarium and suggesting that they create one during this excursion, collecting leaves, flowers, weeds and alien species, always with the utmost respect for the nature.

The final part of the excursion is dedicated to carrying out the long-awaited quiz with prizes: "Alien Species Quiz Game", in which the project would culminate (lasting approximately 30 minutes, including the award ceremony). The quiz will be easy to solve, with 10/12 proposed questions to which 4 answer options or "true or false" will be associated, within a pre-established time of 60 seconds for each answer. Points will be assigned to each question (0 points for each incorrect or unanswered answer; 10 points for each correct answer) which, when added together at the end, will determine the winners among those who have accumulated the highest scores. The proposed questionnaire can be carried out on paper material and filled in with pencils (possibly using recycled paper, in compliance and consistency with the environmental education carried out).

Middle school students could use online digital tools, taking advantage of dedicated platforms and apps, e.g. Kahoot for Android and/or smartphones, in order to encourage students to participate even more, thanks to the use of technology. The students will have to prepare for this quiz test, using the notes taken previously and the materials provided by the operators in the two previous meetings, in order to be able to answer the contents of the quiz.

By doing so, a link is maintained between the first and last meeting, in order to increase the chances that the work carried out by the operators and the educational concepts proposed will be successful. Since it is a sort of competition game, this final prize quiz will have surprise prizes up for grabs, consistent with the proposed themes; prizes which initially will only go to the winners, but which will in reality be diversified and distributed to everyone at the end of the game, before taking a souvenir group photo of all the participants with the operators as a testimony and memory of the day spent. It is important to leave a small memory of this experience.

Among the possible prizes, we have thought of prizes that have an ecological educational value. For example, seeds to plant, or seedlings of native plants (or perhaps endemic to Sicily); or small objects made entirely from recycled materials, or even eco-sustainable prizes to be reused, even when their main function is exhausted (e.g. pencils that become seeds when consumed). At the end of the excursion, the guide operators thank and greet the participants, inviting them to never forget that taking care of the environment also means taking care of themselves!

CONCLUSIONS

Today, the whole world is asked to implement innovative choices, totally different from those of the past, which aim at a more responsible and natural human society, aware of the importance of nature and respectful of the environment.

Today's society needs a profound change of mentality on the management of natural resources and the protection of biodiversity. This new awareness must begin even in the little ones; and this is precisely the main reason why this project with schools was born. The concepts explained, the choice of methods and tools used, were not aimed at themselves, but wanted to promote intentional processes of involvement of the youngest, triggered by a form of active participation, given by the challenge game and practical activities educational-didactic, useful for the approach of a new "ecological" mentality.

With this project dedicated to younger students, through the topics addressed and the critical issues highlighted in the field of knowledge and conservation of biodiversity, we hope to have direct feedback in the individual daily actions of the students involved.

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