Ionizing Radiation from Solar Plants

How does ionizing radiation affect plants?
Understanding the effects of ionizing radiation (IR) on plants is important for environmental protection, for agriculture and horticulture, and for space science but plants have significant biological differences to the animals from which much relevant knowledge is derived.

Can ionizing radiation be used to study plants' adaptive reactions?
In this review,the main attention is paid to the analysis of plants' adaptive reactions to radiation exposure. In fact,ionizing radiation can now be usedas a convenient and effective tool for studying biological responses to environmental stress and helps improve our understanding of adaptive processes.

How does radiation affect plant growth?
The exposure of plants to radiations can have both direct and indirect effects on seed germination,plant growth and reproduction due to the direct interaction of radiation with cellular and tissue structures or because of the aberrations in the genetic material which are responsible for different phenotypic development.

What is ionizing radiation?
It is classified as ionizing radiation or non-ionizing radiation according to its energy level and the ability to ionize materials [1, 2]. Plants on earth are inevitably exposed to UV rays from sunlight and ionizing radiation from cosmic space or radionuclides in rocks and soils [3, 4, 5].

Why are plants more resistant to ionizing radiation than animals?
The increased resistance of most plants to ionizing radiation compared to animals is associated with a more effective antioxidant defense system,DNA repair systems,the regular formation of new reproductive structures,which restrain the effect of harmful mutations,and a significant redundancy in seed production.

What causes ionizing radiation?
On this planet,ionizing radiation stems primarily from geological processes and is the result of the decay of radionuclides in the ground.

In this review, we report main results from studies on the effect of ionizing radiations, including cosmic rays, on plants, focusing on genetic alterations, modifications of ...

Health: thanks to radiation, we can benefit from medical procedures, such as many cancer treatments, and diagnostic imaging methods.; Energy: radiation allows us to produce electricity via, for example, solar ...

The stress that the space environment can induce on plant physiology is of both abiotic and biotic nature. The abiotic space environment is characterized by ionizing radiation and altered gravity ...

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Ion beam irradiation, due to its high energy and strong penetrative capacity, is a significant form of environmental ionizing radiation, which can directly interact with matter to cause ionization and excitation.

Ionizing radiation may impact reproductive organs and gametes and hence reduce plant reproduction. This may delay phenology and hence the timing of reproduction. The difference between the number of buds and the ...

We present an overview of the molecular mechanisms of radiation responses in plants, which leads to a tempting conjecture of the evolutionary role of IR as a limiting factor ...

We present an overview of the molecular mechanisms of radiation responses in plants, which leads to a tempting conjecture of the evolutionary role of IR as a limiting factor for land colonization and plant diversification rates.

Radiation refers to the emission of electromagnetic energy away from the source, such as UV radiation, ion beams and plasma. It is classified as ionizing radiation or non-ionizing radiation according to its energy level and ...

Mean return angle (±SE) of fungi when exposed to a collimated beam of gamma radiation from a 109 Cd source for 24 h (fungal isolates and sources in sequence are Penicillium roseopurpureum 147 Red Forest, P. lanosum reactor room, Paecilomyces liliacinus 101 unpolluted soil, P. lilacinus 1941 Red Forest, Penicillium hirsutum 3 hot particles, Cladosporium sphaerospermum 60 ...

Presented in this review data demonstrate that ionizing radiation can change almost all aspects of plant life: the state of DNA, chromatin, and antioxidant system, patterns of gene expression, basic physiological processes, morphological parameters, and even the death of ...

All organisms (e.g., bacteria, plants, or animals, including humans) are exposed everyday to varying amounts of ionizing radiation. Figure 6-1 shows average contributions from various sources of radiation to which the average U.S. citizen is exposed during his or her lifetime. Approximately 82% of the radiation dose is from natural sources: 55% from radon (see Figure ...

(2) Ionizing radiation--ionizing radiation produces charged particles or ions on hitting any object but they are incapable of breaking molecular bonds or removing electrons. This radiation energy is transferred by particles or waves containing a high amount of energy and these high-energy ionizing radiations can lead to serious ...

Different wavelengths of the radiation spectrum can interact directly with macromolecules [1,12]; UV and ionizing radiation may also exert biological effects indirectly through reactive oxygen species (ROS) produced in plants [13,14,15,16].

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may delay phenology and hence the timing of reproduction. The difference between the number of buds and the number of flowers may also be affected by radiation with a relatively larger number of flowers relative to buds reflecting ...

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Ionizing radiation is a type of energy released by atoms in the form of electromagnetic waves or particles. People are exposed to natural sources of ionizing radiation, such as in soil, water, and vegetation, as well as in human-made sources, such as x-rays in medical devices. Ionizing radiation has many beneficial applications, including uses in medicine, industry, agriculture ...

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