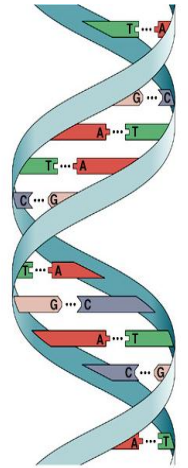


The effect of mutagens and their effect on germination



LAB 8

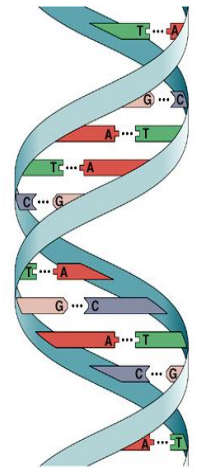
mutations



- a **CHANGE** in a gene or chromosome
- Mutations result in a **different phenotype** than normal → lead to genetic variation
- Mutations may lead to **genetic disorders**

Types of Mutations

- **chromosomal mutations**
- **point mutations**
- **Gene mutation**





There are two ways in which mutations occur

- Mutations can be **inherited**.
 - This means that if a parent has a mutation in his or her DNA, then the mutation is passed on to his or her children.
- Mutations can be **acquired**.
 - This happens when environmental agents damage DNA, or when mistakes occur when a cell copies its DNA prior to cell division.



Mutations can be...

- 1) helpful
 - 2) harmful
 - 3) neutral (no effect)
- **Depends on the environment**



Harmful Mutations

- They reduce the organism's chance for survival and reproduction
- Any mutation leading to a disease
 - Cancer- overexposure to UV light
 - Cystic fibrosis
 - Sickle-Cell Disease
 - Hemophilia
 - Down Syndrome



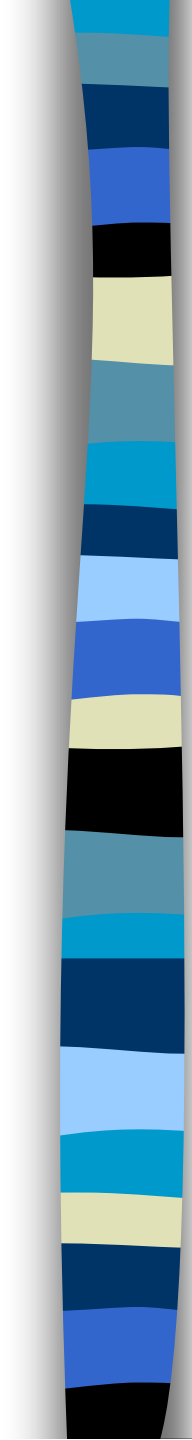
Helpful Mutations

- Improve the organisms chance for survival and reproduction



Neutral Mutations

- These mutations **do not show any advantages or disadvantages** to an organism.
- In fact, many organisms may have mutated genes and **not know it** because it does not show through on its phenotype and does not affect the structure or function of the gene in the cell at all.



Can I get a mutation from someone who has it?

- **No! Mutations are not communicable.** That is, you can not get the mutation by contact with someone who has it.
- Mutations occur within your own cells.
- you can inherit a mutated allele from your parents during fertilization

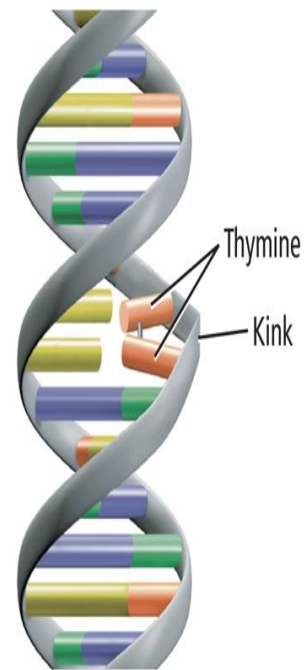


Factors that control the rate of mutations

- **Genetic control:** Genes differ in the degree of susceptibility to mutation, there **Stable genes** and **Mutable genes**. The genetic control mechanism in the mutant is still not definitively known
- **The temperature:** The temperature has an effect on the cell as a whole, and can affect the susceptibility of a gene to mutation.
- **Radiation:** It causes an increase in the rate of mutation, regardless of the duration of the exposure or the radiation dose.
- **Chemicals:** Chemicals differ from each other in the way they affect the genetic material.
- **Age of the organism:** The rate of mutation is significant in the older organism. This may be due to the accumulation of mutagenic substances in the tissues during the life of the organism, thus increasing the possibility of mutations appearing in the later stages of life.

Causes of Mutation

- Mutations can occur spontaneously.
- DNA polymerase can make a mistake.
- Chemicals and radiation also can damage DNA.
- High-energy forms of radiation, such as X rays and gamma rays, are highly mutagenic.
- A mutagen is any agent that changes the DNA of an organism.
- Thymines can stick together causing a kink in the DNA. The bases will not bond correctly.



The effect of mutation on seedling growth



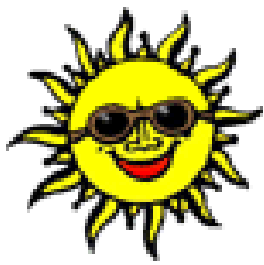
Materials :

Various seeds - Petri dishes - 10 ml graduated tomatoes - Filter paper - 5% Clorox - Plant extract

Aquatic extracts are prepared as consumed

Five seeds for each treatment washed with 5% Clorox and then with distilled water and placed in the dish containing a filter paper and add 10 ml of the extract three times during the week.

Control experiment treated with plain water



| Transactions | Number of germinated seeds | Germination rate |
|----------------|----------------------------|------------------|
| Ginger extract | | |
| Black tea | | |
| Mint | | |
| Roselle | | |
| jasmine leaves | | |
| Clorox | | |
| Dettol | | |

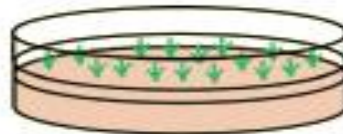
The chart represents a graph, the result is discussed, and the report is submitted in full



Note for next week:

The seeds are taken from the plant today and treated as follows:

- * - Seed exposure to microwave radiation for one minute
- * - It is placed in the sun for a full day
- * - Ray (determines the technical wavelength used and exposure time 2 hours) UV





Shindimba Parent



Shindimba Mutants

Figure 7. White seeded Shindimba (left) compared to colour variations among Shindimba mutant lines (right)



Photo 1. Naturally occurring plant color mutations. Photos credits: orange - Forest Starr and Kim Starr, CC BY 2.0; ficus – public domain; iris – Bob Gutowski CC BY-NC-SA 2.0; hibiscus – Dariusz Malinowski CC BY-NC-ND 2.0.

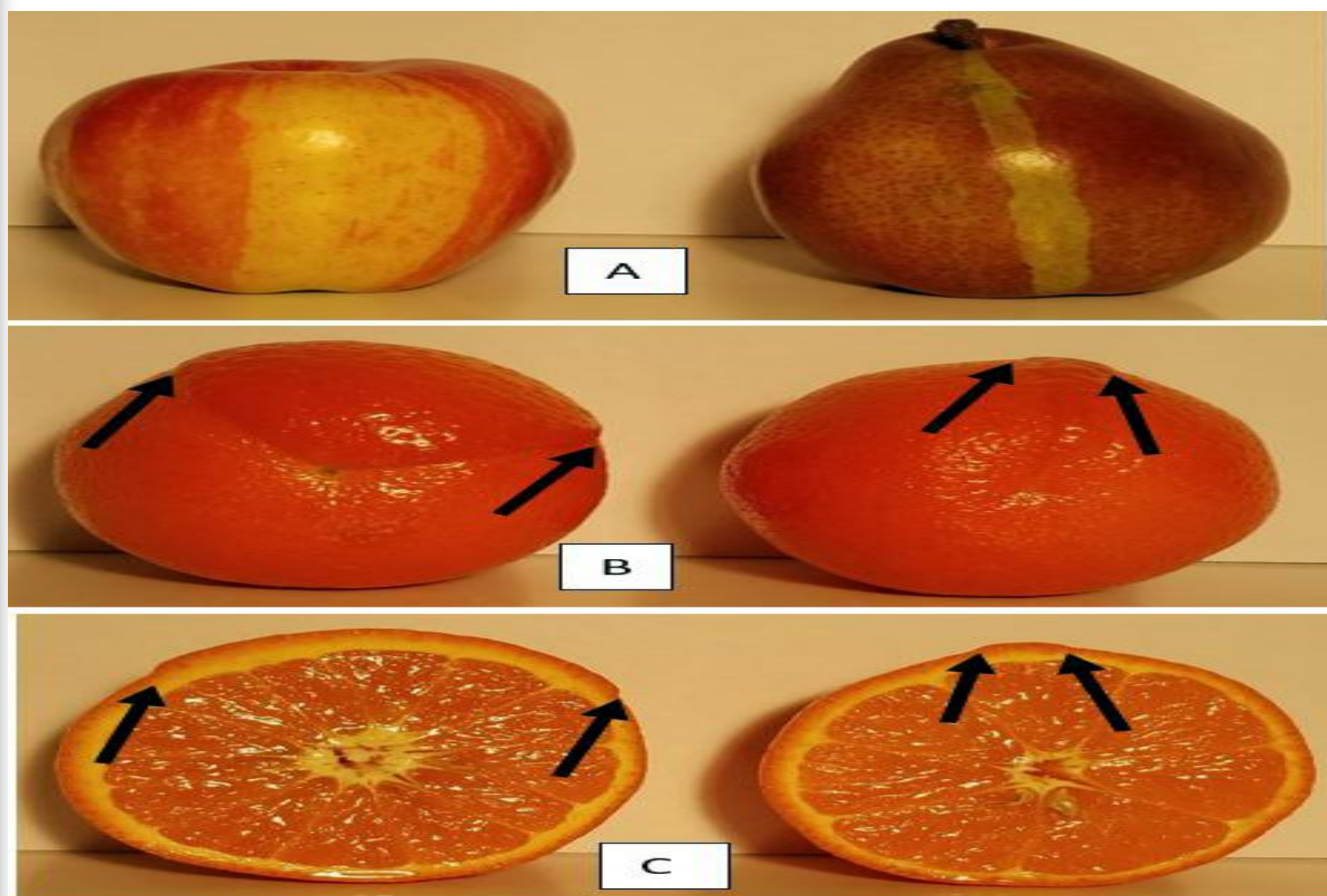
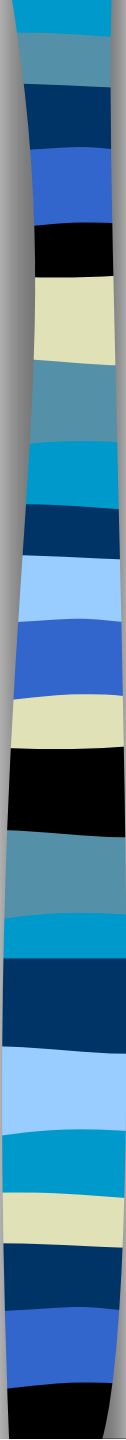
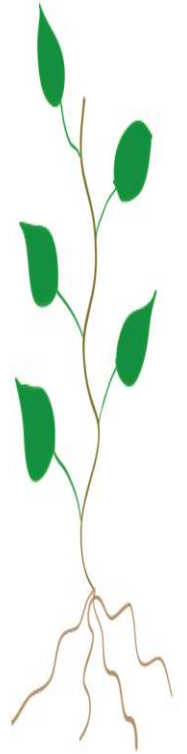


Photo 3. Fruit mutations found in a supermarket produce section. Striping on Gala apple (A, left) and a red pear (A, right). Rind thickness change on orange (B and C). Arrows indicate the area of rind thickening on the oranges (B and C). Photos by Ron Goldy, MSU Extension.

منيره الدوسري

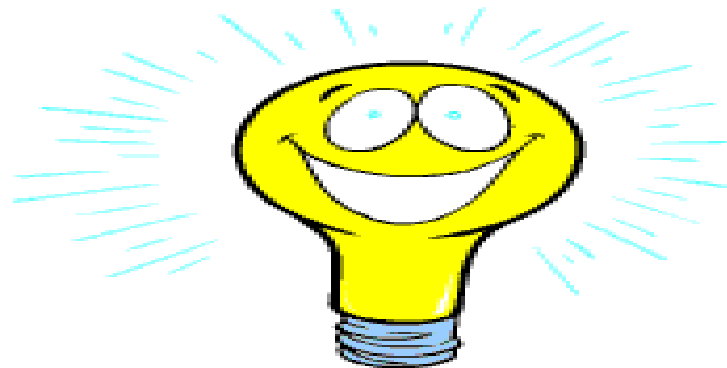


Thank
You



نعم و لله الحمد

You R Bright



Good Luck on
your exam!!

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