IS POSSIBLE TO ADVANCE BREEDING PROGRAM OF ORNAMENTAL CHILI PEPPERS: BY IN VITRO CULTURE OF ZYGOTIC IMMATURE EMBRYOS?

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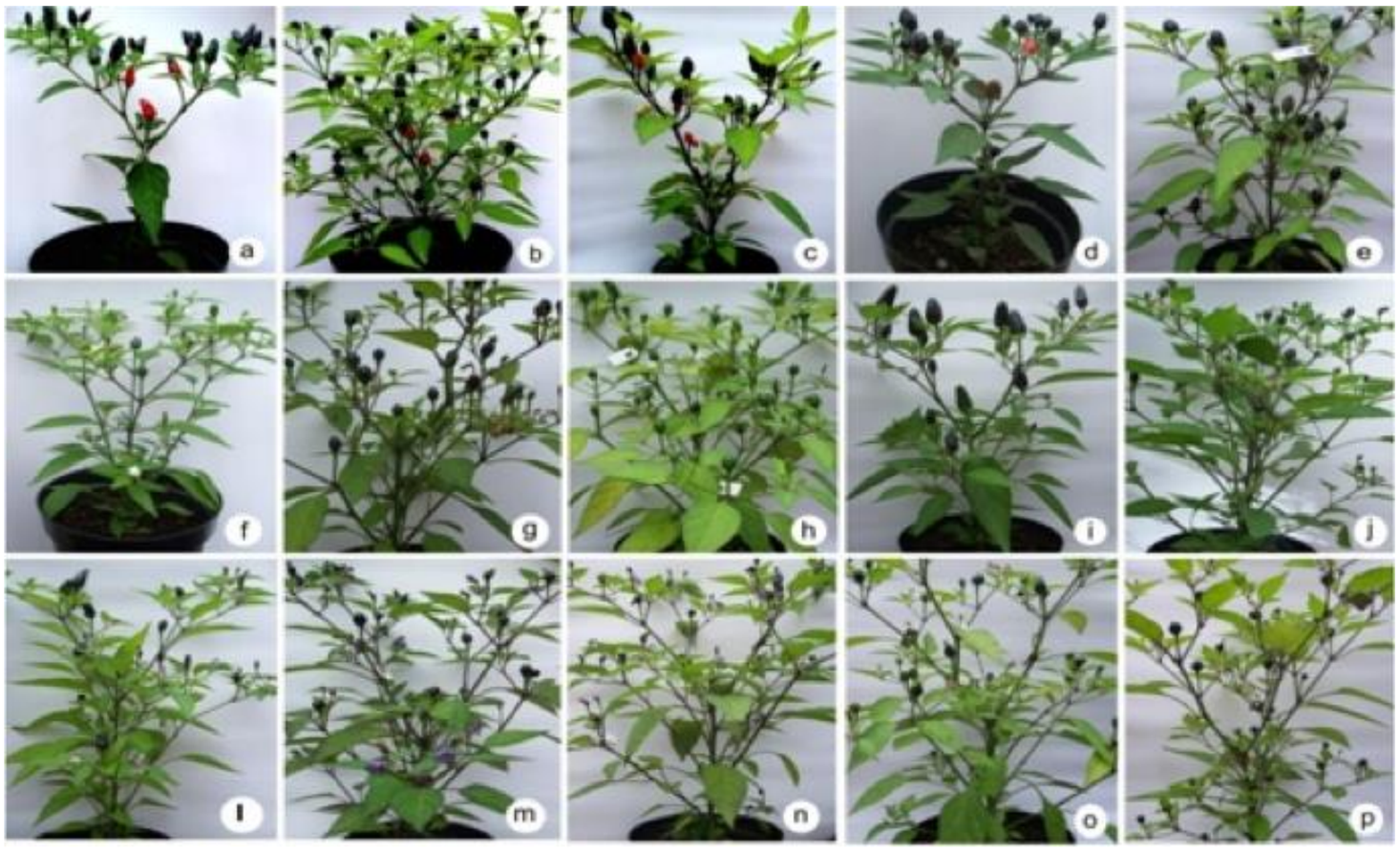
1. Introduction

The conventional improvement of ornamental chili by hibridization and conduction of segregating populations, require several cycles of self-fertilization to obtain pure lines.

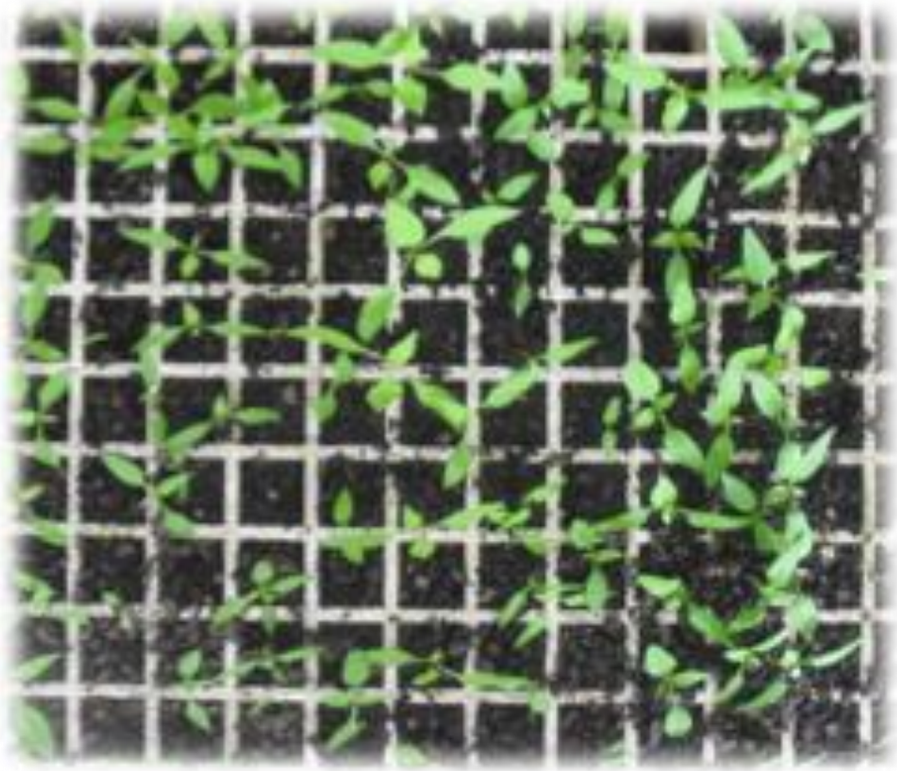
UFPB 134 x UFPB 390



Segregating population (F2)

1. Introduction

Futhermore, it is necessary that fruits are fully ripe, because the germination rate is very low when fruits are haversted imature.



1. Introduction

In this sense, efforts to reduce self-fertilization cycles will have two advantages, accelerate the breeding program and reduce costs in the cultivar release.

Controlled self-pollination of *Capsicum* (Rêgo and Rêgo, 2016)

1. Introduction

So, use the in vitro culture of immature zygotic embryos has been gaining importance in breeding programs.

Immature zygotic embryo of ornamental chili pepper (*Capsicum annuum* L.). (25 days)

2. Objective

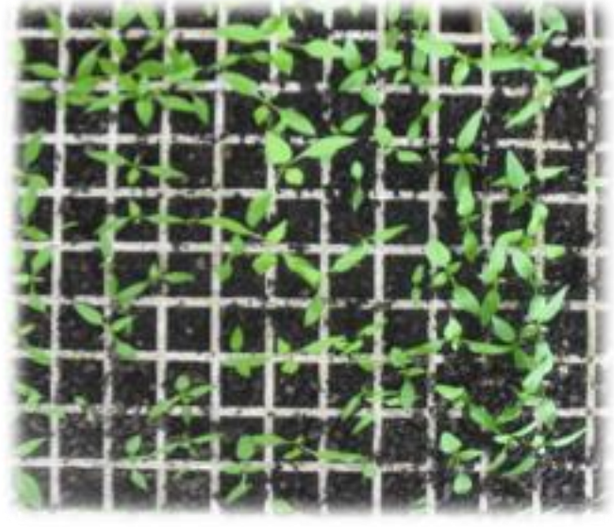
So, the objective of this work was to evaluate the efficiency of the in vitro culture of immature zygotic embryos (IZE System) in the reduction of the improvement cycle of ornamental chili pepper (*C. annuum*) in comparison to the conventional system.

3. Material and Methods

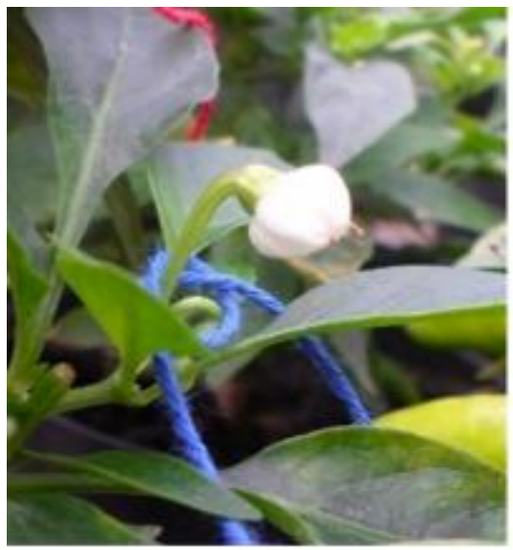
Material Vegetal

10 Plantlets/accession

20 seeds/accession



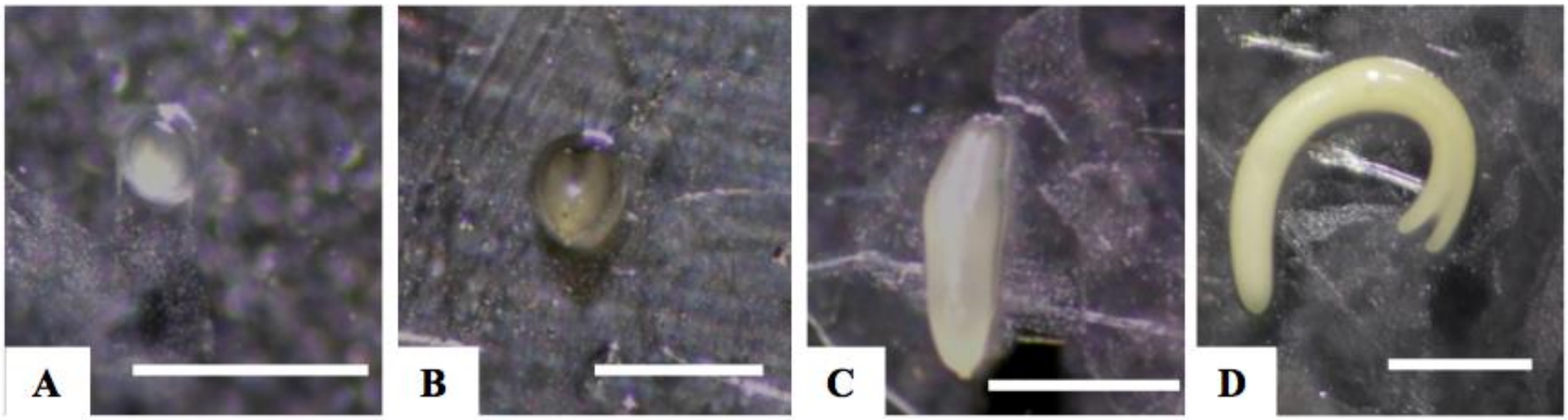
3. Material and Methods



Self-pollination

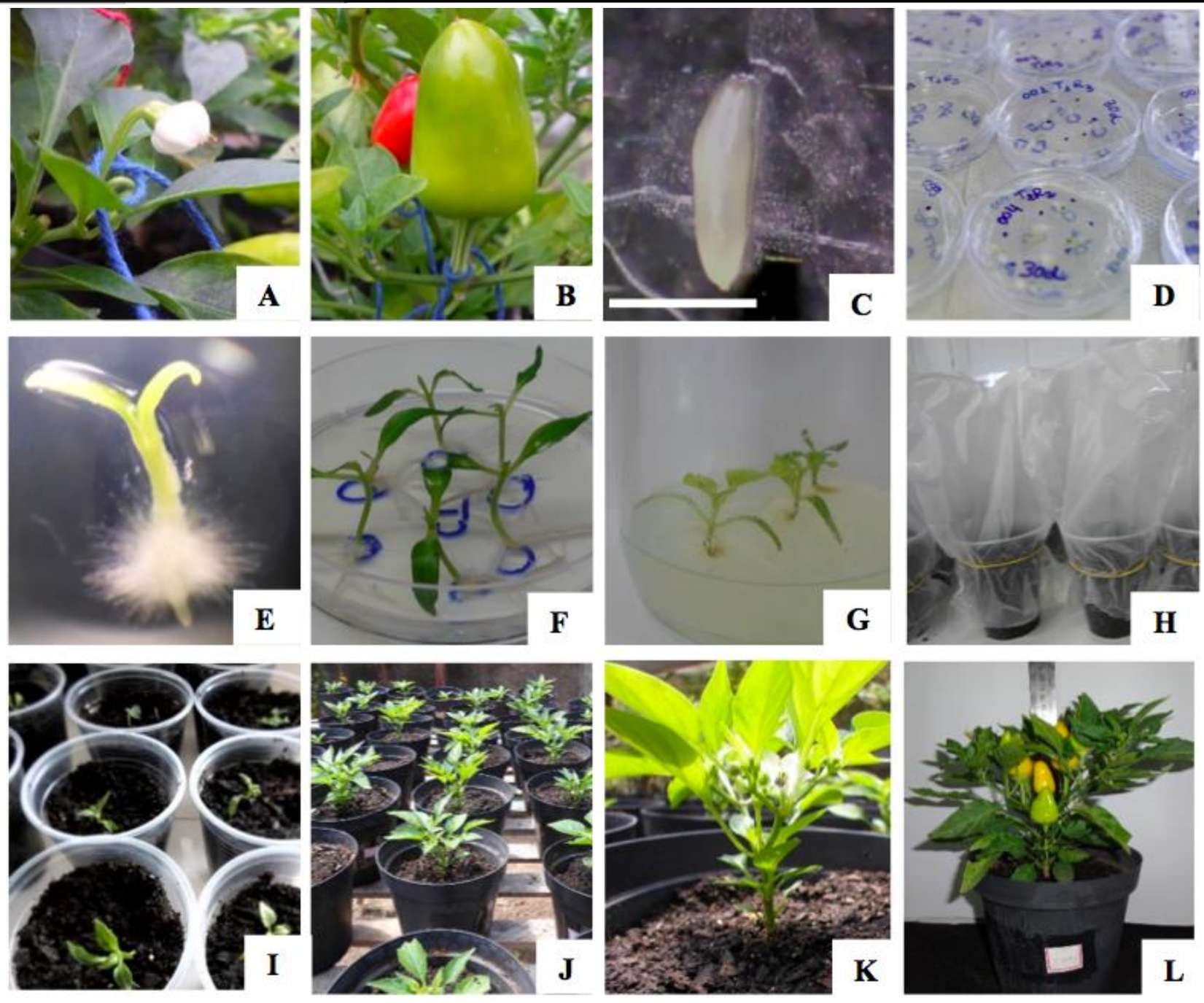
20 DAS
25 DAS
30 DAS
35 DAS

Immature fruit



Different stages of zygotic imature embryos from ornamental chili peppers. (A) globular, (B) cordiforme, (C) torpedo, and (D) cotiledonar.

3. Material and Methods



Morashig and Skoog (MS), 1962

MS 1/2 strength

Improvement cycle of ornamental chili peppers (*Capsicum annuum* L.) from in *vitro* culture Immature Zygotic Embryos. A) Self-pollination. B) Immature fruit. C) Isolated embryo at 30 days after anthesis. D) Inoculated Immature Zygotic Embryos in Petri dishes. E) germinated immature zygotic embryos. F e G) regeneraste seedlings H e I) Aclimatation J) Transplanted seedlings in the greeenhouse. K) Anthesis. L) Mature fruis.

3. Material and Methods

Comparison among Conventional (C) and Immature Zigotic Embryo (IZE) Systems

Phase I Starting with self-pollination to mature seeds (C)
Starting with self-poollination to isolation of immature zygotic embryo (IZE)

Phase II From sowing of seeds to transplant of the seedlings (C)
From inoculation of immature zygotic embryo to transplant of the seedlings (IZE)

Phase III From transplant of the seedlings to beginning of anthesis (C)
From transplant of the seedlings to beginning of anthesis (IZE)

Phase IV From anthesis of three first flowers to maturation of three first fruits (C)
From anthesis of three first flowers to maturation of three first fruits (IZE)

Because characteres related to fruits is very important in the selection of ornamental chili peppers.

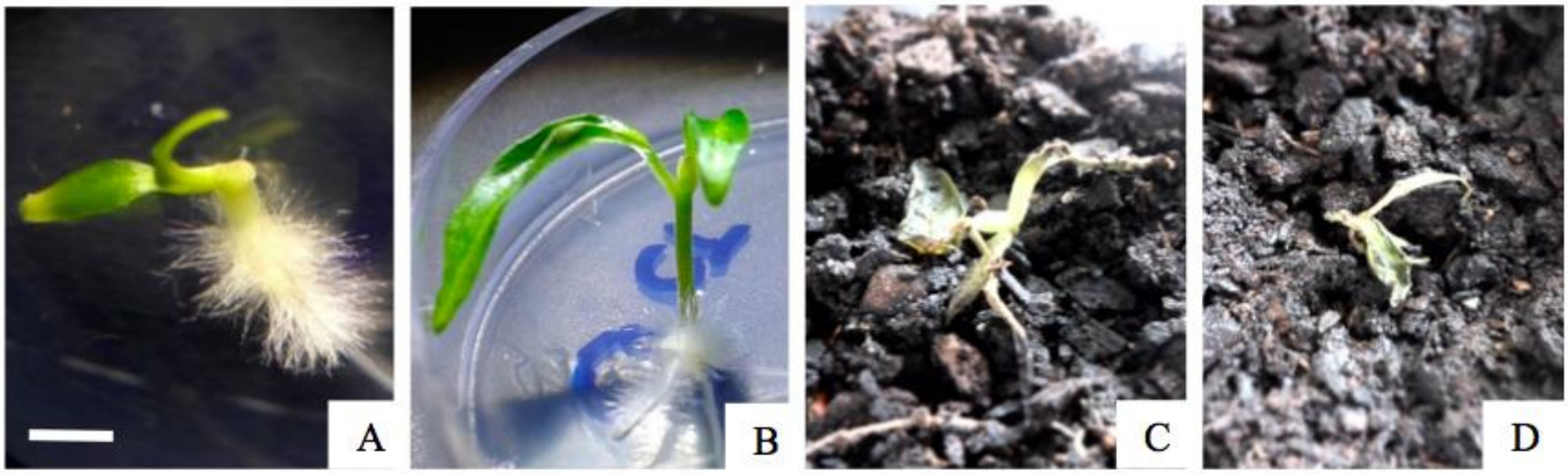
4. Results and Discussion

Tab 1. Influence of period collect of fruits on the root lenght of plantlets derived from immature zygotic embryos of ornamental chili peppers *in vitro* cultured.

Days after Self-pollination	Lenght of Root
20	0.84 b
25	3.9a
30	4.38a
35	4.37a

Means followed the same letter there is no significant difference by Tukey's testa t 5% of probability level.

4. Results and Discussion

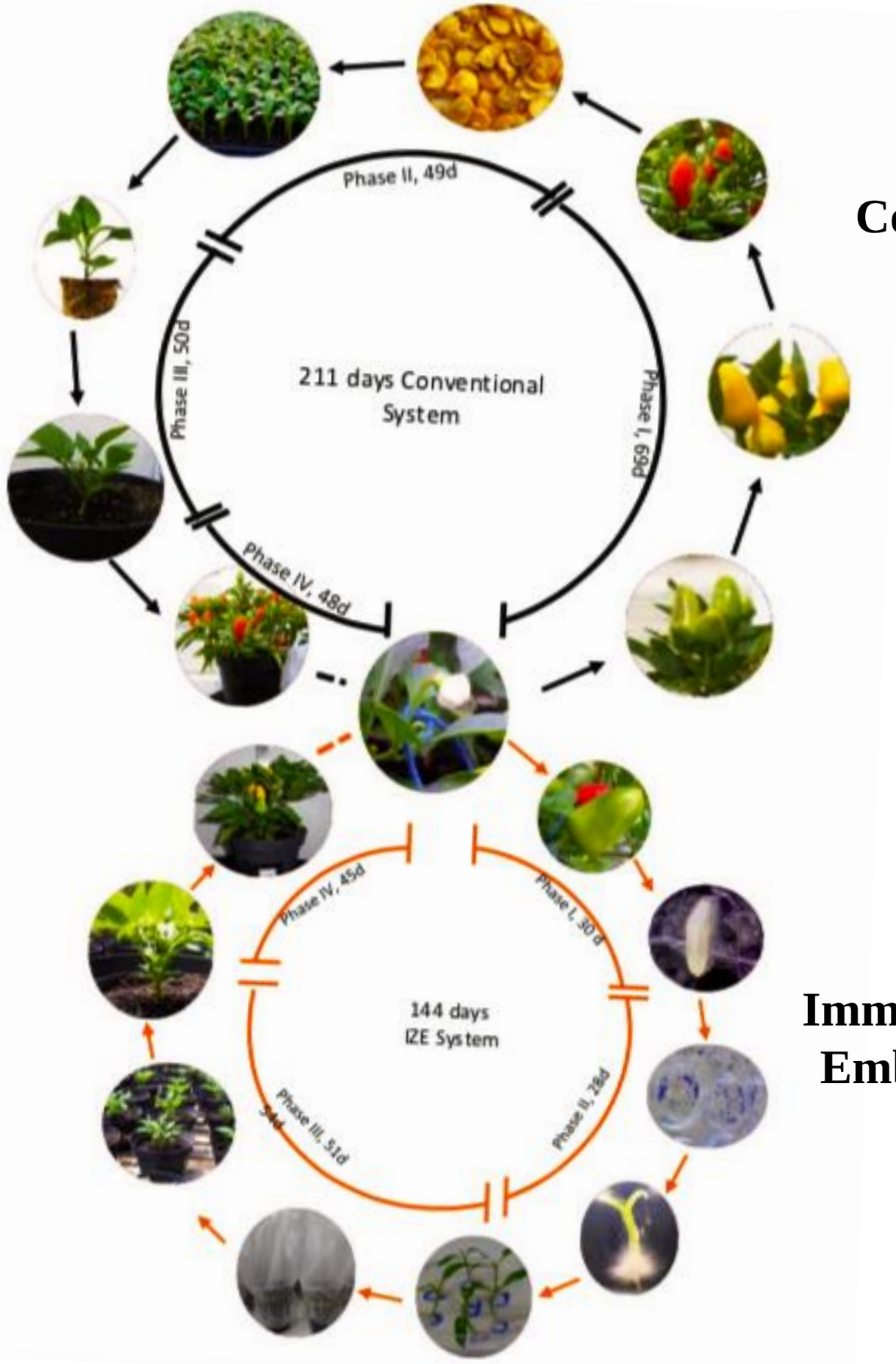


Germination, development (A and B), and loss of seedlings during acclimatization and transplant (C and D) in IZE of ornamental chili peppers(*Capsicum annuumm* L.), derived of fruits with 20 days after self-pollination.

4. Results and Discussion

Comparisons between two-cycle selection in ornamental pepper breeding program. Conventional system (211 days) (black arrows) and immature zygotic system (IZE) (144 days) (orange arrows). Shortening of 67 days per cycle selection (40% of the time), reducing labor costs and inputs, and decreasing the time of the release of cultivars

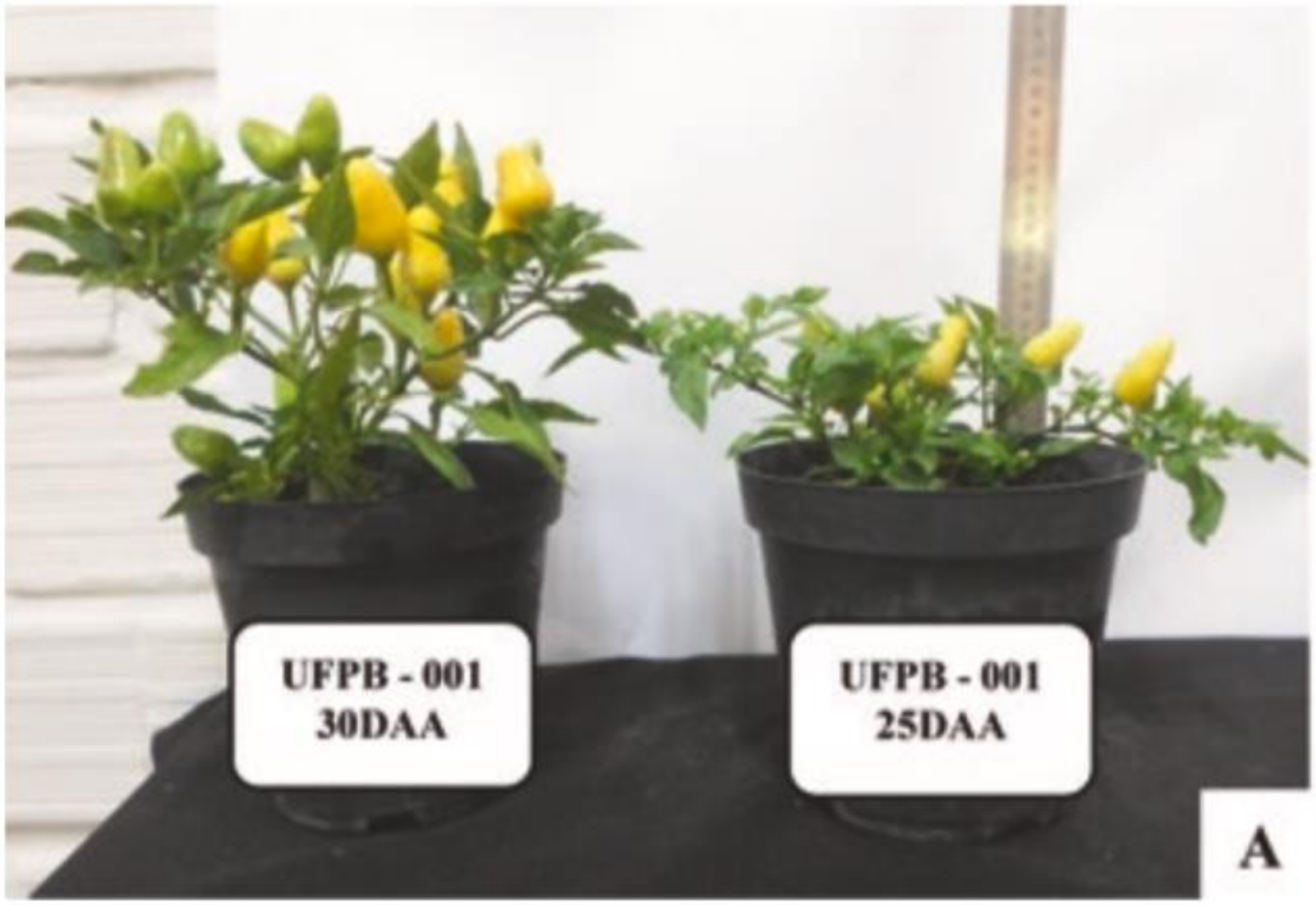
Significant differences between genotypes behavior were observed in relation to phase I in the conventional system and IZE System.



Conventional System

Immature Zygoyic Embryos System

4. Results and Discussion



Ornamental peppers (*Capsicum annuum* L.) from the in vitro culture of immature zygotic embryos (IZE system). (**A**) Difference in height and fruit development between plants derived IZE at 30 (left) and 25 (right) days after anthesis (DDA), which presents phonotype like to dwarfism.

4. Results and Discussion

Ornamental peppers (*Capsicum annuum* L.) from the in vitro culture of immature zygotic embryos (IZE system). **(B)** Influence of culture mediums on the same traits, both Murashige and Skoog (M1) and Murashige and Skoog half strength (M2) on the genotype UFPB 099, respectively.

5. Conclusion

- A significant reduction in the breeding cycle is expected by cultivar immature zygotic embryos collected 30 days after self-pollination (DAS).
- This reduction of 60 days for generation, reduce the time of obtaining homozygous lines, achieved in conventional breeding after 7 at 8 generations, reducing aproximatelly of 5 years, for 3 and half years.

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