Direct effects of chronic gamma radiation on *Musa acuminata* var. Berangan, a local Malaysia banana cultivar

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Introduction

Musa acuminata var. Berangan, is a popular variety of our local banana known as Pisang Berangan. Genetic improvement of banana and plantain in the various programs operating around the world is based on crosses between commercial triploids and improved diploids, with the objective of developing higher yielding cultivars that are more resistant to the main diseases. The variety is a triploid banana, use mainly for dissert and has a great value for commodity fruit crops. However, production of Pisang Berangan has been threatened by diseases such as *Fusarium wilt*, black sigatoka, burrowing nematodes and viral diseases like *Banana streak virus, Banana bunchy top virus* and *Banana bract mosaic virus*. The scenario becoming worst as Musa has a narrow genetic background for breeding and/or selection program. The banana breeding program of edible bananas is hampered by high sterility, and very limited amounts of seeds. Mutation induction via chronic gamma radiation is an alternative ways in creating more variants for selections towards a better quality and disease tolerance. However, the fact that triploid cultivars are seedless makes them edible but it is also a constraint when it comes to improving their yield and resistance to biotic stresses. Breeders always aim to get parthenocarpic hybrids with enhanced resistance. The objective of this work is to get a dose response for chronic gamma radiation in Pisang Berangan.

Methodology

A total number of 75 samples at nursery stage (1 month) were exposed to chronic gamma radiation in Gamma Greenhouse at Malaysian Nuclear Agency for 28 weeks. The samples were accordingly arranged with distance ranging from 1m to 15m from gamma source (Ceasium-137). Plant height and new buds were used as measurement parameters in evaluating the direct effects of the chronic gamma radiation.

Arrangement of banana samples inside Gamma Greenhouse.

(A) (B)

(A) Control samples in shade house and treated sample materials inside gamma greenhouse

Results

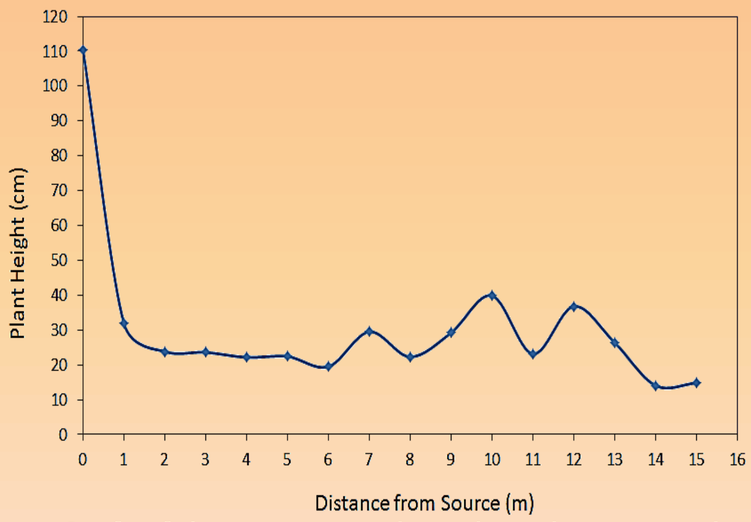
Results showed effective dose of chronic gamma radiation in Pisang Berangan was 20Gy. Number of new emerging sucker was ranging from 1-3 pieces with the highest at ring-4 and ring-5. Plant height was observed ranging from 22.1 to 110.5 cm.

Effects of chronic radiation were observed after 3-4 months in the GGH. The samples revealed as striking leaves, short internode and new emergence of suckers.

As for selection of potential mutant variants, new emerging suckers were tissue cultured in segregating chimeras and to get required numbers of samples for further field evaluation.

Values of plant height at 15 rings positioned in GGH

Ring	Height (cm)
0	110.5
1	31.9
2	23.8
3	23.6
4	22.1
5	22.4
6	19.5
7	29.5
8	22.3
9	29.2
10	39.9
11	23.1
12	36.8
13	26.4
14	14.1
15	14.9



Graft of dose response based on shoot growth performance

Conclusion

Chronic gamma radiation can give effects on growth performance of the Pisang Berangan. The chronic effects has advantages in repairing mechanism to occur.