CLAIMS

1. A method for introducing heterologous DNA into at least one cell of a plant seed embryo comprising priming a plant seed which has not undergone imbibitions with a priming medium containing a viral DNA expression ~~virus-based DNA~~ construct comprising the heterologous DNA, wherein said priming initiates seed germination but does not allow radicle emergence, wherein said ~~under conditions enabling~~ priming ~~and~~allows uptake of the DNA by the plant seed, thereby obtaining the seed embryo comprising the heterologous DNA.

2. The method of claim 1, further comprising subsequently germinating and growing said plant seed ~~the step of providing suitable conditions for subsequent seed germination and growth~~ so as to obtain a plant ~~or part thereof~~ comprising the heterologous DNA.

3. The method of claim 1, wherein the viral DNA expression~~virus-based DNA~~ construct comprises viral genes ~~or parts thereof enabling replication and symptomless spreading of the construct into adjacent plant cells~~ encoding a coat protein, a V2 protein and a C4 protein.

4. The method of claim 3, wherein the DNA expression construct is a Geminivirus ~~based~~ DNA expression construct.

~~5. The method of claim 4, wherein the DNA construct comprises the heterologous DNA flanked by a non-contiguous nucleic acid sequences encoding Geminivirus replicase or replicase-associated proteins.~~

~~6. The method of claim 5, wherein the DNA construct further comprises a polynucleotide sequence encoding a modified Geminivirus coat protein (CP).~~

~~7. The method of claim 6, wherein the modified Geminivirus coat protein comprises a mutation or deletion in nucleotides encoding an N-terminal 100 amino acids.~~

~~8. The method of claim 5, wherein the DNA construct further comprises a polynucleotide sequence encoding a modified Geminivirus V2 protein.~~

~~9. The method of claim 8, wherein the DNA construct further comprises a polynucleotide sequence encoding a modified Geminivirus C4 protein.~~

10.5. The method of claim 54, wherein the DNA expression construct further comprises a bacterial polynucleotide sequence.

11.6. The method of any one of claims 4-105, wherein the Geminivirus is Tomato Yellow Leaf Curl Virus (TYLCV).

~~12.~~7. The method of claim ~~11~~6, wherein the DNA expression construct ~~is a Geminivirus based construct selected from the group consisting of IL-60 having~~ comprises the nucleic acids sequence set forth ~~o~~in SEQ ID NO:1 ~~and IL-60-BS having the nucleic acids sequence set forth in~~ or SEQ ID NO:2.

~~13. The method of claim 1, wherein the DNA construct is an expression construct thereby the heterologous DNA is expressed within the plant cell.~~

~~14.~~8. The method of claim 1~~3~~, wherein the DNA expression construct further comprises at least one regulatory element selected from the group consisting of an enhancer, a promoter, and a transcription termination sequence.

~~15.~~9. The method of any one of claims 1-2, wherein the DNA expression construct further comprises a marker for identifying the seed and plants comprising the heterologous DNA.

~~16.~~10. The method of claim 1, wherein the heterologous DNA encodes a product selected from the group consisting of a peptide, a polypeptide, a protein and an RNA molecule.

~~17. The method of claim 16, wherein the peptide, polypeptide or protein are useful in the cosmetic or pharmaceutical industry.~~

~~18.~~11. The method of claim ~~16~~10, wherein the RNA molecule is an inhibitory RNA selected from the group consisting of antisense RNA, dsRNA and siRNA.

~~19.~~12. The method of claim ~~16~~10, wherein the encoded product confers a desirable agronomic trait selected from the group consisting of resistance to biotic or abiotic stress, increased yield, increased yield quality and ~~preferred~~ growth pattern.

~~20.~~13. The method of claim 1, wherein the heterologous DNA is transiently expressed in the at least one cell of the seed embryo and cells derived therefrom.

~~21. The method of claim 1, wherein the heterologous DNA is incorporated into the genome of the at least one cell of the seed embryo and cells derived therefrom.~~

~~22. The method of claim 1, wherein the priming medium has a water potential enabling seed imbibitions but not radicle emergence.~~

~~23.~~14. The method of claim ~~22~~1, wherein the priming medium is an aqueous solution.

~~24.~~15. The method of claim ~~22~~1, wherein the priming medium is a solid matrix.

~~25.~~16. A dried, primed seed which comprises a Geminivirus-based DNA construct comprising heterologous DNA, wherein said ~~construct was introduced into the seed according to the method of claim 1~~heterologous DNA is expressed in the embryo of the seed.

~~26~~17. The method of claim 1, wherein the seed is of a monocot origin.

~~27~~18. The method of claim 1, wherein the seed is of a dicot origin.

~~28~~19. The method of claim 1, wherein the seed is of cone-bearing origin.

~~29~~20. The method of claim 1, wherein said priming does not comprise~~ing~~ microinjecting.

21. The dried primed seed of claim 16, being generated according to the method of claim 1.