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Literature cited

1. BEARD, J. S. Climax vegetation in tropical America. *Ecology* 25: 127-158. 1944
2. EWEL, J. J. and WHITMORE, J. L. The Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands. USDA For Serv. Res. Pap. ITF-18. Institute of Tropical Forestry, Rio Piedras, Puerto Rico, 1973
3. LITTLE, E. I. and F. H. WADSWORTH. Common Trees of Puerto Rico and the Virgin Islands. USDA Forestry Service Agricultural Handbook 249. 1964.
4. ROBERTS, R. C. Soil Survey, Puerto Rico. USDA in cooperation with the UPR Agric. Exp. Sta. Washington, D. C. (U.S. Bureau of Plant Industry, Soil Survey Report, Series 1936, Nº 8). 1984
5. STEEL, R. G. D. and J. H. TORRIE. Principles and Procedures of Statistics; McGraw-Hill Book Company, Inc. New York, New York, 481 p.
6. WADSWORTH, F. H. Pomarrosa, *Jambosa jumbos* (L.) Millsp. and its place in Puerto Rico. *Caribbean Forester* 4: 183-194. 1943

Note on 2n-3n incompatibility in *Coffea canephora*

Sumario. Cruzas dialélicas entre clones de café de altos rendimientos de la serie Balehonnur Robusta (BR), indicaron un caso de incompatibilidad entre el embrión y el endospermo. Se sugiere que la falta de armonía en el endospermo pero no en el embrión es debida a que el tejido contenía dos juegos de cromosomas maternos y sólo uno paterno.

In higher plants, hybrid inviability is often due to causes other than incompatibility between the parental chromosomes as they affect the embryo itself. This fact has been proved by Laibach, as cited by Stebbins (2), who found that the crosses between *Linum austriacum* and *L. Permie* did not yield viable seeds. But he still managed to obtain hybrid plants of the same cross by embryo culture. Thus the production of hybrids by embryo culture from otherwise incompatible matings has now become common and number of hybrids has been produced. There are numerous examples in the literature on embryo and endosperm incompatibility in angiosperms.

Self-sterility in *C. canephora* has been studied by Dexreux *et al* (1), and it has been established that the failure of the seed set on selfing is due to the failure of the pollen tube growth in the style at various levels leading to self-sterility.

Diallelic crosses were effected in 1976 at the Central Coffee Research Institute using high yielding clones in B. R. (Balehonnur Robusta) series, *viz*, BR 9, BR 10, and BR 11 from S. 274 line and BR 4 and BR 5 from S. 270 line. Wherever the set was low and seed germination was a failure the crosses were repeated in 1977. The details of the experiment and the results will be published elsewhere.

Diallelic crosses involving clone BR 11 as female parent have not only yielded low set when compared to its reciprocal crosses but also the seeds failed to germinate. Poor germination was also noticed in open pollinated seeds of the clone BR 11 as shown in Table 1. Clone BR 11 as male parent yielded viable seeds and normal progenies have been established in the field. Thus BR 11 as male parent with higher compatibility with other clones is a good pollinator.

On examination the ungerminated seeds (both crosses and open pollinated) were found to be complete but the embryos were found arrested in growth. Very few seeds germinated and in most of the cases the embryo failed to emerge and those emerged dried up at various stages (Table 1, Fig. 1).

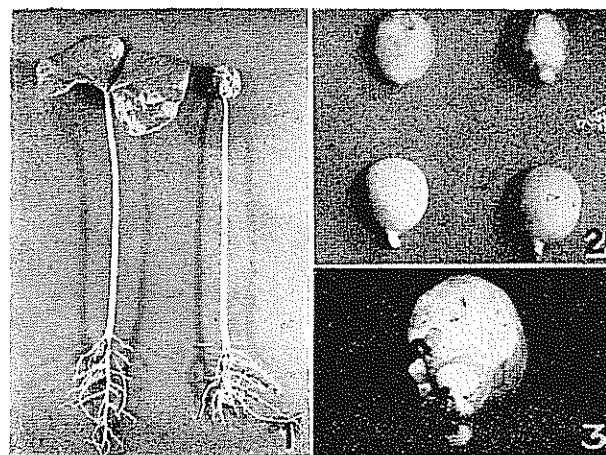


Fig. 1.—A case of normal seedling growth when BR 11 is male parent (65 days)

Fig. 2.—Abnormal germination (Failure) of seeds when BR 11 is female parent, embryos arrested as also dried up (65 days)

Fig. 3.—Embryo exposed to show the limited development of the Cotyledons (65 days).

Table 1—Germination of seeds from diallelic crosses and open pollination in *C. canephora*

Description of cross	1977		Number of seeds % Germination	1978		% Germination
	Sown	Germinated		Sown	Germinated	
<u>CROSSES</u>						
S 4042 RB 9 × 11	100	79	79 00%	100	78	78 00%
S 4043 BR 11 × 9	62	Nil	Nil	227	4	1 76%
S 4054 BR 11 × 4	179	Nil	Nil			
S 4055 BR 4 × 11	84	36	42 85%			
S 4056 BR 11 × 5	175	1	0 57%	157	Nil	Nil
S 4057 BR 5 × 11	100	77	77 00%			
S 4062 BR 11 Self	100	7	7 00%			
<u>OPEN POLLINATED</u>						
BR 11 Clone N° 13/4				115	26	22 60%
BR 11 Clone N° 22/7				35	1	2 85%
BR 11 Clone N° 27/3				40	10	25 00%

The failure of the seeds to germinate is a case of incompatibility between the embryo and the endosperm. According to Stebbins (2), the presence of genic disharmony in the endosperm but not in the embryo may be due largely to the fact that this tissue contains two sets of chromosomes derived from the maternal gamete, and only one from the paternal gamete. Thus, the double dose of maternal genes in the endosperm suppresses the enzymatic activity of the embryo to digest the endosperm for its growth leading to the death of the latter.

Embryo culture technique as done in many other crops when applied to the incompatible cases of BR 11 clone will give additional information, as proge-

nies thus raised are known to behave normally in succeeding generations

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REFERENCES

1. DEVREUX, M., VALLAEYS, P., POCHE, M. and GILLAS, A. Recherches sur l'autosterilité du Caféier Robusta (*Coffea canephora* Pierre). Bruxelles, Institut National Pour l'Etude Agronomique du Congo Belge Sr Sci N° 78 1959 44p.
2. STEBBINS, G. LEDYARD. The inviability, weakness, and sterility of interspecific hybrids. *Advances in Genetics* Vol IX 1958