2. 잡종 배구출을 이용한 *Fagopyrum esculentum* 과 *F. homotropicum* 사이의 작출

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Breeding of a new selfing buckwheat

2. Production of interspecific hybrids between *Fagopyrum esculentum* and *F. homotropicum* through embryo rescue.

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Objectives:

The purpose of this study is to transfer desirable agronomic traits from wild annual species (*F. homotropicum*) into elite lines of the cultivated common buckwheat (*F. esculentum*). Therefore, attempts were made to develop autogamous buckwheat by combining conventional breeding methods with modern tools of biotechnology.

Materials and Methods

Common buckwheat(*F. esculentum*) and *F. homotropicum* used for interspecific hybridization. Crosses were made as per Fig 1. Ovaries were excised at 3, 5,7, or 11 days after pollination, when the embryos were at the following stages: early globular, globular-early heart, late heart-early torpedo and late torpedo. The ovules were surface-sterilised by dipping them for one minute in 70% ethanol, followed by a 2% solution of sodium hypochlorite with one drop of detergent for three minutes. The ovaries were then rinsed three times in sterile distilled water. Ovules were removed from the ovaries on the tip of a scalpel under a dissecting microscope. The ovules were placed on the surface of the culture media described by Woo and Adachi (1997). F_1 plants were sib-mated and /or backcrossed to *F. esculentum*.

Results and Discussion

Application of *in vitro* techniques for overcoming breeding barriers in the genus *Fagopyrum* crosses was for long time restricted to the use of embryo rescue. Recently, Samimy *et al.* (1996) and Wagatsuma and Un-no (1995) have exploited possibilites for ovule culture. In our experiments, over 18% of the ovules cultured, germinated after 30-35 days in culture, but only 25.6% of the germinated ovules regenerated into transplantable seedlings (Table 1). Of all the media tested, the best response was observed on the media supplemented with casein hydrolysate, W_1 and MS_3. Most of the ovules which failed to germinate developed calli and later fomed embryoids. However, the plantlets regenerated from these embryoids were spindly, rootles and albino. We were successful in developing hybrids between *F. esculentum* and *F. homotropicum*. Heterogeneity χ^2 analysis showed that the germination rate of ovules from thrum parents was higher than that from pin parents($P=0.06$ Table 1). There were no significant effects of excision date or female flower type on plantlet regeneration rate.

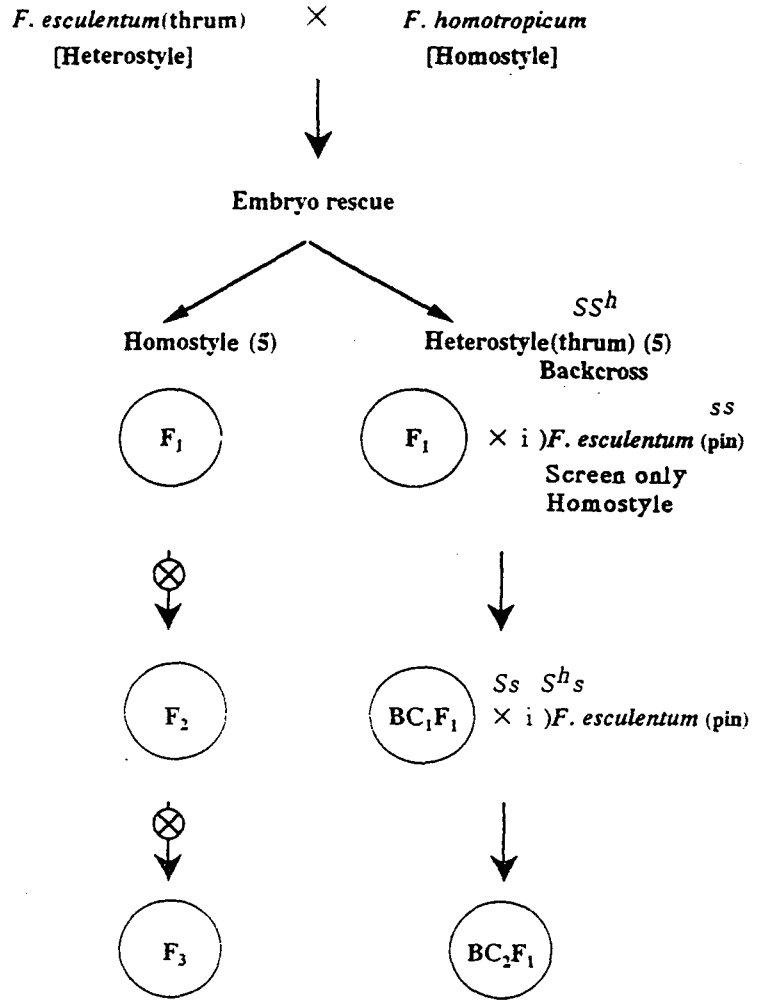

Fig.1. Genealogy of the restored material crossed to produce successive progenies.

Table 1. Response to sterile culture conditions of hybrid embryos excised on different days after pollination (DAP)

Flower type of female parent	DAP	No. of ovules cultured (A)	No. of ovules germinated (B)	No. of ovules regenerated (C)	Germination (B)/(A)×100	Regeneration (C)/(B)×100	Seedlings/100 ovules
Thrum	3	65	13	2	20.0	15.4	3.2
	5	58	16	5	28.0	31.3	8.6
	7	62	13	3	21.0	23.1	4.8
	11	82	15	4	18.3	26.7	4.9
Subtotal		267	57	14	21.8	24.1	5.4
Pin	3	54	5	1	9.3	20.0	1.9
	5	62	11	3	17.7	27.3	4.8
	7	58	8	2	13.8	25.0	3.4
	11	78	14	5	17.8	35.7	6.4
Subtotal		252	38	11	14.7	27.0	4.1
Total		519	95	25	18.3	25.6	4.8