

定年退職を迎えて

—花色の遺伝から植物組織培養—

生命農学研究科

生物機構・機能科学専攻

資源生物機能学講座

植物遺伝育種学研究分野

服部一三

- 生年月日：昭和20年9月10日（1945）
- 昭和39年4月：名古屋大学農学部に入学
- 昭和43年3月：卒業
- その後大学院博士課程を満期退学後
- 昭和49年4月：助手に採用（1974）
- 平成5年2月：助教授に昇任（1993）
- 平成8年3月：教授に昇任（1996）

キクの花色の遺伝

- キクの栽培方法
- キクの採種法：除雄法の開発
- 色素の分析法：主にPaper Chromatography
- 播種から次代の養成：3月播種11月開花
- 花色の測定法：Opal Glass法で直接解析
- AnthocyaninとCarotenoidについて
- Chimeraをどのように解析するか
- Chimeraの解消法は？—組織培養法

植物組織培養法の開発

- キクのChimera解消のための花床・花卉培養
- ペチュニアの子葉・胚軸培養
- マメ科作物の培養法の開発
 - リョクトウ・ソラマメ等の子葉節培養
- ニンニクの組織培養による急速増殖
- ケナフの子葉節・小植物体の培養
- 食用ヒヨウタンの子葉培養
- 組織培養によるイネの植物体再分化に関する遺伝子分析







Fig. 3-1. The flower head pollinated 4 times to 'White Marble' by the pollens of 'Bonnie Jean', 8 days after pollination.



Fig. 3-3. The disc florets of open-pollinated plant of 'White Marble' about 2 months after fully flowering. The 2 florets on the right side have the fertile seeds with shortened styles. The center 2 florets have the sterile seeds with shortened styles. The 2 florets on the left side have the sterile seeds with unshortened styles.

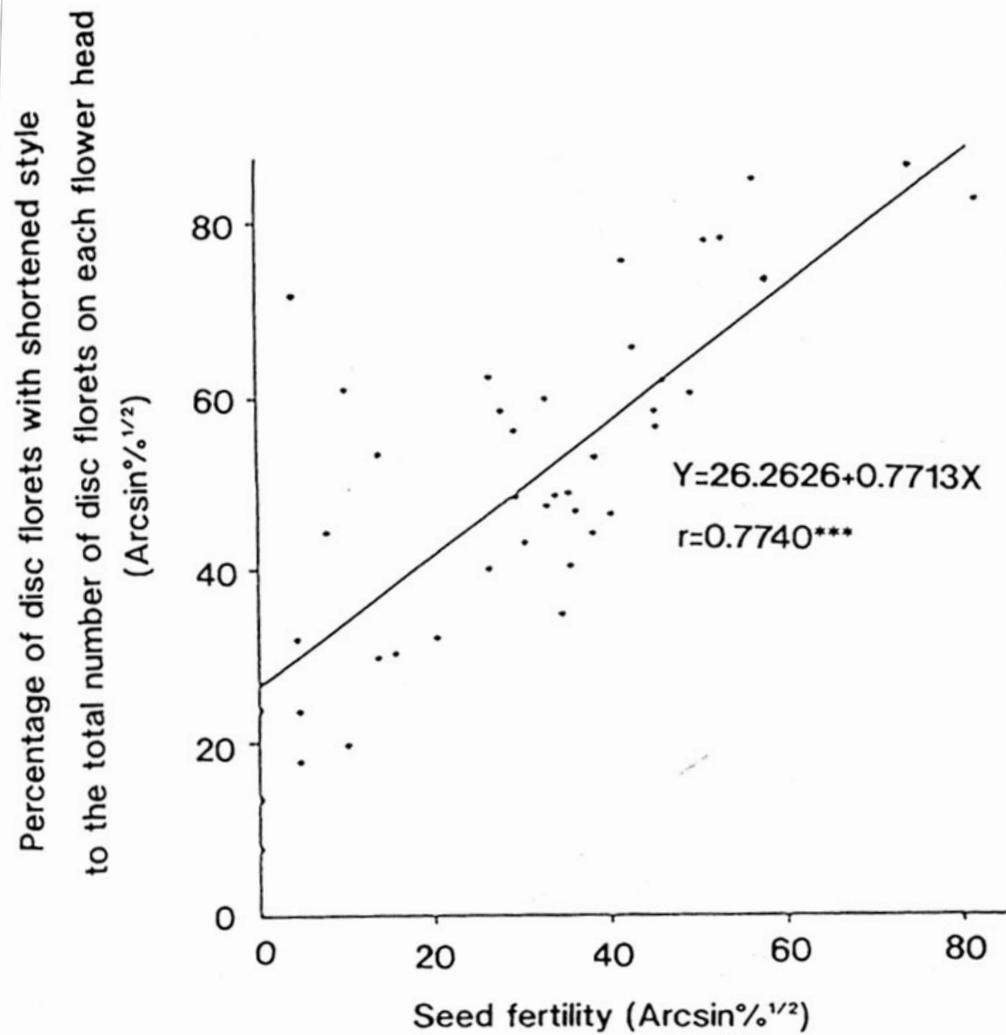


Fig. 3-6. The relation between the seed fertility and the ratio of the disc florets with shortened style in the open-pollination.

***: significant at 0.1% level

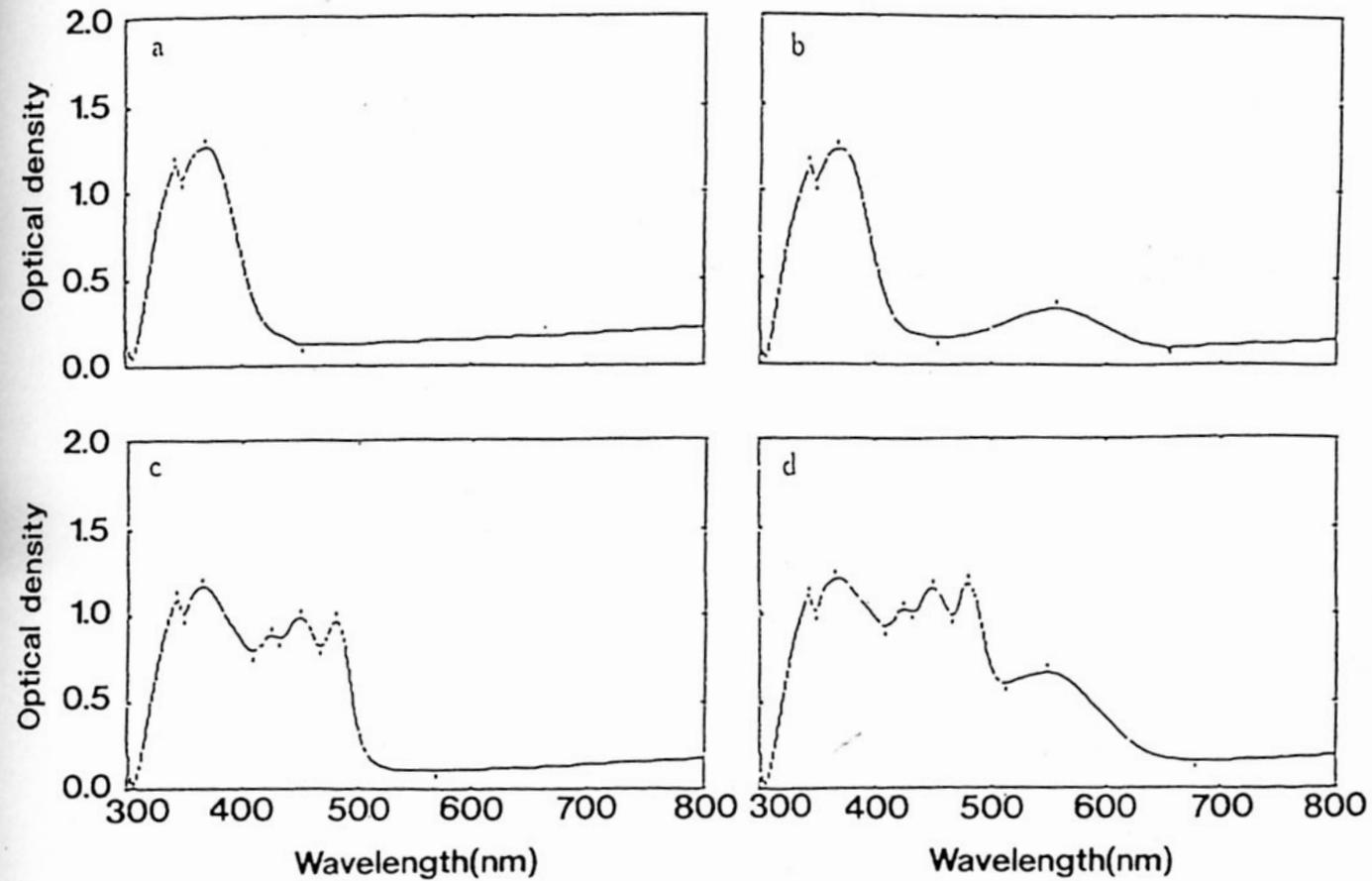


Fig. 4-1. Absorption spectra of intact petals of flowers with various colors in chrysanthemum

- (a): White flower lacking both anthocyanin and carotenoid pigments
- (b): Pink flower with only anthocyanin pigments
- (c): Yellow flower with only carotenoid pigments
- (d): Red flower with both anthocyanin and carotenoid pigments

Table 4-2. Carotenoid segregation in S₁ progenies derived from selfing of various varieties

Line	Progenies Carotenoid		Tested ratio	χ^2 -value	Probability
	+	-			
PD S ₁	22	60	1 : 3	0.1463	0.7021
BJ S ₁	57	185	1 : 3	0.2700	0.6034
YBJ S ₁	61	260	1 : 3	6.1568	0.0131
			3 : 13	0.0135	0.9075
PM S ₁	14	58	1 : 3	1.1852	0.2763
			3 : 13	0.0228	0.8800
Ch.j. S ₁	0	230			

1) + : contained carotenoid pigments

- : no carotenoid pigments

Table 4-3. Carotenoid segregation in F₁ progenies derived from crossing of various varieties

Line	Progenies Carotenoid		Tested ratio	χ^2 -value	Probability
	+ ¹⁾	-			
YBJ X BJ F ₁	9	24	1 : 3	0.0909	0.7630
BJ X YBJ F ₁	9	18	1 : 3	1.000	0.3173
PD X BJ F ₁	47	127	1 : 3	0.3755	0.5400
PM X BJ F ₁	30	103	1 : 3	0.4236	0.5152
WM X BJ F ₁	71	204	1 : 3	0.0982	0.7540
D X BJ F ₁	17	19	1 : 1	0.1111	0.7389
YD X BJ F ₁	54	44	1 : 1	1.0204	0.3124
BM X BJ F ₁	28	80	1 : 3	0.0494	0.8241
WM X YBJ F ₁	75	247	1 : 3	0.5010	0.4790
BM X YBJ F ₁	57	157	1 : 3	0.3053	0.5806
PM X PD F ₁	9	27	1 : 3	0.000	1.0000

1) + : contained carotenoid pigments

- : no carotenoid pigments

Table 4-5. Genetic background of the inheritance of carotenoid pigmentation in chrysanthemums

Variety	State of dominant inhibitor for carotenoid biosynthesis	State of dominant gene for carotenoid pigmentation
Group I PD, BJ,	Heterozygous	Homozygous for dominant gene
Group II D, YD	Homozygous for recessive gene	-
Group III YBJ, PM	Heterozygous	Heterozygous

Table 4-9. Genetic background of the inheritance of anthocyanin pigmentation in chrysanthemums

Variety	State of dominant gene for anthocyanin pigmentation
Group I BJ, Ch. j.	Homozygous for recessive gene
Group II PM, WM, BM, D, YD, T	Heterozygous with single allele
Group III PD, RR	Heterozygous with two distinct alleles

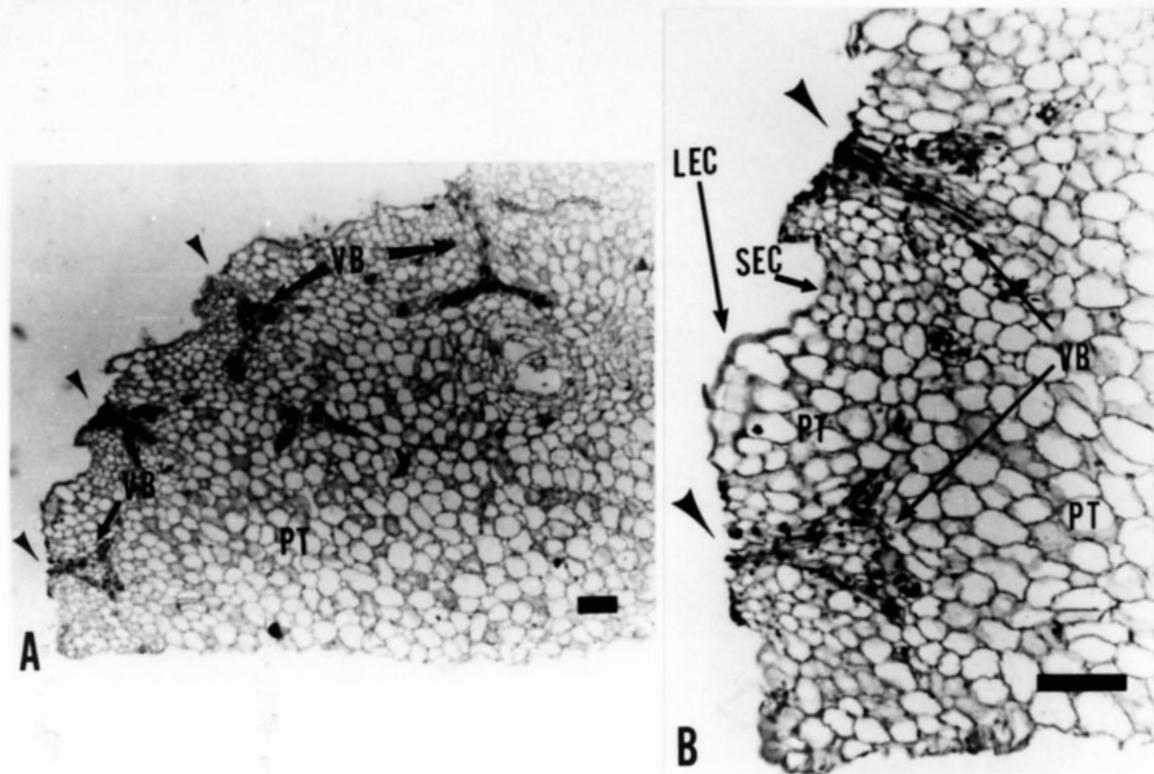


Fig. 5-1. Longitudinal sections of the terminal portion of the receptacle before incubation.

A : At the lower magnification B : At the higher magnification

VB : Procambial strands(Vascular bundle) PT : Parenchyma

LEC : Large epidermal cell with thick cuticle

SEC : Small epidermal cell with thin cuticle

Arrow-heads show the region where the floret has been attached.

Bars indicate 100 μ m respectively.

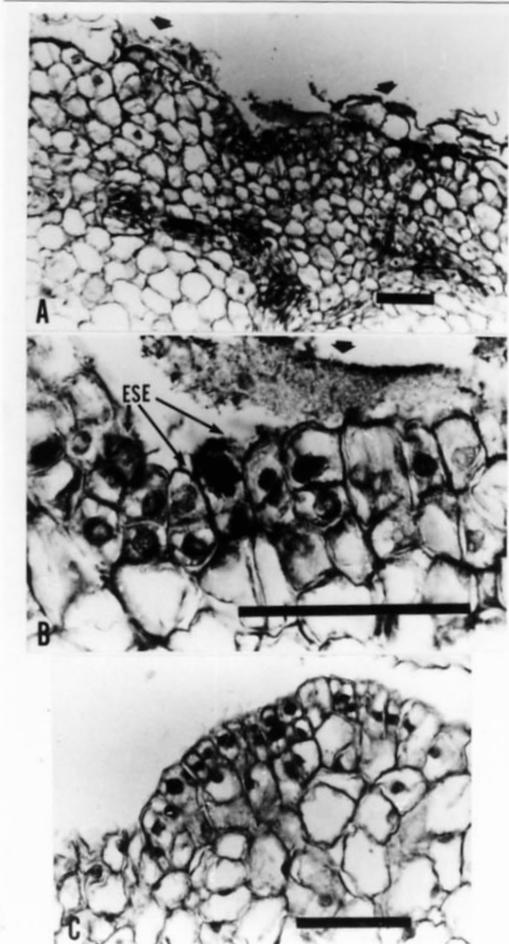


Fig. 5-3. Longitudinal sections of receptacles 6 days and 8 days after incubation.

A : A section 6 days after incubation

B : Higher magnification than A

C : A section 8 days after incubation

ESE : Elongated and divided small epidermal cell

Arrows show the residue of balloon-like cells.

Bars indicate 100 μ m respectively.

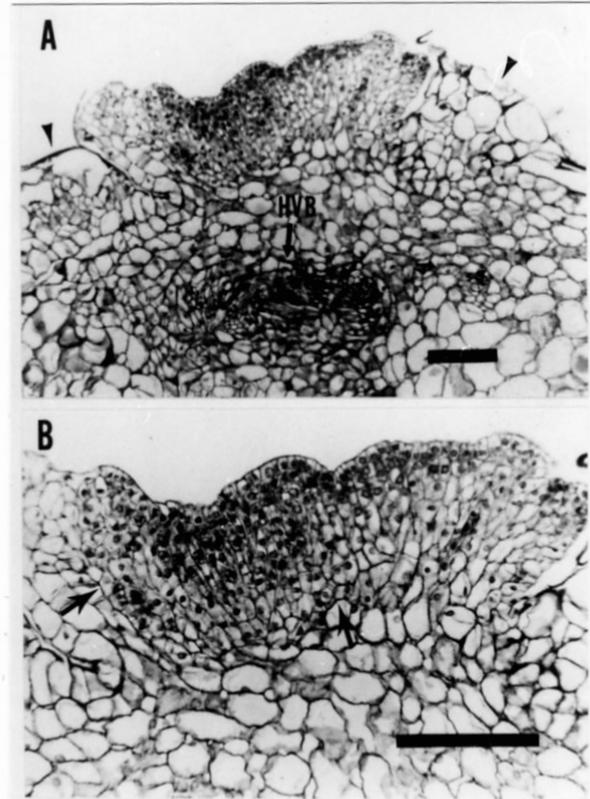


Fig. 5-4. The newly formed meristematic cell-masses in the longitudinal section 16 days after incubation.
 A : At lower magnification B : At higher magnification
 HVB : Huge vascular bundle(Conjugated provascular bundles)
 Arrows show the boundary between the meristematic cell-masses and the surrounding cells.
 Arrow-heads show the residues of balloon-like cells.
 Bars indicate 100 μ m respectively.

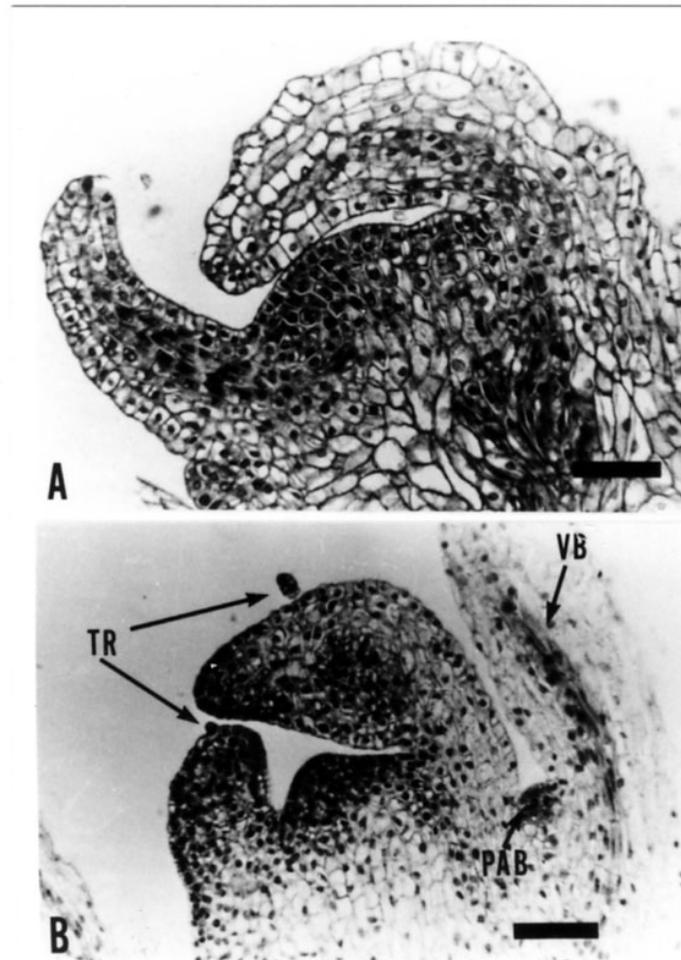
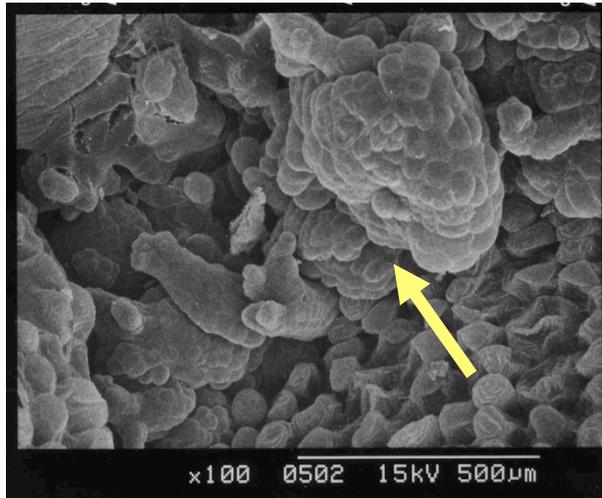
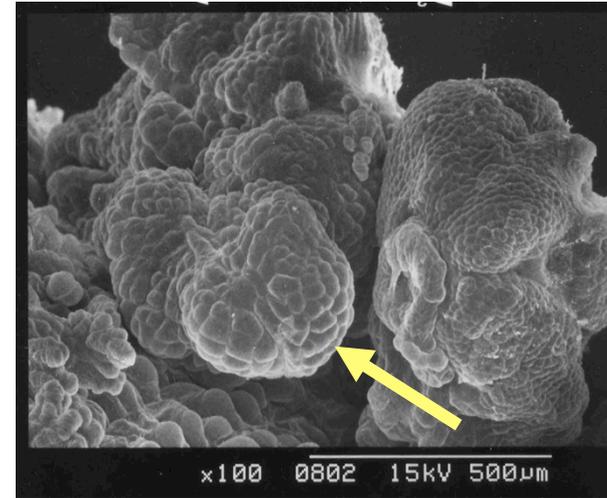


Fig. 5-5. The newly formed shoot apex 16 days after incubation (A) and the completely formed shoot apex 20 days after incubation.
TR : Trichome PAB : Primodium of an axillary bud
VB : Vascular bundle
Bars indicate 100 μ m respectively.

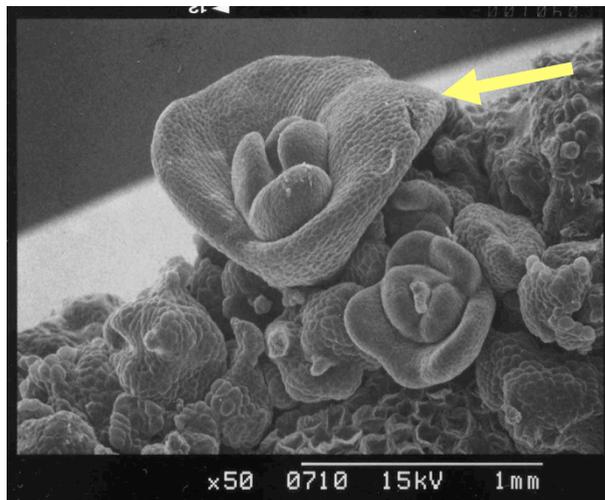
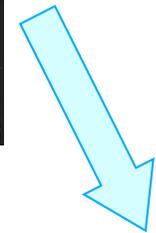
予想されるシュート形成までの過程



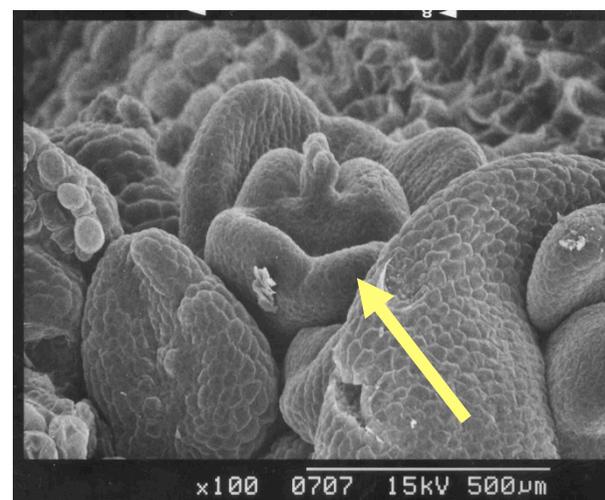
培養開始17日目



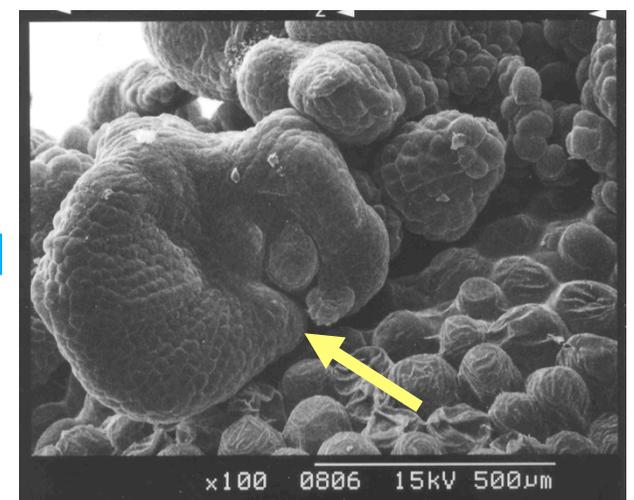
培養開始21日目以降①



培養開始21日目以降④



培養開始21日目以降③



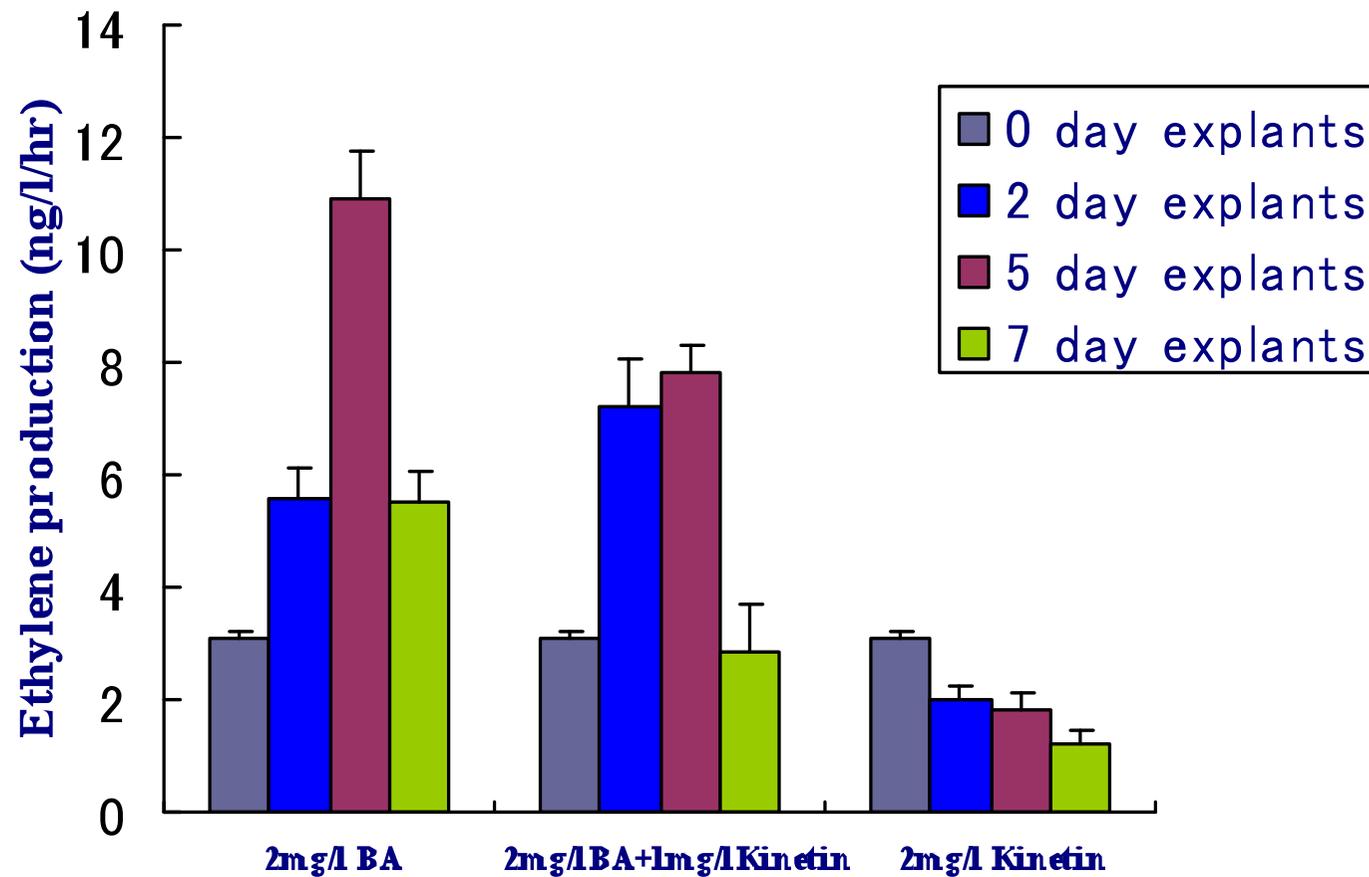
培養開始21日目以降②

BOTTLEGOURD

- **FAMILY- Cucurbitaceae**
- **Melon, Cucumber, Watermelon, Bitter gourd**
- **Tropical and subtropical in origin**
- **Bottle gourd is a Monotypic in Genus.**



Effect of different plant growth regulators on ethylene production at different time course study. Each treatment consisted of three replicates and each with eight explants.



Kenaf (*Hibiscus cannabinus* L.)

- Family- Malvaceae
- Cotton, Okra, Hibiscus
- Annual,
dicotyledonous plant.

Shoot tip system



最後に

教員になってから35年、多くの学生諸君といろいろな研究をしてきました。また、多くの先輩先生方には種々なるご教授を受けてきました。これまで、自分で考えてきた一連の研究が応用面で、よりいっそう役に立ってくれることを期待します。

これからの大学は今以上に厳しい局面に立ち向かっていかなければならないと思いますが、本生命農学研究科のさらなる発展を祈念しております。