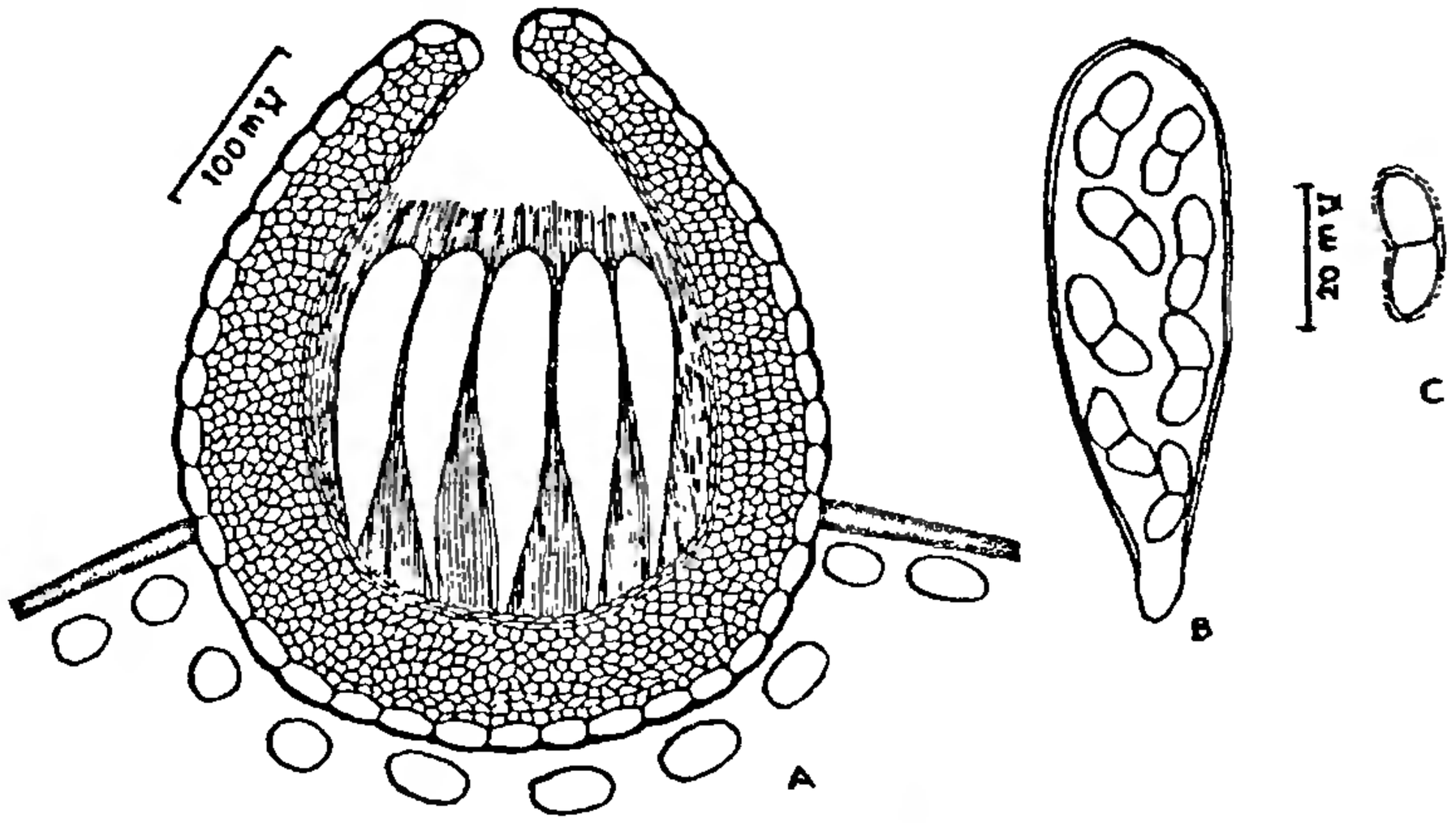

Figure 1A–C. *Hypodermella occidentalae* sp. nov. **A.** V. S. through hysterothecium, **B.** Ascus, **C.** Ascospores.

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2. Sacchardo, P. A., *Sylloge Fungorum*, 1902, **16**, 703.
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SCREENING OF CITRUS GERMPLASM FOR RESISTANCE TO POWDERY MILDEW

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DURING January 1984, powdery mildew (*Oidium tingitaninum* Carter) appeared in a serious form at Citrus Project, Tirupati and it was felt necessary to screen different varieties of germplasm for their resistance to the disease. One hundred and thirty seven varieties maintained in germplasm block were examined under natural conditions and graded into the following 4 categories[1] (figure 1).

1. HS (Highly susceptible) showing numerous lesions on leaves and twigs, almost covered with whitish powdery growth.
2. S (Susceptible) with lesions scattered on the entire leaf area and twigs.

Figures 1–4. 1. Highly susceptible, **2.** Susceptible, **3.** Moderately susceptibile and **4.** Resistant.

3. MS (Moderately susceptible) with only a few lesions on the leaves and twigs, Scanty mildew growth.
4. R (Resistant) leaves and twigs free of lesions.

Out of 137 varieties assessed the following 16 were found resistant: 1. Gajanimma [*Citrus moi* (Lush.) Tanaka] 2. Willow leaf sour (*C. deliciosa* Ten). 3. Sweet lime (*C. limmetioides* Tanaka) 4. Satsuma niku (*C. reticulata* Blanco) 5. Pummelo pink (*C. grandis* Osb.) 6. Acidlime [*C. aurantifolia* (Christm)

Swing] 7. Trifoliates [*P. trifoliata* (L.) Raf.] 8. Rubidox trifoliata 9. Pomery trifoliata 10. *Atalantia monophylla* De Candolle 11. *A. ceylanica* (Arn.) Oliver 12. *Severinia buxifolia* Ten., 13. Limequates [*C. aurantifolia* (Christm.) Swing. X. *Fortunella margarita* (Lour.) Swing.] 14. *Eustis limequat* 15 Lakeland limequat and 16. Citranges, [*Poncirus trifoliata* (L.) Raf X. *C. sinensis* (L.) Osb.] viz Troyer citrange and Ekkateru citrange. All others were found susceptible.

Five seedlings of six months old from each of the above resistant varieties along with Cleopatra mandarin (*C. reticulata* Blanco.) which was found highly susceptible under field conditions during the present studies, were evaluated artifically by dusting the spores of the pathogen collected from heavily infected trees during February, 1984. All the sixteen varieties found resistant under field conditions were unaffected while heavy incidence of powdery mildew was observed in Cleopatra mandarin.

Petch has earlier reported the prevalence of the disease in Ceylon on mandarin oranges and sweet oranges but not on acidlime[2]. Present investigations also revealed the susceptibility of mandarins and sweet oranges and resistance of acidlime to the disease. The resistant sources now observed in Citrus, Atalantia, Severinia, Poncirus, Fortunella and some of their hybrids may be utilized in breeding for powdery mildew resistance.

29 May 1984; Revised 2 August 1984.

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IN VITRO OVULE AND EMBRYO CULTURE OF *GOSSYPIUM*

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THE transfer of desirable traits from some wild species to cultivated cottons has met with considerable difficulties through conventional breeding methods because of abortion of hybrid embryo and endosperm at various developmental stages[1,2]. However, immature hybrid embryos and ovules can be excised and cultured *in vitro* to raise hybrid seedlings[3,4]. The present study was planned to identify appropriate conditions for growing young immature ovules and embryos of *Gossypium* species through *in vitro* culture techniques and to utilize this information in producing interspecific hybrids between otherwise incompatible species.

The experimental material comprised the cultivated diploid species of cotton, *G. arboreum*, var G27, *G. herbaceum* var SM 132 and the wild diploid *G. anomalum* Wawr ex Wawr and Peyr. The self-, and cross-pollinated ovules (2-, and 15-day old) of cultivated varieties, and of G 27 × SM 132 and G 27 × *G. anomalum* crosses were cultured on B5 medium[5] supplemented with 2, 4-D (2 mg/l); MS medium[6] supplemented with various combinations and concentrations of indole acid (IAA) and kinetin (KIN) and casein hydrolysate (250 mg/l). The 15-day old embryos were cultured on MS medium supplemented with various combinations and concentrations of IAA and KIN. The cultures were maintained at 25 ± 2°C and 55–65% relative humidity under diffused light and were examined daily. Well-established seedlings were transferred to pots containing sterilized soil and watered regularly with Hogland's nutrient solution.

The 2-day old ovules from self-pollinated as well as crossed flowers yielded excellent callus growth on B_5 + 2, 4-D (figure 1). The callus was creamy white in G 27, and hard and light brown in SM 132. It was excessively friable white in the cross G 27 × SM 132, but yellowish, loose and friable in G 27 × *G. anomalum*. The 15-day old ovules when cultured on MS medium supplemented with casein hydrolysate (250 mg/l) also yielded fast growing vigorous seedlings (figure 2). The 15-day old embryos of parents and their cross G 27 × SM 132 when cultured on MS medium supplemented with IAA (2 mg/l) + KIN (0.5 mg/l) developed into seedlings (figure 3). The percentage of embryos which produced plantlets was 82.9 in G 27, 74.3 in SM 132 and 72.9 in G 27 × SM 132. These plantlets assumed growth on transfer to soil (figure 4). MS medium supplemented with IAA (2 mg/l) + KIN (0.5 mg/l) produced best results for embryo culture, whereas B_5 medium supplemented with 2, 4-D (2 mg/l) resulted in excessive callus growth from ovules. This technique may be used to obtain hybrids between cultivated A genome species and other wild species of cotton to make available, most of the entire gene pool of genus *Gossypium*, to cotton geneticists and breeders.

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