present study is assoicated with decrease in growth of callus and is comparable to the work of Nash and Devis with Paul's scarlet rose cell suspension cultures[8].

Higher doses of gamma ray cause considerable tissue damage which perhaps in turn leads to the production of more phenols than the control. The reduction of phenolic content in higher doses (20 Krads) may be due to the drastic reduction in growth and 100% lethality in 40 Krads. Estimation of phenols in the same callus tissues after two months led to decrease in phenol content as in Paul's scarlet rose cultures which according to Muhitch and Fletcher may be due to the 'on and off' of the respective genes controlling phenol production[9].

Thus considerable increase in the synthesis of phenolic compounds by irradiating the callus cultures of castor may be utilized in the production of disease-resistant plants, since induction of plant secondary metabolic compounds from plant cells *in vitro* and their subsequent biotransformation is considered one of the promising areas in the biotechnological application of plant cell cultures[10].

Apart from the 'Casbene' which is a diterpine hydrocarbon phytoalexin extracted from cell-free extracts of young seedlings of the castor bean[11]; the present study on phenols in castor callus shows that there is an alternative defence mechanism *in vitro* and *vivo* systems in castor. Further work on the role of Casbene and phenols in relation to disease resistance would be interesting and rewarding since castor is an important oil yielding crop.

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WELDED TUFFS FROM THE MALANI VOLCANICS OF GURAPRATAP SINGH AND DIRI AREAS, PALI DISTRICT, RAJASTHAN

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THE Malani Volcanics of Precambrian age cover an area of 50,000 km^2 in western and southwestern Rajasthan. The rocks of this volcanic suite range in composition from basic to acidic. The presence of welded tuffs from different localities of Malani Volcanic suite has been reported earlier[1,2].

The Malani Volcanics exposed around Gurapratap Singh and Diri Area (Latitude 25° 35′–25° 40′ N and longitude 73°– 73° 10′E) are generally welded tuffs as evident from field and petrographic studies. A majority of known localities of welded tuffs in the world indicate widespread occurrences of welded tuffs in Tertiary and pleistocene times with a remarkable decrease in their number in the older rocks[3], although the recent spurt in Precambrian research has brought to light many ancient examples.

A vast majority of rocks from the present area are fine-grained/glassy with composition varying from basic to acidic. Field studies indicate highly even upper surfaces and gentle dips of flows, except at places where deformation has modified the original attitude. At places layering is recognized, which may be attributed to the various degrees of welding.

The frequent occurrence of glass shards (figure 1a) with varying degrees of distortion due to welding is characteristic of these volcanics. The other petrographic features include the presence of subangular to angular phenocrysts of feldspar (figure 1b), corroded quartz (figure 1c) and collapsed pumice

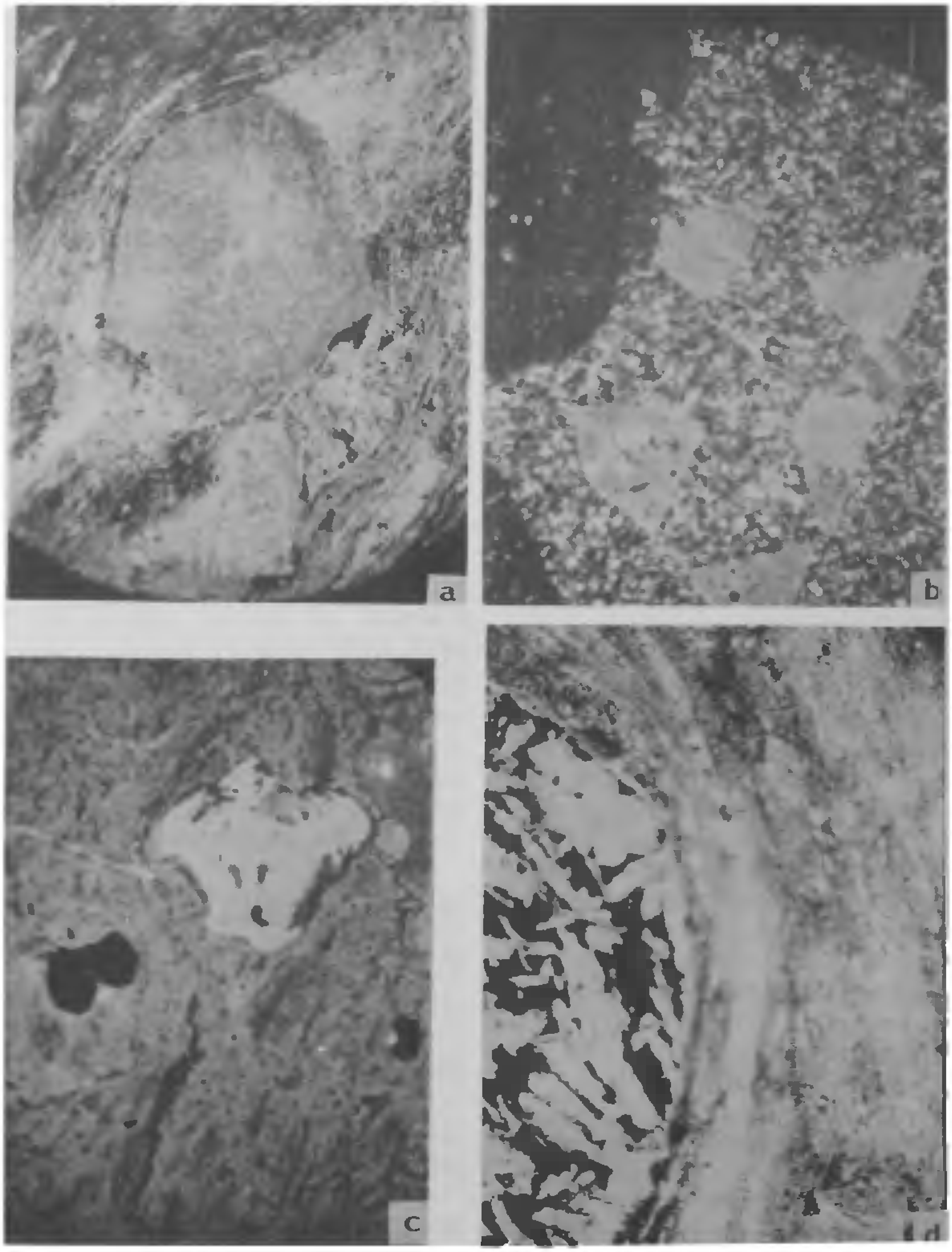

Figure 1a–d. **a.** A fine-grained glassy welded tuff showing molding of devitrified shards against an altered subhedral plagioclase phenocryst (crossed nicols. ×60); **b.** A phyric welded tuff with angular feldspar phenocrysts (×60); **c.** A welded tuff showing corroded quartz phenocryst in which the glassy material has entered into through a small opening (×70); **d.** Photomicrograph showing the presence of andesitic lithic fragment in welded tuff (×75).

fragments. The ubiquitous presence of small rock fragments of andesitic (figure 1d) and silicic volcanics also points to the tuffaceous nature of the present volcanics, though the presence of a few true flows in the area cannot be ruled out.

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INDUCED MUTANTS OF GROUNDNUT CULTIVAR PHULE-PRAGATHI

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THE popular groundnut (*Arachis hypogaea*, L.) cultivar Phule-Pragathi (JL–24)[1] is currently used as a national check in the yield trials of 'All India Co-ordinated Research Project for Oilseeds' (AICORPO) during the *kharif*[2] season. However, JL-24 is not superior .to the other cultivars when grown in summer. Since the area under summer groundnut is increasing, it would be desirable to have a cultivar that can be grown in both the seasons. To improve the yield potential of JL-24 in summer cultivation; the dry seeds were treated with different doses of gamma-rays and grown as reported earlier[3].

Screening of more than 10,000 plants in the M_2 resulted in the selection of five mutants, JL-24M-1 and JL-24-2 having increased pod and seed size, JL-24M-3 with reduced pod and seed size; JL-24M-4 with pods as in JL-24 but having flat seed (figure 1) and the JL-24M-5 with increased number of branches. Among these the latter three bred true in M_3 and designated as small pod, flat seed and JL-24M-5 respectively. The true breeding nature of JL-24M-1 and JL-24M-2 could be established only in M_5 generation. The comparative characteristics of JL-24 and its mutants showed that the majority of them was similar to JL-24-1, except for the specific characters for which they were selected.

Yield trials of the mutants were conducted along with JL-24 twice in *kharif* and in summer seasons at Trombay and Gauribidanur and the results are summerized in table 1. All the mutants except the small pod gave superior yields as compared to JL-24. There was no difference in maturity period and shelling percentage between parent and the mutants. Hundred kernels weighed 67.5 ± 1.2 g,

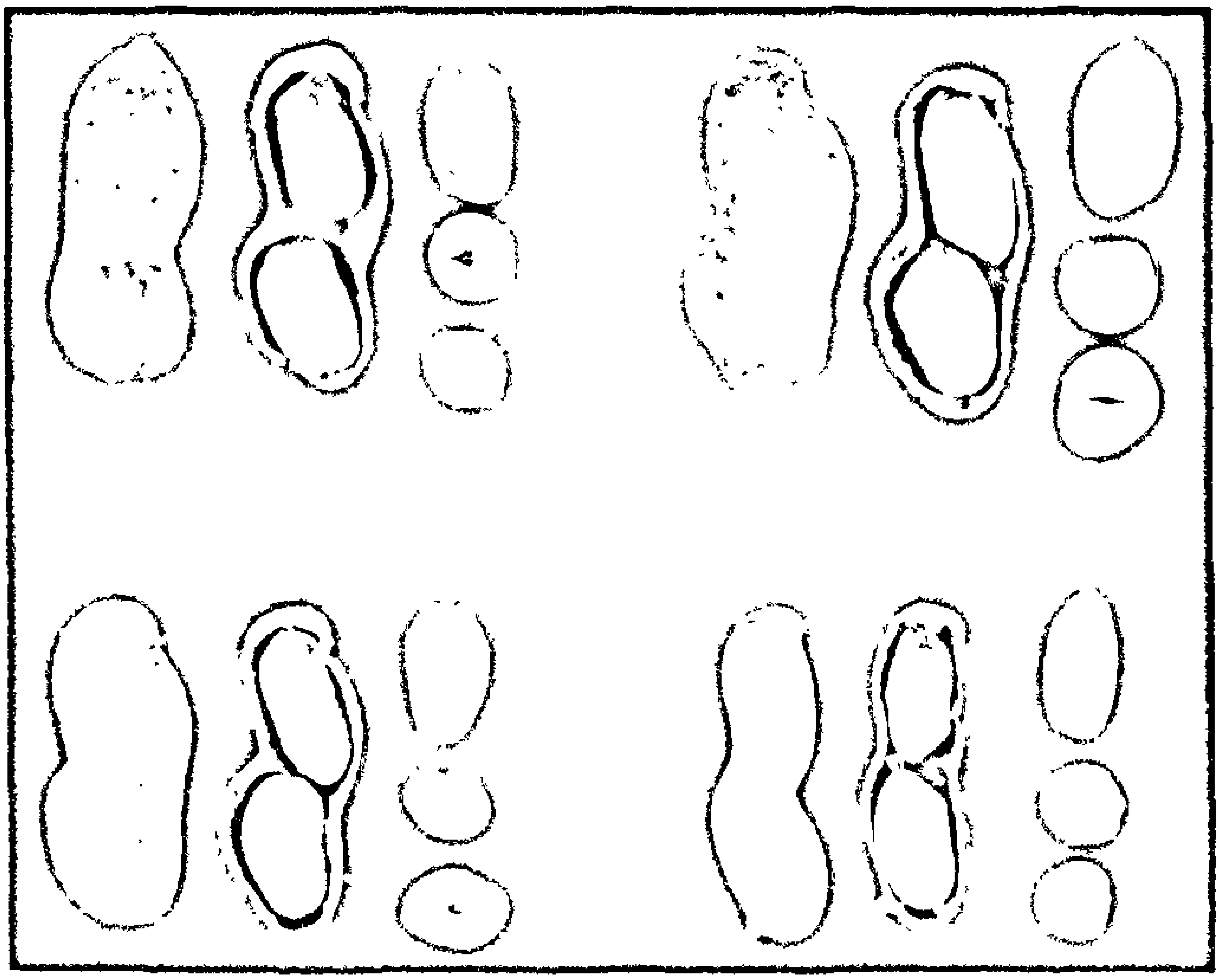

Figure 1. Pods and seeds, JL-24 culture and its mutants JL-24M-1 (top row), flat seed and small pod (bottom row).