ing lines have increased the genetic diversity of groundnut in the national program. Six manuscripts are being prepared for publication in association with ISC scientists.

Looking ahead. INRAB will continue its efforts to popularize promising new varieties and the use of integrated disease management strategies to increase and stabilize production. There is a need for a Memorandum of Understanding between INRAB and ICRISAT to institutionalize this useful collaboration. Future collaboration could cover other ICRISAT mandate crops (sorghum and pearl millet) in addition to groundnut.

Effect of Transparent Polythene Mulch during the Reproductive Stages of Groundnut

S D Golombek, H S Talwar, and
C Johansen (ICRISAT Asia Center,
Patancheru 502 324, Andhra Pradesh, India)

Under low-temperature conditions in Korea, polythene mulch applied at the beginning of crop growth accelerated emergence, seedling growth, and flowering, and increased pod number and 100-seed mass of groundnut by increasing soil temperatures (Choi et al. 1979). This technique has also been popular in China since 1967. In a preliminary postrainy-season study at ICRISAT Asia Center (IAC), polythene mulching from sowing onwards reduced the time to emergence and flowering, and increased pod yield by 73% (Nigam, S N, Rao, R C N, and Talwar, H S, unpublished data).

To study the effects of soil temperature during reproductive growth and development, we investigated the effects of transparent polythene mulch treatments applied during the early and later reproductive stages. The experiments were conducted on an Alfisol at IAC during the 1994 rainy season. There were three treatments—a control treatment (without mulch), polythene mulching applied from the start of pegging (50 days after sowing, DAS) until harvest (113 DAS) (treatment M1), and mulching from pod filling (71 DAS) until harvest (treatment M2).

Treatments were laid out in a split plot design, with mulch treatments in main plots and genotypes in subplots, with three replications. Plot size was 1.5 × 2.4 m. The mulch was applied by placing polythene sheets between rows, and stapling the sheets together between plants in each row. Three spanish type groundnut cultivars were used; TMV 2, AH 6179, and Comet. They were

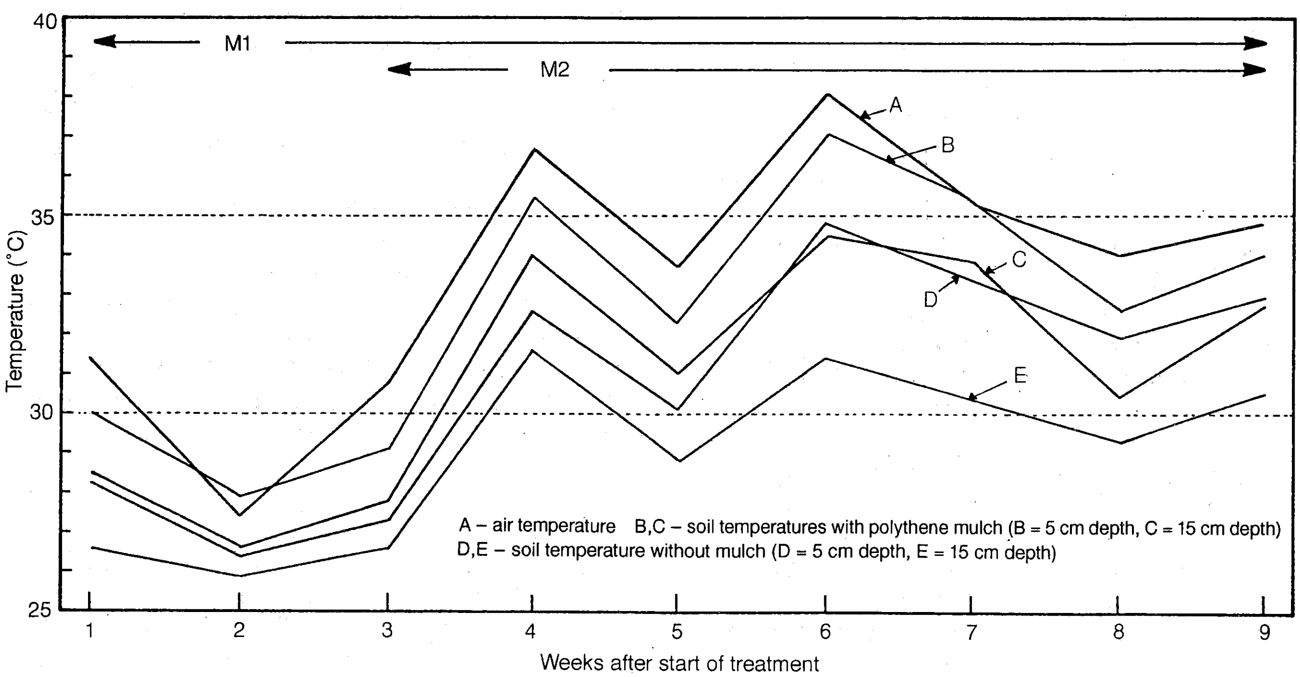

Figure 1. Soil and air temperatures (weekly means) recorded at 1300 hrs, starting from 51 days after sowing (DAS) until harvest (113 DAS). M1, M2 are mulching treatments (see text).

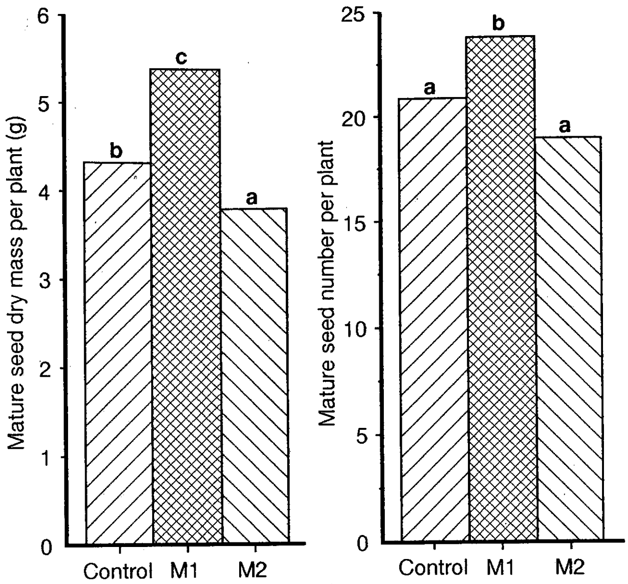

Figure 2. Effect of two polythene mulch treatments M1, M2 (see text for details) on dry mass and number of mature seeds per plant. Bars labelled with the same letter indicate that means are not significantly different at $P<0.05$ according to the Multiple Range Test.

sown on 30 Jul 1994, 10 cm apart in rows spaced at 60 cm. This wider-than-normal spacing facilitated light penetration through the canopy, thus ensuring that mulching would increase soil temperatures even at the later growth stages. A portable rain-out shelter was used to protect the experimental plots from rain. Soil moisture was periodically determined gravimetrically at 0–15 and 15–30 cm soil depths. Based on these moisture content determinations, the plots were irrigated to field capacity once or twice a week.

Soil temperatures were recorded daily at 1300 hrs at 5 cm and 15 cm depths in each plot. Mulching increased the soil temperature at 1300 hrs by 0.7 to 3°C (Fig. 1). Soil temperatures under polythene mulch were similar in treatments M1 and M2.

There were no genotypic differences in vegetative or reproductive growth; therefore the means for each treatment are presented. Mulching had no influence on the dry mass of vegetative parts (leaves, stems, and tap root), on leaf area and stem length, or on specific leaf area. However, reproductive growth and development was influenced by mulching.

When polythene mulch was applied at the early reproductive stages (M1), mature seed dry mass per plant increased by 24% (Fig. 2). This effect was mainly due to an increased number of mature seeds, not due to increased seed filling (100-seed mass). One reason for this increase in seed yield was the significantly lower partitioning of assimilates to pods which are still immature or juvenile at harvest (unpublished data).

Application of polythene mulch in the later reproductive stages (M2) marginally decreased the seed yield. This might be due to a change in temperature sensitivity at the later growth stages and/or the generally higher soil temperatures during these stages (Fig. 1).

Polythene mulching during the early reproductive stages can improve seed yield by increasing seed number, at least within the temperature ranges of this experiment. Thus the beneficial effects of polythene mulching appear to extend beyond the early vegetative growth stages, for which the technique is primarily used in East Asia.

Acknowledgments. We gratefully acknowledge the discussions with R C N Rao and the assistance of M Narsi Reddy in conducting the experiment.

Reference

Choi, B.H., Lee, H.S., and **Lee, J.I.** 1979. Studies on flowering habits and kernel yield of peanuts (*Arachis hypogaea* L.). Journal of the Korean Society of Crop Science 24(4):71–82.

Bioenergetic Considerations in Increasing Groundnut Yield

J B Mishra and **S K Yadav** (National Research Centre for Groundnut, Post Bag No 5, Junagadh 362 001, Gujarat, India)

The biomass productivity of a crop plant depends on its efficiency in intercepting and utilizing solar radiation for photosynthesis. Selection and breeding have enhanced the yield potential of several crops by improving partitioning in favor of the harvested portion of the plant. The radiation-use efficiency of groundnut has been compared with wheat (a C_3 crop) and *Cynodon dactylon* (a C_4 plant), and groundnut has been found to be more efficient both in trapping solar energy and in energy partitioning (Dwivedi et al. 1985).

In developing countries like India, groundnut is primarily grown as an oilseed crop. Consequently, breeding programs are formulated to develop varieties with a higher oil content or higher productivity. The bioenergetic costs of increasing oil percentage have been discussed