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Promotion of Integrated Disease Management for ICGV 91114, a dual-purpose, early maturing groundnut variety for rainfed areas

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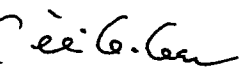
Preface

Groundnut (*Arachis hypogaea* L.) is one of the most important oil seed crops in the rainfed areas of the Deccan Plateau in India. It also provides nutritious fodder for ruminants. For several decades, the farmers of this region have cultivated the traditional cultivar TMV 2, which suffers from several diseases, resulting in low quantity and quality of pod and fodder yields. Of these diseases, two foliar diseases, late leaf spot (*Phaeoisariopsis personata*) and rust (*Puccinia arachidis*), are economically significant.

ICRISAT, in collaboration with partner organizations, has been working for the past decade to develop and promote sustainable management technology options to manage these foliar diseases and in turn to achieve higher yields of pod and fodder at the farm level. Moreover, farmers in this region need a high yielding, improved cultivar with appropriate production technology to replace TMV 2. After several on-station and on-farm studies, a dual purpose, early-maturing groundnut cultivar ICGV 91114 and its Integrated Disease Management (IDM) technology were developed at ICRISAT. In addition to the cultivar, the package includes economical use of fungicide as seed treatment and foliar application.

This bulletin provides information about the management-responsive, early-maturing cultivar ICGV 91114 and its IDM technology. It also traces its genesis, evaluation and eventually, promotion through the farmers' participatory approach. The potential economic benefits of the use of the cultivar and its impact on groundnut-growing areas of the Deccan Plateau are also outlined. It is now clear that the dual-purpose cultivar ICGV 91114 can successfully replace the local cultivar TMV 2.

The authors have put in tremendos effort and must be congratulated for their success in promoting IDM technology for ICGV 91114 to benefit groundnut farmers in the Deccan Plateau.



William D Dar
Director General
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The context

Groundnut (*Arcachis hypogaea* L.) is a major oilseed crop and is cultivated in 8 million ha in India with a production of 7.5 million tons (FAO 2003). The crop provides high quality edible oil for human consumption and nutritious fodder for ruminants. It also provides easily digestible proteins, half of 13 essential vitamins and seven of 20 essential minerals necessary for normal body growth in humans.

In India, groundnut is grown in three seasons, rainy (85% area), postrainy (10% area) and summer (5% area). Among the states, Gujarat and Andhra Pradesh (AP) are the largest producers of groundnut in the country, and together occupy 55% of total area and production. Karnataka, Tamil Nadu and Maharashtra are the other groundnut growing states in the country (Fig. 1).

In Andhra Pradesh, the crop is grown in about 2.1 million hectares every year, one-third of which is in Anantapur district alone; in fact, Anantapur is the single largest groundnut-growing district in the world (Fig. 2).

Within the district (Fig. 3), groundnut accounts for 67% of area followed by sorghum (8%), paddy (4%) orchards (18%) and other horticulture crops (3%).

Apart from the income from groundnut pods, farmers also use haulms as feed for dairy animals and sale of milk is an important additional source of income. Significantly, several farmers buy paddy straw or sorghum

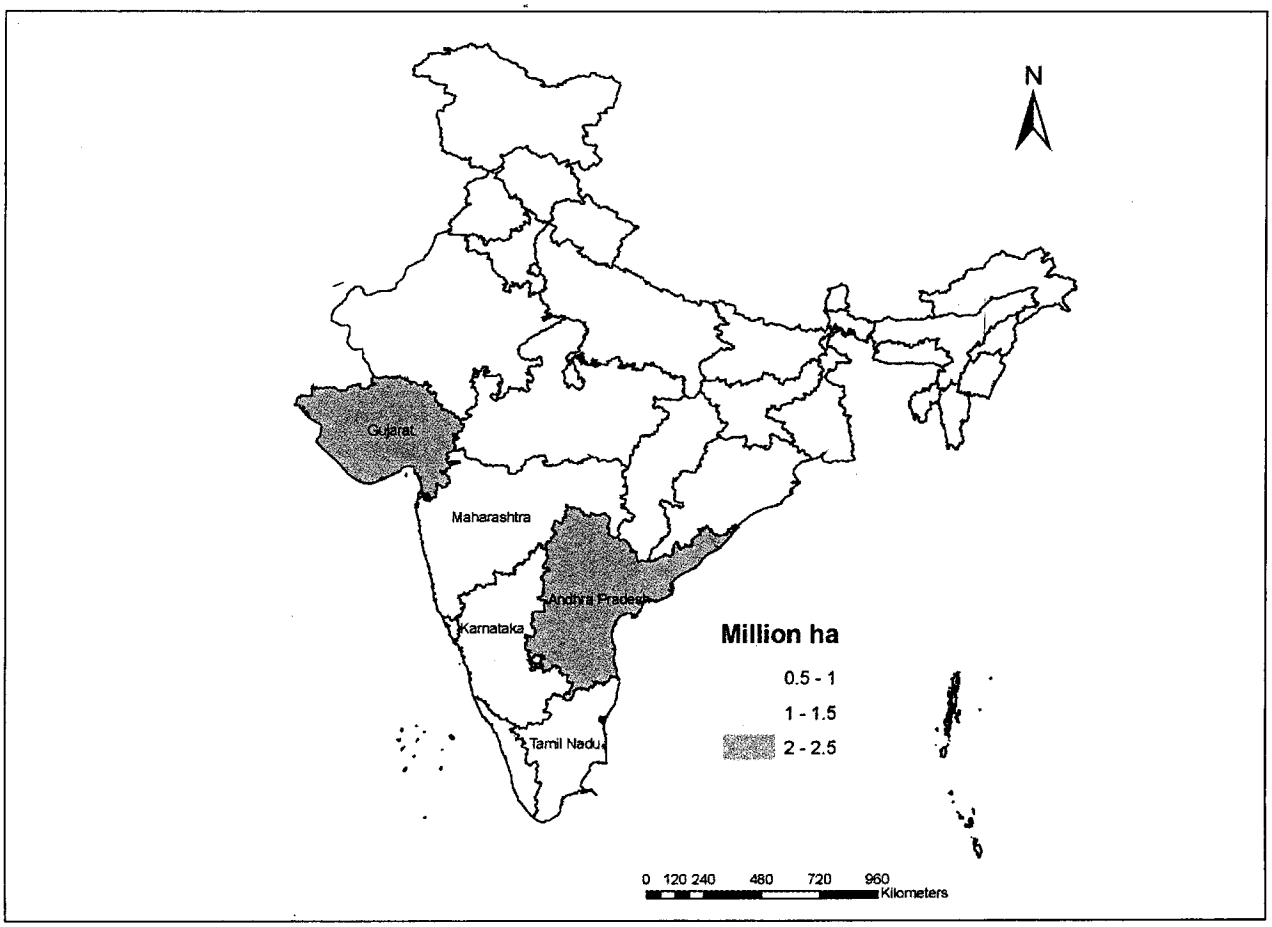

Fig. 1. Major groundnut growing states in India.

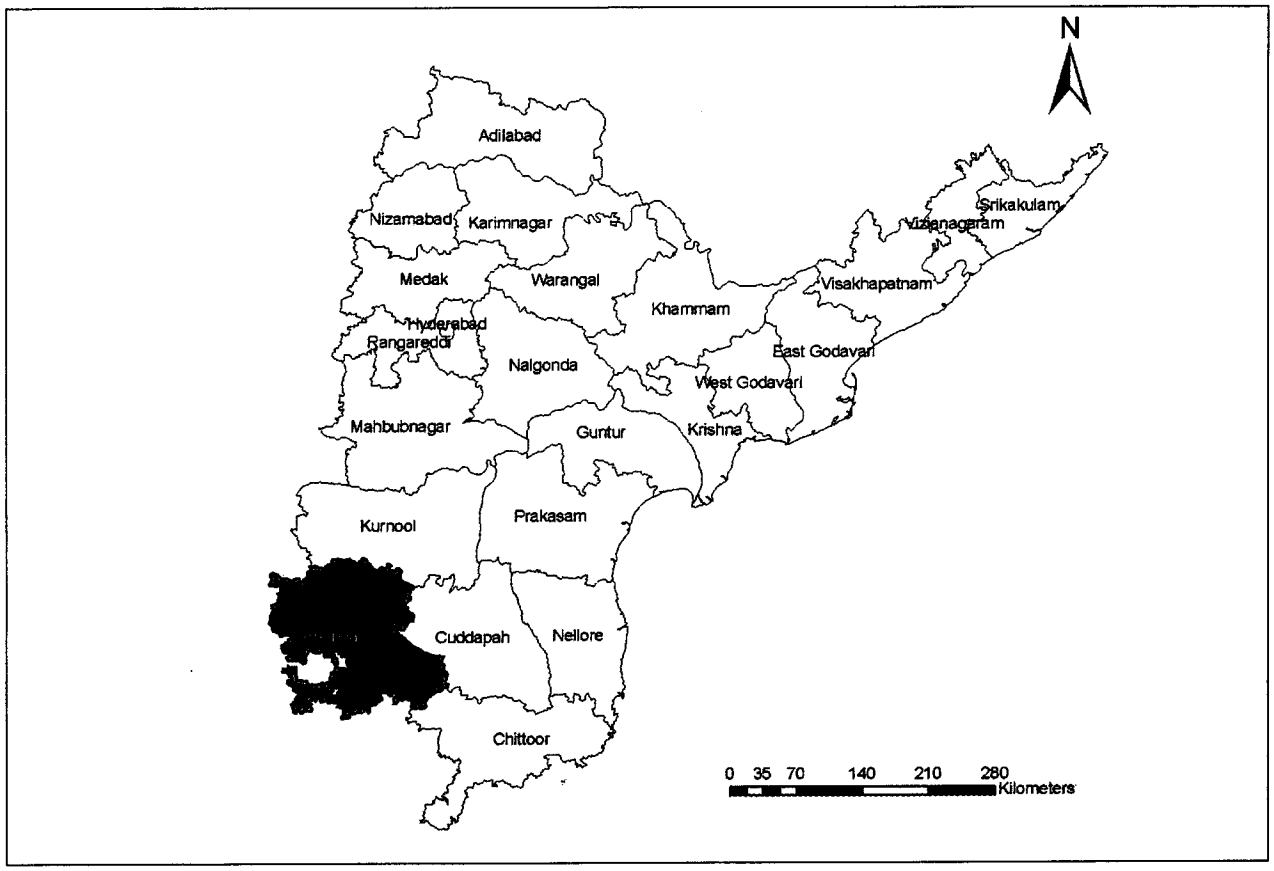

Fig. 2. Anantapur, the largest groundnut growing district in the world.

stover from other states since the available groundnut haulm is insufficient to meet fodder requirements in the region.

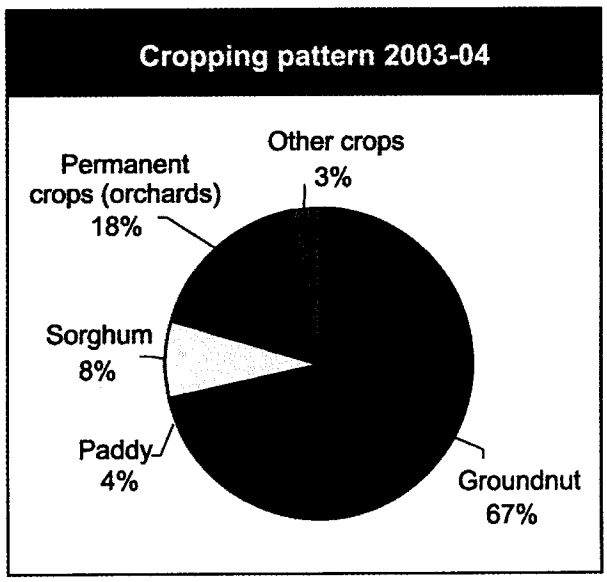

Fig. 3. The cropping pattern in Anantapur, 2003-2004.

Groundnut productivity in India is very low: less than 1 t/ha compared to 2.25 t/ha in the USA (FAO 2003). Yields in Anantapur are still lower ie, 0.5 t/ha. Only in Gujarat, in the Saurashtra region, are yields close to 1.4 t/ha. Several reasons contribute to low yields in India, particularly in the rainfed areas of the Deccan Plateau:

- Non-availability of seeds of improved cultivars and their production technology
- Lack of awareness on diseases, insect pests and their management
- Scanty, erratic and unpredictable rainfall, and
- Socioeconomic conditions of dryland farmers.

Although several improved cultivars have been released in the Deccan Plateau since the 1980s, their adoption has not been widespread. These varieties lacked traits acceptable to

farmers, were susceptible to diseases and insect pests, and also suffered price discrimination by traders in local markets. In this region, farmers generally favor short (90-100 days) and medium duration (100-115 days) cultivars over long duration cultivars (120 days and above) (Table 1). Presently, the dominant cultivar that occupies about 80% of the total area in the rainfed districts of the Deccan Plateau is TMV 2, followed by JL 24 (10%), Vemana (K 134) and others (10%) (Fig. 4).

Table 1. Popular groundnut cultivars, their duration and productivity under rainfed conditions in the Deccan Plateau, India.

Cultivar	Duration (days)	Productivity kg/ha
TMV 2	105-110	480-600
JL 24	105-110	600-720
Vemana	105-110	720-1040
Polachi (red)	110-115	700-850

Source: DAATTC, Anantapur.

Unfortunately, all these cultivars are susceptible to several fungal diseases in farmers' fields. Of these, late leaf spot (LLS) (*Phaeoisariopsis personata*) and rust (*Puccinia arachidis*) are the most destructive foliar diseases (Fig. 5) and together cause up to 70%

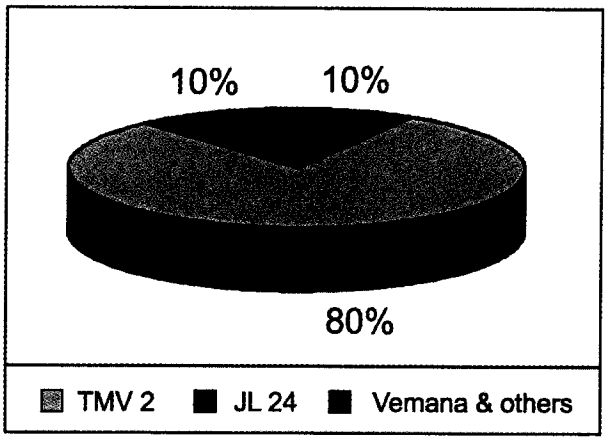

Fig. 4. Percentage distribution of popular groundnut cultivars in the Deccan Plateau.

losses in quantity and quality of pods and haulms (Gorbet et al. 1990; Pande et al. 2001). Foliar diseases and thereby infected fodder affect the health of livestock. This in turn reduces milk yield in cattle and buffalo (Pande et al. 2003a). Additionally, diseased fodder also commands a lower price in the market (Rama Devi et al. 2000). There was, therefore, an urgent need for scientists and researchers to come up with new cultivars complete with sustainable and affordable production technologies such as Integrated Disease Management (IDM) that could resist foliar diseases and assure better pod and haulm yields than TMV 2 for resource-poor farmers of the region.

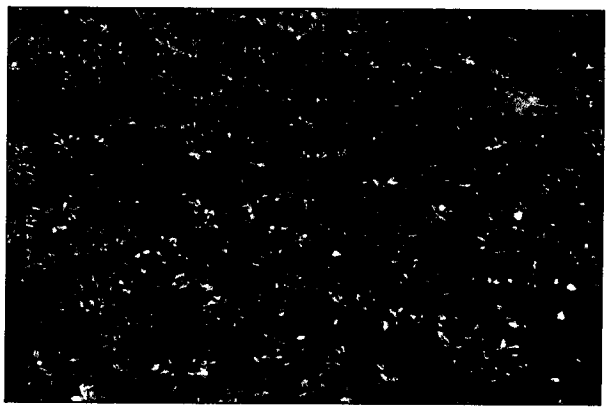

Fig. 5. Severity of late leaf spot and rust under field conditions.

Genesis and identification of IDM-responsive groundnut cultivar ICGV 91114

Keeping in mind various factors, scientists at ICRISAT initiated the development of new cultivars by incorporating farmer-acceptable traits. After extensive research and sustained work and several on-station and on-farm experimentations on integrated disease management, finally they emerged