Journal of Agricultural Science, Cambridge (1993), **121**, 205–211.

Screening of groundnut germplasm collection and selection of genotypes tolerant of lime-induced iron chlorosis

A. L. SINGH AND V. CHAUDHARI

National Research Centre for Groundnut, Junagadh – 362 001, Gujarat, India

(*Revised MS received 18 October 1992*)

SUMMARY

Erect type groundnut germplasm belonging to the Valencia and Spanish botanical groups was examined in the field for five consecutive cropping seasons (wet 1988, 1989 and 1990 and dry 1989 and 1990) at Junagadh, India, in order to identify groundnut genotypes with the ability to grow in calcareous soil and tolerate iron deficiency (lime-induced iron chlorosis). On the basis of the visual chlorotic rating scores of their leaves, 17 and 19 genotypes of the Valencia and Spanish groups, respectively, which showed the least or no chlorosis were classified as tolerant (iron-efficient) to iron chlorosis. These genotypes may now be used as donor parents in groundnut breeding programmes for the development of iron chlorosis-tolerant varieties.

Almost all the iron-efficient groundnut genotypes had higher pod and seed (kernel) yields and Harvest Index (HI) than the susceptible types. The seed yield of 12 iron-efficient groundnut genotypes was either equal to or higher than a commercial cultivar which showed tolerance to iron chlorosis and, hence, these genotypes could profitably be grown in those areas where chlorosis due to iron deficiency is a major problem.

INTRODUCTION

Iron is the fourth most abundant element in the earth's crust and soil (Krauskopf 1972), yet iron deficiency is the most widespread micronutrient deficiency worldwide (Chen & Barak 1982; Clark 1982; Vose 1982). This is because the iron in the soil is mainly present in a form which the plant cannot absorb and utilize directly (Chaney *et al.* 1972; Lindsay & Schwab 1982; Brown & Jolley 1989). Iron deficiency is most prevalent on calcareous soil, which accounts for approximately one-third of the earth's surface (Chen & Barak 1982; Brown & Jolley 1989) and about a quarter of the agricultural land (Vose 1982). Lime-induced iron chlorosis (LIIC) is one of the major factors responsible for low yield in groundnut (Hartzook *et al.* 1974; Singh *et al.* 1987, 1990; Papastylianou 1989, 1990). The soil amendments and foliar sprays of iron fertilizers and chelates which are recommended nowadays either to prevent or to rectify the disorder are not permanent solutions to this problem. Therefore a search for iron-efficient groundnut genotypes and their subsequent utilization for breeding to develop high-yielding groundnut varieties having tolerance to iron chlorosis is of paramount importance for the provision of an economic and permanent solution to this problem.

Crop genotypes differ greatly in their response to iron availability (iron stress) in the soil and have been designated as iron-inefficient (susceptible to iron chlorosis) and iron-efficient cultivars (Brown *et al.* 1971; Clark 1982; Brown & Jolley 1989). Iron-efficient genotypes have already been identified for many crop plants (Brown *et al.* 1971; Kannan 1982; Vose 1982; Clark & Gross 1986). Although reports on a limited number of groundnut genotypes are available, an extensive and systematic investigation has not been undertaken for the identification of genotypes tolerant of LIIC for use in breeding programmes (Hartzook *et al.* 1972; Kannan 1982). The screening of groundnut germplasm (both Spanish and Valencia types) was therefore undertaken to identify the iron-efficient genotypes by growing them on a calcareous soil having low available iron.

MATERIALS AND METHODS

Field screening for tolerance to iron chlorosis of erect type groundnut germplasm available at the National Research Centre for Groundnut, Junagadh, India