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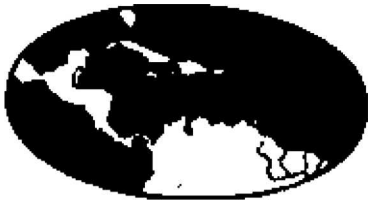

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THE APPROPRIATENESS OF SPECIFIC PACKAGES OF TECHNOLOGICAL PRACTICES FOR WEED CONTROL IN PEANUT CULTIVATION IN JAMAICA

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SUMMARY

In Jamaica, scarce foreign exchange makes it very important to examine carefully every aspect of technology employed in agricultural production to ascertain its appropriateness to local conditions and particularly its labour employment opportunity.

On small farms where a fraction of an acre is involved in peanut production it is most advantageous for optimum utilization of family labour to employ manual methods of weed control. In this way family income is optimized. Improved cultural practices and management involving maximization of land use would increase the efficiency and effectiveness of manual methods of weed control on small farms which collectively could supply Jamaica's needs for "ball park" peanuts.

Peanut industrial development in Jamaica however depends on expansion of the size of individual areas devoted to this crop. With increased size of areas, manual methods of weed control become less desirable. It would be disastrous, as far as efficiency is concerned, to depend on a large number of hired workers employing manual methods of hired workers employing manual methods of weed control only on individually large areas of peanut production. Economy and competitiveness of the final product will dictate a shift to a higher level of technology and capitalization involving the use of chemicals and fuel powered cultivators.

Although an integrated system involving all methods of weed control is essential for successful peanut production it would be unwise to specify any particular package of technological practices for weed control as the desirability of any practice or group of practices varies widely with circumstances and is determined by optimization of income, factor utilization and the satisfaction of well-being.

INTRODUCTION

An integrated system of all methods of weed control is essential in economic peanut production. Methods of weed control are best considered as occurring in one of the following distinct groupings:

Cultural
Chemical
Mechanical – the use of cultivators, powered by fuel
Manual – hand labour assisted by simple tools as the cutlass or hoe.

The role and thus the appropriateness of each of these methods either separately or in combination varies widely with circumstances. For example, in small farming where only a fraction of an acre is involved in peanut production, it would be advantageous to rely on manual

methods thus better utilizing the excess labour usually available on the small farm. Only under these conditions a labour intensive approach to weed control is to be preferred to the more technological and capital intensive approach involving the use of chemicals and equipment, both of which might be outside of the skills and financial competence of the small farmer; hence manual methods of weed control are most appropriate on small farms. The accumulated effect of a labour intensive approach to weed control on small farms can have national significance in Jamaica in that there will be a savings of scarce foreign exchange that would otherwise have to be utilized for purchase of chemicals and equipment from abroad. However, as the individual areas to be devoted to peanuts are increased from a fraction of an acre, the need for improved technology and capitalization increases. No longer will it be possible for the farm family to carry out the required operations timely and efficiently. As the size of the peanut undertaking increases beyond an acre the cost of hired labour quickly becomes prohibitively high and efficiency would dictate an increase in the roles played by other methods of weed control if the final product is to remain competitive with the farmer obtaining the greatest benefit from his enterprise. Hence with increased size, labour intensive methods become less appropriate. Where extensive areas are involved in peanut production the advantages of chemical and mechanical methods of weed control come into their own although it is not possible to completely eliminate manual methods.

In Jamaica, very high prices are paid for "ball park" peanuts and on this market it is quite feasible for the sake of social benefit to make weed control and even other operations in peanut production labour intensive; however, if peanuts are required for processing into canned peanuts, butter or confectionaries or the numerous other uses of peanuts, there is an urgent need to increase mechanization and to improve the technology. Although such action would increase the foreign content of the industry, the shift cannot be avoided for efficiency. It must be realized that the cost of hand labour is high in terms of its productivity and for national survival, Jamaica must increase its productivity both per man and per acre and only in this context would peanuts play its proper role in the country's economy. Jamaica cannot subsidize inefficiency in any of its farming operations and expect to fulfill the aspirations of its people.

Cultural Methods

There are several operations carried on in peanut production that although not undertaken specifically for weed control have much significance in this regard and it is important to maximize the weed control benefits of these operations for success.

a. Thorough land preparation

Seed bed preparation usually commences with thorough clean-up operations of all plant remains and are followed by a number of tillage operations to provide a good tilth. Where tillage operations are suitably spaced with long intervals for weathering, the desiccating rays of the sun do much to reduce weed problems. Land preparation must not be hurried for good soil tilth alone but for maximum weed and other pest control benefits.

b. High plant populations

Spacing or arrangement of plants varies with variety grown – bunch or runner types,

system of planting involved – mechanical or manual and other factors but high plant populations are to be preferred. In Jamaica, with the local bunch type (Spanish) a 4 inch spacing in rows 18 inches apart have proven optimal under most circumstances. It is important to stress that cord lines should guide the establishment of straight rows. Any failure in this regard makes subsequent interrow cultivation and harvest difficult. High plant densities not only ensure higher yields but the shading effect of the crop is the most economical measure for weed control. All techniques such as placement of fertilizer about 1 inch below the depth of planting thus giving the crop a unique advantage for vigour can be considered as having special weed control merit.

Implementing seeding immediately after the final soil refinement operation allows the crop opportunity to get a good head start over weeds. Here also, careful selection and treatment of seed for protection against insect and disease damage combine with establishment on moist soil to give complementary benefits in the fight against weed growth.

c. Crop rotation and multiple cropping

Peanut production should be pursued as an integral part of the systematic development of the entire farm. Since peanuts is a clean cultivated crop that affords the soil little protection, it should be established only in flat or gently sloping areas or in areas that have been adequately protected from erosion losses through terracing. This factor makes site selections most important and it is wise to give special consideration to avoiding areas with weed problems – "prevention is better than cure". Continuous cropping is the most effective weed control measure and peanut being a legume has special merits as a rotational crop with a wide range of crops and its value as an intercrop is increasingly being realised. Infrequent cropping where the land is idle for protracted periods and/or permitted to go to bush fallow, aggravates weed problems. Bare fallowing, in areas of gentle slope where erosion is not a hazard, is to be preferred to bush fallow by virtue of its moisture conservation merits as well as avoidance of built up weed seed infestation.

d. Farm and field sanitation

Maintenance of clean hedge rows, suppression of weed growth on irrigation and drainage water ways and field intervals all have a vital role in peanut production of high quality. Collection and disposal of weeds eradicated from peanut fields form a part in the fight for maintaining good crop sanitation. The earliness of removal of weeds before their seeding is the key to success; indeed "a stitch in time saves nine".

Chemical Measures

Pre and post selective herbicides that would give effective weed control throughout cropping is a thing of the future. In Jamaica the use of Gesagard at 2 lb. a.i. per acre have given satisfactory control for about 6 weeks after planting under a wide range of conditions. It is important to stress that for effectiveness Gesagard must be applied to moist soil. Irrigating immediately after gesagard application reduces its effectiveness. Under circumstances of good seed bed preparation it has proven possible to eliminate any other control measure up to "closing in" of the rows planted at 18 inch intervals. In areas with a history of weediness, it has proven advantageous to

reduce firstly the weed seed content of the soil before crop establishment. Either by awaiting a shower of rain but preferably by carrying out an irrigation on the thoroughly and completely prepared area, weeds are forced to germinate. The young weeds are then destroyed (burnt off) by an application of Gramoxone (at 1½ pints p.a.). After two days, the area is subjected to a final very light rotavation to no more than 2 inches depth. This operation creates a layer of soil relatively free of weed seeds and if planting occurs immediately thereafter gives the crop a good head start over weed growth from seeds buried at depth. Interrow cultivation carried out in the pegging crop can do much damage and is ineffective in any event for weed growth within the plant rows. It would therefore be a great technological break through if research could come up with a selective herbicide for application at this stage that would not produce phytotoxic effects on the crop but would ensure weed-free conditions to harvest.

Mechancial Methods

Under most circumstances, at least two interrow cultivations using shallow and wide cultivator sweeps will be necessary before closing of the plant rows. The use of "duck feet" tynes has given excellent control when the weeding operation is carried out early to allow the young crop to get a good head start. A shift over to spear shaped tynes for the final interrow operation is desirable at flowering and early pegging to provide the loose soil at moulding. Pegs that do not get under the soil do not form nuts; yet in the early stages of the crop soil should not be permitted to get on the leaves. Hence interrowing has to be carried out very carefully and the importance of absolutely straight rows in crop establishment cannot be over-stressed. A cord line should be used to guide the planting operations otherwise much damage can be caused by interrow cultivation.

Manual Methods

Hand eradication of weeds assisted by simple tools such as the cutlass or hoe has to be resorted to irrespective of what combination of other methods are employed. The use of a wheel hoe allows early control of weeds between rows with increased efficiency. It is possible for one operator to weed over an acre per day with this implement compared to merely two squares with the standard hoe. The wheel hoe operation however must be carried out at a particularly early stage of weed growth, actually at first emergence of weed seedings which is considerably prior to the stage of weed growth at which ordinary hoe weeding is normally implemented. The wheel hoe also has an advantage of creating less soil disturbance.

Hand eradication of weeds in the plant row will normally be required at least twice with the last operation occurring after closing in of the rows or at early pegging. The timing of this last operation is most important so that the peanut stand is free of weeds at harvest. Weediness at harvest causes difficulties in this operation and poor recovery of nuts.

RECOMMENDATIONS AND CONCLUSION

Satisfactory weed control in peanut cultivation calls for careful planning and timely execution of all operations. The cost of weed control can be considerably reduced by the proper implementation of a number of operations not specifically designed for weed control and maximizing these benefits are the essence of good husbandry.

The appropriateness of any technological package for weed control varies widely with circumstances particularly the size of the enterprise, the individual farmer's skills and his financial competence. For this reason it would be unwise to recommend a specific set of practices as a guide to all peanut farmers.

On small farms, labour intensive technology such as manual methods of weed control, optimizes farm family income in the absence of alternative employment. Such methods are therefore most appropriate as they make the best use of the small farmer's resources. Labour intensive technology however cannot be expanded efficiently through increased numbers of hired labour to cope effectively with the problems of large scale production on individually large areas. Large areas call for high levels of technology and capital investment if efficiency is to be maintained. Conversely, it will be inappropriate to apply capital intensive technology to small farms although much improvements in efficiency can be obtained by the use of small equipment such as the wheel hoe. For emphasis, it is the individual size of areas devoted to peanuts that largely determines the desirability of possible combinations of labour and capital intensive technology.

Increased emphasis on the role of cultural methods of weed control offers Jamaica the best opportunity for saving foreign exchange in its drive for self sufficiency in peanut production.

Small farm peanut production systems offer the greatest social benefits but needs to be supported by a high price market. For competitiveness, peanut industrial development must be supported by mechanized operations at every stage of its primary production. Only in this way would peanuts play its optimum role in the Jamaican economy.

NAME OF PAPER: The appropriateness of specific packages of technological practices for weed control in peanut cultivation in Jamaica (Payne)

Questions by: John Hammerton
Country: Belize

QUESTIONS:

1. What is the level of yield of small farmers growing peanuts in Jamaica?
2. What inputs do you consider would be most likely to increase yields?
3. Is "moulding-up" a common practice, and has any comparison be made of moulding versus no moulding?

ANSWERS:

1. Over the last 5-year period, average small farmers yield have increased from 200 to 300 level in 1972, 500 to 750 in 1974, 900 to 1200 lbs per acre in 1976. More recently levels of 1500-2000 lbs characterize levels of most peanut farmers. The better farmer obtains 2500 p/a.

2. Thorough land preparation in some areas; followed by increased population. For large scale plantings, improved harvesting by a peanut digger. Peanut threshing is costing over $200 per acre or 10c. per lb. to maximize return of yield.

3. Moulding is standard largely for weed control. Surface compaction is common on all the alluvial soils and shallow interrowing and moulding-up has been assumed to be advantageous for covering of the pegs but this has not been established formally.