AGRO TECHNOLOGIES

2018-19

Natural Resource Management & Crop Production,
Crop Protection, Farm Mechanization and Value Addition

Professor Jayashankar Telangana State Agricultural University
Rajendranagar, Hyderabad, Telangana State, India.
www.pjtsau.edu.in

AGRO TECHNOLOGIES

2018-19

Natural Resource Management & Crop Production,
Crop Protection, Farm Mechanization and Value Addition

Professor Jayashankar Telangana State Agricultural University
Rajendranagar, Hyderabad, Telangana State, India.
www.pjtsau.edu.in

Publication No. : 98/RP/PJTSAU/2019
Agro-Technologies 2018-19

Concept by :
Dr. V. Praveen Rao
Vice Chancellor

Compiled by:
M.Sreedhar, P. Spandana Bhatt, A. Madhavi, G. Sridevi, B. Pushpavathi, V. Gouri Shankar, V. Ramulu, K. Muralidharan and R. Jagadeeshwar

Designed by:
Ch. Venu Gopala Reddy
M. Pallavi

No. of Copies : 500

Year of Publication : 2019

Printed at :
PJTSAU Press, ARI Campus
Rajendranagar, Hyderabad - 30, Telangana State

Published by :
Professor Jayashankar Telangana State Agricultural University
Rajendranagar, Hyderabad - 30, Telangana State

CONTENTS

CONTENTS

PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY

Administrative Office. Rajendranagar, Hyderabad - 500 030, Telangana State, India

Dr. V. Praveen Rao
Ph.D
Vice Chancellor

Phone : +91-40-24015122
Fax : +91-4024018653
Mobile : +91 9849029245
E-mail : vcpjtsau@gmail.com

FOREWORD

The research programmes of the Professor Jayashankar Telangana State Agricultural University are being designed to fulfill the underlying motto of "Science with Societal Relevance". The experimental procedures and data parameters undergo thorough scrutiny at various levels before and during implementation, resulting in technologies that are relevant across agroclimatic zones or address location specific issues. Much emphasis is being given to multidisciplinary science based methodologies that optimize resource utilization while being cost effective to ensure remunerative returns to farmers.

It is heartening to note that the ingenuity and industry of the research scientists of the University is being ably supported by the extension scientists to validate such unique farm implementable interventions for their consistency during adoption. The present compilation "Agro – Technologies 2018-19" presents 29 such innovative farm technologies encompassing areas like Natural Resource Management and Crop Production, Crop Protection, Farm Mechanization and Value Addition, that I am sure would be immensely helpful in improving the productivity of crop, soil and water both in the State and Country.

On this occasion, I congratulate all the Research Scientists for their scientific temper and perseverance in developing these technologies. I also appreciate all the technical personnel and officers, for their contribution in bringing out this publication in its present form.

Date: 28.08.2019
Place: Hyderabad

(V. PRAVEEN RAO)

PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY

Administrative Office. Rajendranagar, Hyderabad - 500 030, Telangana State, India

Dr. R. Jagadeeshwar
Ph.D
Director of Research

Direct : +91-40-24015078
+91-40-24017453
Mobile : +91 9121107203
E-mail : dr.pjtsau@gmail.com

PREFACE

Technological innovations rolled out by the Research Scientists in the last few years have started throwing vibrant reflections on fulfilling the basic concept of 'Societal Relevance'. These technologies were aimed at resolving immediate concerns of farmers to steady the agricultural production system of the State without much time loss. This initiation based on strong platform had created precedence to look further with confidence and certainty on technology front.

The benefits accrued from higher adoption of these technologies on macro scale are manifested in the form of manifold increase in the production and productivity levels. Such field implementation of farm technologies has propelled the State's figures to be among the best in the country in important staple food crops. Robust technology modules designed on multidisciplinary platforms have created off shoot benefits such as harmony with environment, huge reduction in usage of precious irrigation water, fertilizers and crop protection chemicals leading to sustainability of the practices on long run.

Riding on the successful launch of previous technologies the efforts are intensified at PJTSAU through various Research facilities led by the Regional Agricultural Research Stations to design and develop cost effective, farmer friendly technologies duly accounting the feedback from field level machinery including the end users. Scientists are encouraged to pursue ideas based on interdisciplinary and inter institutional collaborations in a participatory approach. The Research ideas are fine tuned constantly for their capacity to integrate with emerging issues like climate change, ecosystem level changes in view of upcoming irrigation potential and the concept of Crop Colonies.

This compilation contains such innovations aimed at changing the agricultural scenario in the State in coming times. I congratulate all the scientists, who succeeded in their efforts to bring out these novel technologies. I hope it will serve as a ready reckoner for the farm fraternity striving for improving the state of the farmers.

Date : 28-08-2019
Place : Hyderabad

(R.JAGADEESHWAR)

Drought Affected Mandals to Guide Development of Resilient Farming Practices in Telangana

Salient Features

Telangana state is located in semi-arid region with rainfall as major source of water. The rainfall is seasonal in character with short rainy season of 3 to 4 months and the state experiences dry conditions for 8 to 9 months in various parts and more so in southern parts of Telangana. Prolonged water scarcity conditions prevailing over larger areas lead to severe droughts. During most of the years, some parts of the state do not have access to water resources other than rainfall. Therefore, there is need to develop strategies for drought mitigation with the experience of drought identification and management practices that can rescue the farming community from miseries of drought. Rainfall deficiency and three consecutive dry weeks were used to identify frequently drought prone mandals in Telangana State using 30 years mandal level historical rainfall data.

Performance

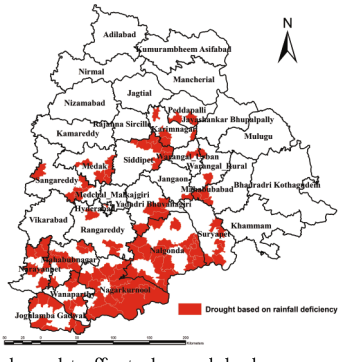
A total 194 frequently drought prone mandals were identified in Telangana State. Among the districts, in Nagarkurnool 90% of the mandals (18 out of 20 mandals), 74% (23 out of 31) in Nalgonda and 73% (19 out of 26) in Mahabubnagar were ranked as the three most frequently drought prone districts in Telangana. This information can be used as guide to make policy decisions to carry out research and to implement adaptation strategies through frontline extension. This information is also useful to prepare mandal level action plan to mitigate adverse effect of drought on various farm enterprises.

Cost of Technology

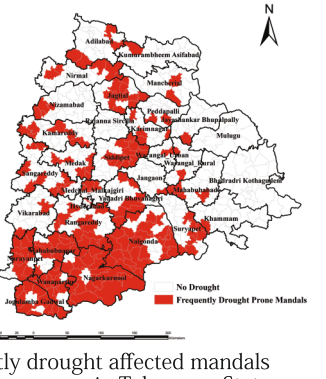
No additional cost.

Impact and Benefit

Identification of frequently drought prone mandals would facilitate preparation of suitable short-term and long-term action plans as drought preventive and mitigation strategies at various levels aimed at building resilient farming practices for the benefit of farming community.



Frequently drought affected mandals due to rainfall deficiency in Telangana State



Frequently drought affected mandals in Telangana State

Contact
Principal Scientist (Agronomy) & Head
Agro Climate Research Centre (ACRC), ARI
Rajendranagar, Hyderabad-500030
Telangana State
Phone : 040-24016901
E-mail : acrchyd@gmail.com

Integration of Seasonal and Medium Range Weather Forecast for Climate Risk Management in Major Crops of Telangana

Salient Features

Decision making at farm level is more crucial for timely application of inputs and other management strategies. At present farmers are not using the real time weather information and agromet advisory services to minimize the impact of adverse weather. Farmers need information on seasonal climate forecast for crop selection and medium range weather forecast based crop advisories on real time basis to take suitable decision at farm level.

Performance

During normal rainfall forecast year (2017 and 2018) allocation of land area to each component crop on equal priority basis (33.3% cotton, 33.3% maize & 33.3% redgram), during the years of normal rainfall forecast (2016) allocation of 60% of area for high water demanding crop (maize) and 40% of the area for low water demanding crop (cotton) and during deficit rainfall forecast year (2015), allocation of 40% of area for high water demanding crop (maize) and 60% of the area for low water demanding crop (cotton) is beneficial.

In addition to the land allocation decision, planning daily crop management practices like pest and disease management, fertilizer application, inter cultivation and need based irrigation management at critical stages based on Medium Range Weather Forecast Agromet Advisories provided the yield advantage of 5.8 % in terms of mean cotton equivalent yield and economic advantage of 37.5% over farmers practice.

Cost of Technology

No additional cost is required for adoption of technology.

Impact and Benefit

Weekly twice Medium Range Weather forecast based Agromet Advisories have yield advantage of 5.8 % and economic advantage of returns to the extent of 37.5% over farmers practice.

Forecast based maize and cotton crops

Contact
Principal Scientist (Agronomy) & Head
Agro Climate Research Centre (ACRC), ARI
Rajendranagar, Hyderabad-500030
Telangana State
Phone : 040-24016901
E-mail : acrchyd@gmail.com

Paired Row Planting for Yield Maximization of Redgram

Salient Features

Paired row planting system allows timely weed management through appropriate farm mechanization by exploring wide interspace. Creating soil mulch with intermittent intercultivation in this system resulted in better soil moisture conservation and thereby, helped plants to avoid terminal drought stress. Due to good earthing-up, it is possible to prevent lodging. Paired row system of planting also permits better light interception by the crop and improved resource sharing and enables to harvest increased redgram yields.

Performance

There was no significant difference between distance within the pair (45 cm and 60 cm). But the differences between pairs (1.8 m, 2.4 m, 3.0 m and 3.6 m) were noticed, such a paired row system, significantly increased primary, secondary branches and pods/plant. A 3 m distance between two pairs recorded significantly the highest redgram seed yield of 2282 kg/ha and was on par with 3.6 m spacing between two pairs (2098 kg/ha).

Cost of Technology

The highest net returns (Rs. 91,420/ha) and B:C ratio (4.1) were recorded under 3 m spacing between two pairs and 45 cm within a pair in redgram crop.

Impact and Benefit

In a paired row system, sowing the redgram crop at 3 m distance between two pairs and 45 cm between a pair, helps to harvest higher yield (2282 kg/ha) in black soils.

Paired row planting system in redgram cultivation

Contact
Principal Scientist (Agronomy) & Head
Agricultural Research Station
Tandur-501141, Vikarabad District
Telangana State
Phone : 9959807891
E-mail : arstandur@gmail.com

Fodder Oat Production in Telangana Under Irrigated Conditions

Salient Features

Oat (Avena sativa L.) is an important winter cereal forage crop due to congenial climate leading to excellent growth, quick regrowth and high nutritive value for both milch as well as draught livestock. However, it is proved to be suitable rabi fodder crop for Telangana due to prevalent low temperatures during winter.

Performance

High yields in green fodder (448.3 q/ha), drymatter (103.7 q/ha) and crude protein (9.1 q/ha) were recorded when fodder oat was sown in the first fortnight of November. This was followed by oat sown in second fortnight of November (green fodder 438.3 q/ha and crude protein 8.09 q/ha). Hence, fodder oat can be sown any time in November during the cool winter in parts of Telangana profitably.

Cost of Technology

Cost of cultivation ranges between Rs. 44,343/ha to Rs. 48,513/ha and net returns range from Rs. 30, 628/ha to Rs. 64,405/ha.

Impact and Benefit

Forage crop production during winter season in most parts of Telangana is challenging. Many important forage crops such as jowar, bajra, napier bajra and cowpea do not perform well as crop growth is affected by cold weather. In such a situation oats are the best choice for getting good forage biomass and crude protein with benefit cost ratio of 2.3:1.0.

Fodder oat as a profitable crop in Telangana State

Contact
Principal Scientist (Plant Breeding) & Head
AICRP on Forage Crops & Utilization
ARI, Rajendranagar
Hyderabad-500030, Telangana State
Phone : 9849152482
E-mail : forage_hyd@yahoo.com

Pigeonpea - a Remunerative Option to Replace Cotton Under Protected Irrigation

Salient Features

Generally farmers grow pigeonpea at a wider spacing between rows with solid rows because of which only one-way intercultivation is possible. The growth of intra row weeds and consequent crop weed competition reduces crop yield. Intensive cultivation of pigeonpea with square planting facilitating two way intercultivation helps in effective weed control, earthing up, moisture retention, more light interception and vigorous plant growth which manifest in yield enhancement. This could be an alternative option to rainfed cotton which is becoming less profitable due to shortage and escalating high labour cost.

Performance

Maximum pigeonpea equivalent yield (1424 kg/ha) was recorded with 180 cm x 60 cm spacing in pigeonpea (cotton at 120 cm x 60 cm spacing gave high yields 1322 kg/ha). Under rainfed conditions, pigeonpea cultivated in square seeding (150-180 x 60 cm spacing) gave more profit (25-30%) when one protective irrigation is given at bud initiation stage for pigeonpea and at boll formation for cotton. The net profit from pigeonpea was higher with a B:C ratio of 3.2-3.4 than cotton (B:C ratio of 2.0).

Cost of Technology

Rs. 1750/ha.

Impact and Benefit

Wider spacing of rainfed pigeonpea at 150-180 cm x 60 cm gave additional monetary benefit of Rs. 9000/ha than rainfed cotton. Pigeonpea cultivated with one protective irrigation at bud initiation stage gave additional net profit of Rs. 11000/ha than cotton irrigated at boll development stage.

Performance of rainfed pigeonpea under wider spacing

Contact
Associate Director of Research
Regional Agricultural Research Station
Warangal-506007, Telangana State
Phone : 08702100236
E-mail : adrrars_wgl@yahoo.co.in

Response of Different Maturity Groups of Pigeonpea to Protective Irrigations

Salient Features

Pigeonpea is drought tolerant crop and needs minimum inputs to give reasonable yields even under unfavorable agro-ecological conditions. But prolonged dry spell at critical stages can lead to yield loss. Ensuring moisture at critical growth stages of crops is essential to ensure production in rainfed areas. Erratic rains and prolonged dry spells during the critical growth stages cause substantial crop loss in rainfed areas. Hence, protective irrigations provided can support crop during the dry spells and increase production.

Performance

Life saving irrigations were given at two stages viz., before flowering and pod filling lead to profitable yields, over 3years (kharif 2016-18). WRG-27 has recorded higher seed yield, gross returns, net returns and benefit cost ratio (1324 Kg/ha, Rs.72231/ha, Rs.41327/ha and 2.34, respectively), which was on par with WRG-96 (1306 Kg/ha, Rs. 71262/ha, Rs. 40022/ha and 2.28, respectively) and WRG-97 (1293 Kg/ha, Rs. 70563/ha, Rs. 39683 /ha and 2.29, respectively).

Superior performance of pigeonpea under protective irrigation

Cost of Technology

Cost ranged from Rs. 29800-31241/ha.

Impact and Benefit

Lifesaving irrigations at two stages viz., pre-flowering and pod development resulted in higher net returns in pigeonpea varieties WRG-27, WRG-96 and WRG-97.

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Tornala -502114, Siddipet District
Telangana State
Phone : 9441312264
E-mail : ars.tornala@gmail.com

Nipping in Pigeonpea - Technology to Enhance Yield

Salient Features

Nipping is cutting the growing shoot by 10 cm from top. It is an important agronomic practice of removal of apical bud which helps to reduce apical dominance and increase branches, per cent pod set and yield by improving source sink relationship. The energy provisionally used by the plant is diverted towards the production of branches and pods.

Performance

One time nipping at 45 days old crop produced maximum grain yield (1776 kg /ha) which was on par with nipping at 60 days after sowing (1600 kg/ha). Nipping at 45 and 60 days after sowing (1555 kg/ha) was on par with control unnipped plants (1540 kg/ha).

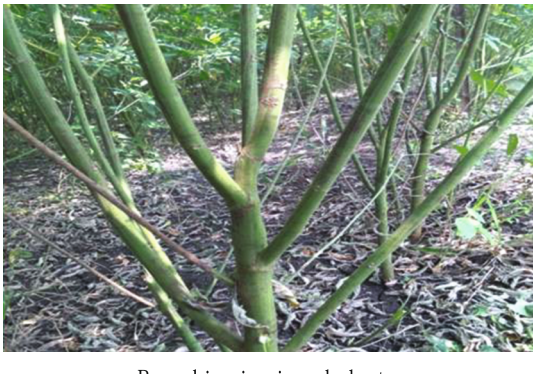
Cost of Technology

Rs.1500/ ha.

Impact and Benefit

Nipping in pigeonpea at 45 DAS gave higher grain yield of 1776 kg/ha (15-20% more) irrespective of plant geometries over normal practice. With an additional investment of Rs.1500/ha on nipping, farmers can realize an additional income of Rs. 13393/ha. Hence, nipping is practicable, viable and profitable method under rainfed conditions with a plant spacing of 120 cm x 20 cm with high B:C ratio of 3.09.

Nipping at 45 DAS



Branching in nipped plant

Contact
Associate Director of Research
Regional Agricultural Research Station
Warangal-506007, Telangana State
Phone : 08702100236
E-mail : adrrars_wgl@yahoo.co.in

Effect of Dates of Sowing on Pigeonpea Under Rainfed and Irrigated Conditions

Salient Features

In India, cultivation of legumes forms an integral part of the rainfed production systems; however, their productivity over the years has remained low and unstable. In Telangana, pigeonpea was traditionally cultivated in rainfed areas over wide range of agro-eco systems. The yield levels are highly variable and location specific. Conducting research at each location on complex variable is laborious and time consuming. Therefore, the present investigation aimed at identification of suitable sowing dates for cultivation of pigeonpea under rainfed and irrigated conditions of Northern Telangana Zone.

Performance

The highest grain (2520 kg/ha) and stalk yield (7496 kg/ha) were observed when sown between 3-4 weeks of June. The lowest grain (1491 kg/ha) and stalk yield (3289 kg/ha) were recorded when sown in 1-2 week of August. Among the irrigation treatments the highest grain (2319 kg/ha) and stalk yield (5717 kg/ha) was observed with two irrigations at critical stages of pre-flowering and pod development.

Cost of Technology

No additional cost.

Impact and Benefit

Sowing between 3rd week to 4th week of June or 1st and 2nd week of July produced 37 to 41% yield increase over delayed sowing in August.

Two irrigations (pre-flowering and pod development stage) provided to pigeonpea resulted in 24% yield increase over a rainfed crop.

Maximum pigeonpea yield realization (Sown during 3rd - 4th week of June)

Contact
Associate Director of Research
Regional Agricultural Research Station
Polasa-505529, Jagtial District
Telangana State
Phone : 9989625213
E-mail : adr_rarsjgl@yahoo.com

Comparable Crops to Maize Under Rainfed Situations of Medak

Salient Features

Maize is one of the principal crops of the Medak district grown on light soils under rainfed conditions. It is a very sensitive crop to moisture stress. Erratic behavior of monsoon often results in moisture stress of both kinds (excess and deficit) during maize growing season which is leading to partial or complete crop failure. Further, irrigation facilities are meager in dry land areas. Millets and pulses are gaining importance which can be grown successfully under rainfed conditions. Pigeonpea, bajra and ragi were found remunerative than maize on rainfed Alfisols of erstwhile Medak district (Siddipet, Sangareddy and Medak).

Performance

Redgram crop has recorded higher maize equivalent yield, gross returns, net returns and benefit cost ratio (4354 kg/ha, Rs. 66745 /ha, Rs. 39080/ha and 3.38, respectively) followed by bajra (2804 kg/ha, Rs. 43340/ha, Rs. 25553/ha and 2.44, respectively) and ragi (2604 kg/ha, Rs. 40320/ha, Rs. 20614/ha and 2.05, respectively) and were profitable than maize (1938 kg/ha, Rs. 30264/ha, Rs.2297 /ha and 1.08, respectively). Others like foxtail millet (korra), greengram, cotton and castor were found to give less net returns and B:C ratio.

Cost of Technology

Crops which have lower cost of cultivation were bajra (Rs. 17787 /ha), ragi (Rs. 19706/ha) and pigeonpea (Rs. 27665/ha) than maize (Rs. 27967/ha) than other crops korra (Rs.17903/ha), green gram (Rs. 22572/ha), cotton (Rs. 39324/ha) and castor (Rs. 23894/ha).

Impact and Benefit

Pigeonpea, bajra and ragi were found more remunerative than maize in rainfed Alfisols of erstwhile Medak District (Siddipet, Sangareddy and Medak) with higher net returns than maize.

Bajar and pigeonpea - Profitable alternate crops to maize under rainfed situation

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Tornala -502114, Siddipet District
Telangana State
Phone : 9441312264
E-mail : ars.tornala@gmail.com

Moisture Conservation Practices to Enhance Productivity in Maize

Salient Features

Sole pigeonpea, maize and pigeonpea intercropping (4:1) and sole maize cropping systems are very common under rainfed conditions in Telangana. Lack of moisture in soil at critical stages leads to complete or partial crop failure. Maize is very sensitive to moisture stress i.e., both lack of moisture or excess moisture. Therefore, there is a need to adopt soil moisture conservation practices to achieve higher yields in rainfed areas.

Performance

Flatbed followed by making ridges at 25 DAS and flatbed followed by making conservation furrow at 25 DAS were found to be better land configurations for conservation of moisture and for higher returns. Sole crop of pigeonpea was more remunerative than maize and pigeonpea intercropping (4:1) and sole maize crop in rainfed areas. Sole pigeonpea has given significantly higher maize equivalent yield, higher gross returns, net returns and benefit cost ratio (4340 kg /ha, Rs. 65532/ha, Rs. 33926/ha and 2.07) than maize and pigeonpea intercropping (1:4) (4080 kg /ha, Rs. 61609/ha, Rs. 25786/ha and 1.72). Higher maize equivalent yield, gross returns, net returns and benefit cost ratio were recorded by ridge and furrow method (4253 kg/ha Rs. 64213/ha, Rs. 29752/haand 1.86) and by flatbed followed by making conservation furrow at 25 DAS (4247 kg/ha, Rs. 64132 /ha, Rs. 30042/ha and 1.88) and flatbed followed by making ridges at 25DAS (4193 kg /ha, Rs. 61940/ha, Rs. 27568/ha and 1.80).

Moisture conservation techniques to enhance maize productivity

Cost of Technology

Cost of cultivation of sole maize crop is Rs. 33971/ha, maize and pigeonpea is Rs. 35823/ha and sole pigeonpea is Rs. 31606/ha. Cost of moisture conservation practices like ridge and furrow is Rs.34461 /ha, flatbed followed by making ridges at 25 DAS costs Rs. 34372/ha and cost of flatbed followed by making conservation furrow at 25 DAS is Rs. 34090/ha at an additional cost of Rs. 2500/ha over flatbed preparation.

Impact and Benefit

The moisture conservation practices resulted in higher yield and 52-60% higher net returns as compared to that of flatbed. Sole pigeon pea crop (Rs. 33926/ha) accrued more net returns by 24-55% as compared to that of sole maize crop (Rs. 15366/ha) and maize and pigeonpea intercrop (4:1) (Rs. 25786/ha).

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Tornala -502114, Siddipet District
Telangana State
Phone : 9441312264
E-mail : ars.tornala@gmail.com

Optimum Planting Density and Fertilizer Level for Increased Grain Yield in Maize

Salient Features

The influence of different planting density and fertilizer levels in maize crop during kharif in red sandy loam soils indicated significant difference in maize yield at different planting density.

Performance

Under different fertilizer levels, the grain yield of maize was higher at 150% RDN but was found to be on par with 100 or 200% RDN, hence farmers can go with recommended dose of fertilizer (RDF) application. Among the planting density, 75 cm x 20 cm resulted in significantly higher grain yield (6424 kg/ha) and was on par with 60 cm x 20 cm (6349 kg/ha). While, the grain yield at 50 cm x 20 cm and 45 cm x 20 cm were significantly less (5448 and 6924 kg/ha respectively). The yield attributing characters of cob length, cob girth, kernel number and grain weight per cob were significantly higher at 75 cm x 20 cm and 60 cm x 20 cm. The optimum plant density for getting higher yields in maize crop is 66,667plants/ha with a spacing of 75 cm X 20 cm. Farmers can benefit with recommended dose of fertilizer application.

Cost of Technology

No additional cost is involved in this technology.

Impact and Benefit

This technology helps farmers to reduce the cost of cultivation by saving Rs. 360/ha.

Enhanced field performance of maize at optimum plant density

Contact
Principal Scientist (Agronomy) & Head
Agricultural Research Station
Karimnagar-505001, Telangana State
Mobile : 9440415134
E-Mail : ars.karimnagar@yahoo.com

Effective and Economic Row Ratio for Seed Production of Single Cross Maize Hybrid, Karimnagar Makka 1 (KNMH 4010131)

Salient Features

Hybrids in maize crop gives more yields than conventional varieties. Yield is to a large extent depends on plant population maintained in fields. It is important to establish optimum row ratio (female:male) to ensure high yields. During rabi, in red sandy loam soils, the evaluation of row ratios in seed production of maize hybrid Karimnagar Makka-1 (KNMH-4010131) indicated that, sowing in 5:1 row ratio (female:male) has recorded higher F_1 grain yield of 2597 kg/ha than F_1 the existing practice of 4:1 row ratio (2094 kg/ha) indicating 24% increased F_1 hybrid yield. The yield attributing characters which contributed to the increased yield are cob length, kernel number, 1000 grain weight and grain weight per cob. This has also been validated in farmers field in an area of 2.25 acres area during rabi 2018-19.

Karimnagar Makka 1 (KNMH 4010131)

Performance

This technology has been adopted at the research station as well as in outsourcing farmers field (Malkapur village). 5:1 row ratio recorded higher hybrid seed yield of Karimnagar makka 1(KNMH 4010131).

Cost of Technology

No additional cost is involved in this technology.

Impact and Benefit

With the increased yield of 24% (503 kg/ha), an amount of Rs.90540 /ha will be the benefit in the seed production without incurring any additional cost. Further, this technology will aid in more availability of seed to the farmers.

Contact
Principal Scientist (Agronomy) & Head
Agricultural Research Station
Karimnagar-505001, Telangana State
Mobile : 9440415134
E-Mail : ars.karimnagar@yahoo.com

Profitable Intercrops in Sugarcane Grown in Northern Telangana Zone

Salient Features

Sugarcane, as a long duration crop, gives income about a year after planting. There is a dire need to introduce other crops, either as sequential or inter-crop especially for farmers having small land holdings. The growth rate of sugarcane during its initial stages (first 120 days) is rather slow, with the leaf canopy leaving sufficient uncovered area. Sugarcane growers can take advantage of this and grow various short duration crops. But choice of intercrops should be such that they compliment sugarcane yield but not compete with sugarcane.

Performance

Planting sugarcane at a wider spacing of 150 cm between the rows to accommodate various intercrops during early summer produced significantly higher cane yield from sole sugarcane (75.7 t/ha). Further, cane yields from sugarcane + coriander (seed)(67.5 t/ha), sugarcane + clusterbean (67.3 t/ha) and sugarcane + coriander (leaf) (66.7 t/ha) were statistically superior over other intercropping systems and on par with sole sugarcane. The cane yield was recorded in sugarcane and chilly intercrop system (42 t/ha) with yield reduction of 35% compared to sole sugarcane. Maximum equivalent cane yield was recorded in sugarcane + bhendi (96.7 t/ha) and sugarcane + clusterbean intercrop combinations (96.5 t/ha). But due to lower cost of production in clusterbean intercrop, the highest net returns of (Rs 1,11,411/ha) and B:C ratio (0.92) was realised. Sugarcane + coriander (leaf) gave a net return and BC ratio of Rs. 1,07,881/ha and 0.91, respectively over sole sugarcane (Rs. 75733/ha and B:C ratio of 0.77. Clusterbean and coriander which are short duration, dwarf and non exhaustive crops and complement sugarcane.

Cost of Technology

Clusterbean or coriander as intercrop in sugarcane costs Rs. 63,000 /ha in addition to sugarcane cost of cultivation.

Impact and Benefit

Sugarcane + clusterbean or Sugarcane + coriander (leaf) are identified as profitable intercropping systems over sole sugarcane. Farmers can adopt 150 cm between rows of sugarcane with these inter crops.

Profitable intercrops in sugarcane

Contact
Principal Scientist (Entomology) & Head
Regional Sugarcane &
Rice Research Station
Rudrur-503188, Nizamabad District
Telangana State
Phone : 08467 284024
E-mail : rsrrs.head@gmail.com

Efficient Chemical Treatments to Enhance Germination In Sugarcane During Low Night Temperatures

Salient Features

Sugarcane is normally propagated by stalk cuttings with 2 to 3 bud sets. In conventional system, seed cane 8 t/ha is used as planting material. During low night temperatures, the sugarcane bud encounters physical limitation for the process of germination. The inducing effect of 2-chloroethyl phosphonic acid @ 100 mg/l (0.1%) and calcium chloride (0.1%) increased sprouting and early growth due to changes in physio-biochemical parameters which regulate the process of shoot emergence by reducing of sucrose content in the cane. Impact of treatment on improving germination ranged from 32-36 per cent over untreated control.

Performance

Poor germination in case of sugarcane under the influence of low atmospheric temperatures results in the use of higher seed cane rate, that increases the cost of cultivation. Low night temperatures in Telangana generally are encountered during November to January. The inducing effect of 2-chloroethyl phosphonic acid @ 100 mg^{-1} and calcium chloride (0.1%) exhibited impact on bud sprouting and early growth due to changes in few physio-biochemical parameters which regulate the process of shoot emergence.

The efficient combination of chemicals of this treatment will economize input cost on seed cane. Further, this technology exhibited synergistic effect on crop physiology and resulted in increased tiller which is a key yield component that ultimately facilitated in higher yield.

Germinating seedling of sugarcane under low night temparatures

Cost of Technology

Rs. 60,000/ha.

Impact and Benefit

Impact of treatment has ranged from 32-36 per cent over control due to 2-chloroethyl phosphonic acid and calcium chloride treatment, respectively in view of improvement in the germination rate of sugarcane bud, increase in the tiller number per unit area and reduction in cost of production.

Contact
Principal Scientist (Physiology) & Head
Agricultural Research Station
Basanthpur-502001, Mamidigi
Sangareddy district
Telangana State
Phone : 9849535756
E-mail : ps.sugarcane09@gmail.com

Sustainable Soybean Production Through Crop Diversification and Tillage Systems

Salient Features

Influence of crop rotation and method of preparatory cultivation on soybean yield are developed and recommended to the farmers for economical soybean cultivation.

Performance

Conventional tillage of land preparation (i.e., deep ploughing, two times with cultivator and planking) was found to be the most suitable practice yielding (2404 kg/ha, 2670 kg/ha and 2329 kg/ha) as compared to the minimum tillage (i.e., two times with cultivator, 1988 kg/ha, 2354 kg/ha and 2641 kg/ha) from 2015-2017, respectively. Soybean-maize-soybean-maize crop rotation showed the maximum SEY.

Cost of Technology

An additional cost of Rs. 5,500/ha is required to perform conventional tillage over minimum tillage. Similarly, Rs. 10,250/ha additional cost is involved to raise the maize crop in rotation to soybean.

Impact and Benefit

Land preparation by conventional tillage is must to raise a good soybean crop. Cultivation of soybean crop altered with maize in every 2 or 3 years is giving sustainable yield rather than soybean monocropping.

There is enough scope to popularize commercially the soybean-maize crop sequence in north and southern Telangana districts.

Soybean crop under conventional tillage

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Adilabad-504001, Telangana State
Phone : 08732-226863
E-mail : ars.adilabad@gmail.com

Row spacing and Seed Rate for Yield Enhancement in Soybean

Salient Features

Realising the potential yields in soybean, row spacing is considered more important. Narrow rows (less than 75 cm) can produce higher yields than wider rows (75 cm or greater). However, narrow rows have not consistently shown increased yields over wider rows because of many influencing factors. Soybean plants have ability to compensate for wider spacing and lower seed rate by developing more canopy and pods. Soybean crop is gaining importance and is increasingly replacing pulses, maize and rice area. The high seed cost and tender seed coat due to which germination is affected, make the supply of huge seed demand to growers a difficult challenge.

Performance

Seven spacing's (cm x cm) (30 x10, 30x15, 30x30, 45x10, 45x15, 45x30 and 45x45) practiced with two varieties, JS 335 and Asb 22. Variety Asb 22 performed significantly superior with yield of 2808 kg/ha over JS335 (2209 kg/ha). Spacing 30 cm x 15 cm recorded significantly higher yield (2875 kg/ha) and was followed by 45 cm x 10 cm (2675 kg/ha) and 45 cm x 15 cm (2614 kg/ha) over farmers practice 30 cm x10 cm (2500 kg/ha). Planting soybean at any of these spacing produced more number of branches and pods and effectively utilized the space to produce more yield per unit area. Hence, seed rate can be reduced to 15 kg /acre in 30 cm x 15 cm and 45 cm x 10 cm spacing and further to 10 kg /acre in 45 cm x15 cm spacing over present recommendation of 25 kg/acre making soybean cultivation more economical.

Yield enhancement of soybean under 30 cm x 15 cm and 45 cm x 10 cm

Cost of Technology

Soybean cultivation with spacing of 30 cm x 15 cm or 45 cm x 10 cm involve a total cost of Rs. 24,400/ha with (37.5 kg seed rate/ha) over Rs.26,200/ha for spacing 30 cm x10 cm (62.5 kg seed rate/ha), approximate reduction is Rs. 450/acre in seed cost, with added yield advantage of 15%.

Impact and Benefit

The seed rate 37.5kg/ha with spacing of 30 cm x15 cm or 45 cm x10 cm reduce seed cost and bring more area using this saved seed.

Contact
Principal Scientist (Entomology) & Head
Regional Sugarcane &
Rice Research Station
Rudrur-503188, Nizamabad District
Telangana State
Phone : 08467 284024
E-mail : rsrrs.head@gmail.com

Nutrient Management in Rice-Maize Cropping System Under Different Tillage Practices

Salient Features

The area under maize crop in rice-fallows is increasing particularly during rabi season. The soil conditions after puddling rice field limit the growth of upland crops. In such situations, zero-tillage offers a great scope as resource conservation technology in saving time, labour, energy and cost compared to conventional methods. In recent time due to wide spread adoption of zero-tillage maize the sustainability of the system in terms of soil fertility is also an important criterion.

Performance

Conventional tillage with direct seeding of rice in kharif followed by zero-tillage maize in rabi resulted in a system productivity (13356 kg/ha). The recommended dose of fertilizer (rice 120-60-40: maize 240-80-80 kg N:P:K/ha) gave a system productivity of 14151 kg/ha over farmer practice (rice 140-90-40: maize 215-90-50 kg N:P:K /ha) (13566 kg/ha) and realized higher net returns (Rs. 96674/ ha) with B:C ratio of 1.85.

Impact and benefits

Soil moisture content and aggregate stability have registered enhanced levels in zero-tillage maize and gave long term benefits like soil fertility enrichment and moisture availability thus zero-tillage maize offers great scope as resource conservation technology.

Performance of rice crop at 120-60-40 kg NPK/ha

Zero tillage maize

Contact
Principal Scientist (Plant Breeding) & Head
Maize Research Centre
ARI, Rajendranagar
Hyderabad-500030, Telangana State
Phone : 9866653568
E-mail : mrcari@rediffmail.com

Optimization of Fertigation for Tomato Under Different Irrigation Levels With and Without Mulch in Open Field, Shadenet and Polyhouse Condition

Salient Features

Tomato is one of the important vegetable crop accounting 30% area among the vegetable crops cultivated in Telangana State. In recent years, vegetables grown under shadenet and polyhouse in Telangana State underwent rapid expansion to minimize the impact of biotic and abiotic stresses. Technologies such as drip irrigation and fertigation can result in the effective utilization of water and fertilizers besides augmenting the productivity. Mulching controls weed incidence, reduces water, prevents nutrient loss thus improves hydrothermal regimes of soils.

Performance

Fertigation was given at 3 days interval in 43 splits under open field conditions with mulch, 50 splits under green shadenet and naturally ventilated poly house without mulch. Under naturally ventilated polyhouse, the highest total fresh fruit yield of tomato variety Heem Sohna was at application of 100% RDF by fertigation and irrigation at 0.8 Epan without mulch. Response to mulch (25 microns, dual coloured, black and silver) was not noticed under polyhouse condition.

Under green shadenet (35% mono x mono) condition, the highest total fresh fruit yield of tomato was recorded by application of 125% RDF (187.5-75-100 kg N-P_2O_5-K_2O/ha) by fertigation and irrigation at 0.6 Epan without mulch. Under open field condition, the highest fresh fruit yield was recorded by tomato with application of 80% RDF (120-48-64 kg N-P_2O_5-K_2O/ha) at 0.8 Epan with mulch.

Cost of Technology

The cost of technology is Rs. 39016/ha (Includes cost of fertilizers, water, mulch sheet, and their application/ laying) under open field conditions with mulch, Rs. 28636/ha green shadenet (Tape x Tape) and Rs. 21616/ha naturally ventilated poly house without mulch.

Impact and benefit

This technology of cultivating tomato under drip irrigation, fertigation increases the productivity and helps in conservation of resources and increasing income to the farmers.

Profitable tomato cultivation under open field, shadenet and polyhouse condition

Contact
Director
Water Technology Centre
Rajendranagar - 500 030
Hyderabad, Telangana State
Phone : 9440494019
E-mail : wtc.pjtsau@gmail.com

Effect of Micronutrients (Zn, Mg and B) Application on Cotton

Salient Features

Cotton is mainly grown as rainfed crop. Nutrients are not available at later stages of crop growth due to non availability of moisture (dry spells) or water logging. Under such situations foliar application is recommended instead of soil application. The advantages of foliar feeding are quick plant response and use of small quantity of nutrient, which will increase the yield and better fiber quality in cotton. Hence, there is need to supplement the plant with proper micronutrients along with recommended dose of fertilizer (RDF) nutrients as soil and or foliar to produce more number of flowers and to retain them on the plant to develop into bolls for final harvesting, so that yield can be increased considerably.

Performance

Significantly higher cotton seed yield (2811kg/ha) was recorded by two foliar sprayings of $ZnSO_4$ (0.2 %) at 30 and 45, Borax (0.2 %) at 45 and 60 and $MgSO_4$ (1%) at 60 and 75 along with RDF over RDF alone (2244 kg/ha) and RDF along with $ZnSO_4$, $MgSO_4$ and Borax (@ 50, 50 and 10 kg/ha each) as soil application (2735kg/ha) in red loamy soils with low available nitrogen, medium available phosphorus and potassium, and marginally available micronutrients (Zn, Cu, Fe and Mn) under rainfed condition.

Cost of Technology

Additional cost is Rs.1150/ha for foliar spray over the application of recommended dose of fertilizer (RDF).

Impact and Benefit

The advantages of foliar feeding are quick plant response, use of small quantity of nutrient, compensation for the lack of soil fixation, avoiding root uptake problems, increased yield and fiber quality in cotton.

Cotton crop under foliar feeding of micronutrients

Contact
Associate Director of Research
Regional Agricultural Research Station
Warangal-506007, Telangana State
Phone : 08702100236
E-mail : adrrars_wgl@yahoo.co.in

Rescheduling of Fertilizer Doses for Cotton for Rainfed Red Soils of Warangal District

Salient Features

Revision of fertilizer doses for different crops is essential with the changed soil fertility status, micronutrient deficiencies, buildup of some nutrients like phosphorus and change of cropping pattern or introduction of new varieties.

Performance

Higher seed cotton yield (1816 kg/ha) was recorded by the application of NPK (180-60-60 kg/ha) compared to seed cotton yield (1634 kg/ha) obtained with application of RDF @ NPK (120-60-60 kg/ha). The farmers can realize higher seed cotton yield (13%) by the application of NPK @180-60-60 kg/ha.

Cost of Technology

Additional cost is Rs. 900/ha (60 kg N/ha).

Impact and Benefit

Application of integrated use of optimal fertilizer dose was successful for improving and sustaining seed cotton yield and an additional income of Rs. 8190/ha can be realized by spending Rs. 900/ ha extra over the RDF/ha.

Cotton crop under rescheduled fertilizer doses

Contact
Associate Director of Research
Regional Agricultural Research Station
Warangal-506007, Telangana State
Phone : 08702100236
E-mail : adrrars_wgl@yahoo.co.in

Bridging Yield Gap of Soybean Through Site Specific Nutrient Management (SSNM)

Salient Features

Nutrient expert is an easy to use, interactive and computer based decision support tool that can rapidly provide nutrient recommendations for an individual farmer field in the presence or absence of soil testing data. It uses the principles of site-specific nutrient management (SSNM) and enables for farm advisors to develop fertilizer recommendations tailored to a specific field or growing environment.

Performance

Application of nutrients through SSNM/Nutrient expert system (24.8-55.5-57.6 kg/ha N, P_2O_5 and K_2O + 30-60 kg elemental S or 227-375 kg/ha gypsum as basal) produced comparable yield (2627 kg/ha) and remained at par with RDF (FYM @ 5 t/ha, 50-60-40 kg N, P_2O_5& K_2O (+) 50 kg/ha $ZnSO_4$ - 2809 kg/ha). The yield gap due to omission of nutrients from nutritional schedule indicated that the omission of N, P or K caused yield gap of 809 (N), 614 (P) and 336 (K) kg/ha.

Cost of Technology

There was little difference in the cost of fertilizer recommendation applied either through SSNM/Nutrient expert system and the recommended nutrient management practices.

Impact and Benefit

Application of nutrients through SSNM/Nutrient expert system produced comparable yield with RDF. Nitrogen is the major nutrient that influenced soybean yield and were followed by P & K. By adopting SSNM/Nutrient expert recommendation, other secondary or micro nutrients like zinc and sulphur deficiencies can be prevented.

Site Specific Nutrient Management (SSNM) in soybean

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Adilabad-504001, Telangana State
Phone : 08732-226863
E-mail : ars.adilabad@gmail.com

Foliar Application of Nutrients on Soybean to Raise Productivity

Salient Features

Split application of fertilizer or foliar application of nutrients at pod initiation stage (twice at one week interval) may be more economical in realizing higher yield in soybean rather than single application during sowing or soon after crop emergence.

Performance

The three year results revealed the significant influence of foliar nutrients applications (twice at one week interval during pod initiation) on soyabean yield. Branches, pod/plant and plant dry matter at 30, 45 or 60 days after sowing was highest when foliar nutrients of 2 % of NPK (19-19-19) was applied with recommended dose of fertilizers than other treatments. This treatment of RDF and 2% NPK (19-19-19) produced significantly higher yield of soybean seeds (2591 kg/ha). However, it was at par with RDF and 2% DAP (2416 kg/ha).

Higher soybean productivity under foliar nutrition at RDF

Cost of Technology

An additional cost of Rs.1550/ha is required for spray application of foliar nutrients (19-19-19/ Urea/DAP @ 2%) during pod initiation stage twice at one week interval.

Impact and Benefit

Foliar application of nutrients at pod initiation stage along with basal application of RDF is beneficial than sole RDF during sowing to realize additional seed yield in soybean.

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Adilabad-504001, Telangana State
Phone : 08732-226863
E-mail : ars.adilabad@gmail.com

Flubendiamide for the Management of Maize Pink Stem Borer

Salient Features

Pink stem borer, (Sesamia inferens) is a serious pest in peninsular India, limiting the production of maize during rabi season, causing considerable yield loss (25-79%). Yield losses are attributed to dead heart formation as a result of early attack (10-20 days old crop), on the stem, immature cobs and tassels. The widely used insecticides against pink stem borer with banned Endosulfan warrant identification of new and more effective molecules.

Performance

A prophylactic spray of Flubendiamide 480 SC @ 0.2 ml/l of water on 12-15 days old maize crop provided effective control of pink stem borer with mean leaf injury rating of 2.7 compared to 6.6 in the untreated control and gave yield advantage of 40 q/ha under irrigated conditions during rabi season.

Cost of Technology

The cost of one spray application of Flubendiamide is Rs. 1,700/ha (@100 ml/ha) .

Impact and Benefit

Flubendiamide belonging to Diamide group acts on Ryanodine receptors in insect muscles causing immediate cessation of feeding and thus prevents any crop damage. This unique mode of action makes the compound well suited as a tool in insect resistance management programme. Hence, Pink stem borer can be effectively managed at early stage of the crop during rabi season.

Treated crop

Untreated crop

Contact
Principal Scientist (Plant Breeding) & Head
Maize Research Centre
ARI, Rajendranagar
Hyderabad-500030, Telangana State
Phone : 9866653568
E-mail : mrcari@rediffmail.com

Influence of Insecticides on Seed Quality and Insect Damage During Storage

Salient Features

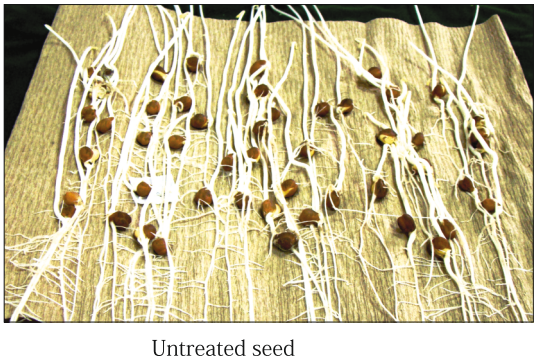
Seed treatment with one or more pesticides is the most economic and efficient way to protect the seed from pests and improve seed quality. Protection of seed against pests should not be at the expense of seed viability and vigour. Effective chemical insecticides and botanicals are hence needed to be identified.

Performance

Among the various insecticides tested, Emamectin benzoate 5 SG @ 2 ppm (40 mg/kg seed), Deltamethrin 2.8 EC @ 1.0 ppm (0.04 ml/kg seed) and the botanical Acorus calamus @ 10 ml per kg of paddy seed were able to restrict insect damage within permissible limit (0.5 %) and resulted in 100 per cent cumulative mortality of Sitotroga cerealella adult within 5 days of release up to six months of storage. Also, all the treatments maintained seed germination (82-87%) above IMSCS (Indian Minimum Seed Certification Standard-80%) up to nine months of storage. Similar results were recorded in bengalgram, wherein these three treatments restricted Callosobruchus chinensis damage within permissible limit (<1.00%) and maintained germination above 85%. Botanical of Acorus calanus can be effectively used to retain seed quality and prevent insect damage upto six months in storage.

Treated seed

Germination of treated and untreated bengalgram seeds by Acorus calamus



Untreated seed

Cost of Technology

The cost towards seed treatment is Emamectin Benzoate- Rs. 340/t (@40 g/t); Deltamethrin- Rs. 26/t (@40 ml/t); and botanical of Acorus calamus - Rs. 11,000/t (@10L/t).

Impact and Benefit

Although chemical insecticides are cost effective, botanicals have long been touted as attractive alternatives to synthetic chemical pesticides for pest management as they pose little threat to environment and to human health. Botanicals act as antifeedants, repellents and toxicants and best suited for use in organic food production.

Contact
Director
Seed Research & Technology Centre
Rajendranagar- 500 030
Hyderabad, Telangana State
Phone : 040-29705382
E-mail : srtcpjtsau@gmail.com

Pre-harvest Management of Pulse Beetle in Redgram with Insecticidal Sprays

Salient Features

Bruchids are the main pests of stored pulses that lay eggs in the field before harvest and get manifested during storage and cause pronounced loss. Controlling these pests in the field prevents them from entering godown and spreading further to un-infested seeds. Pre harvest sanitation spray is a novel method to arrest these insects in the field itself thereby delimiting the damage during storage.

Performance

Among the insecticides tested, the lowest adult emergence was observed in the treatment Profenophos 50 EC @ 1ml/l which was on par with Emamectin benzoate @ 0.3 ml/l when sprayed at 50% pod maturity and maturity stages.

Cost of Technology

The cost of one pre-harvest spray application of Profenophos is Rs. 300 /ha (@500 ml/ha) and that of Emamectin benzoate is Rs. 1,275/ha (@150 mg/ha) .

Impact and Benefit

Profenophos 30 EC, is a broad spectrum insecticide with ovicidal and adulticidal activity, long lasting activity, while Emamectin benzoate, a novel insecticide is effective at very low rates mainly through ingestion, causing paralysis of insect due to the activation of chloride channel at nerve level. The toxicity and eco-toxicity properties make them compatible with modern integrated pest management programmes.

Efficacy of insecticide against pulse beetle in redgram

Contact
Director
Seed Research & Technology Centre
Rajendranagar- 500 030
Hyderabad, Telangana State
Phone : 040-29705382
E-mail : srtcpjtsau@gmail.com

Seed Dressing : an Effective Management Strategy to Maintain Seed Health in Soybean

Salient Features

Maintenance of seed viability and vigour during storage seems to be a challenging task in soybean. One of the important reason for this is seed associated pathogens that cause rapid deterioration in seed especially during storage under ambient conditions. To avoid seed borne infections that occur during storage or carried through field, it is essential to find out a suitable and economical management strategy. Keeping this in view, a set of fungicides were tested for their efficacy against seedborne infections in soybean.

Performance

Seed treatment with a combination fungicide Carboxin 37.5% + Thiram 37.5% (Vitavax power) @ 3g/kg at immediately after processing and before placing the seed in storage was found effective in improving seed germination and seedling vigour by minimizing seedborne infections and seed rots in soybean upto 14 months after storage.

Cost of Technology

Rs. 375/ha.

Impact and Benefit

Seed treatment with Carboxin 37.5% + Thiram 37.5% in soybean has improved the seed quality parameters viz., germination and seedling vigour by maintaining good seed health status under extended storage conditions. The technology is scalable from an individual soybean growing farmer to seed industries.

Effect of seed dressers on seed germination of soybean

Effect of seed dressers on seed health status of soybean under glass house condition

Contact
Director
Seed Research & Technology Centre
Rajendranagar- 500 030
Hyderabad, Telangana State
Phone : 040-29705382
E-mail : srtcpjtsau@gmail.com

Insecticide-Herbicide Combinations to Manage Pests and Weeds of Soybean

Salient Features

Tank mix application of both post-emergence herbicide Imazethapyr 10% SL @ 1.0 L/ha and insecticide Rynaxypyre20 SC @ 100 ml/ha was tested for three years in soybean at 15-20 days after sowing (DAS) to control all categories of weeds and the most important pests of soybean (stemfly and girdle beetle) during the early crop growth stages.

Performance

The combined application at 20 DAS with Imazethapyr 10 SL @1.01 l/ha along and Rynaxypyre 20 SC @ 100 ml/ha was effective in controlling both weeds and pests without any hazardous effect on soybean. Imazethapyr and Rynaxypyre when applied together showed high weed control efficiency at 30 DAS (82%) and 45 DAS (90%). It also produced the highest seed yield (2036 kg/ha) as compared to combined application of Indoxacarb 14.5 SC @ 300 ml/ha (1599 kg/ha) or Quninalphos 25 EC @ 4.5 l/ha (1413 kg/ha).

Cost of Technology

An additional cost of Rs.2500/ha can be saved with combined application of insecticide and post emergence herbicide at three weeks crop growth stage.

Impact and Benefit

Under cost reduction technology in soybean, tank mix or combined application of post-emergence herbicide along with insecticide was more economical than individual applications during three weeks crop growth stage for controlling weeds as well as stemfly/girdle beetle in soybean.

Management of pest and weeds through insecticide-herbicide combination

Contact
Senior Scientist (Agronomy) & Head
Agricultural Research Station
Adilabad-504001, Telangana State
Phone : 08732-226863
E-mail : ars.adilabad@gmail.com

Mechanization in Redgram Cultivation

Salient Features

Mechanization is a technological improvement in agriculture. It has a great demand in agriculture sector due to labour shortage and increased wage rates. These are the two major problems that affect the sustainability of agriculture and render farming as a less prioritized occupation of the young population. Mechanization aids to complete farm operations on time and to reap higher yields per unit area.

Performance

Mechanization in redgram cultivation by sowing with seed drill, weeding with power operated tiller, intercultivation with rotovator mounted on a baby tractor, plant protection spray application with boom sprayer mounted to baby tractor and harvesting with combined harvester (with small modifications) was found to be a resource saving method for large scale adoption compared to normal method of cultivation by sowing with gorru, manual weeding and intercultivation with guntaka, manual spraying with Taiwan sprayer and harvesting by labour.

Cost of Technology

Cost of cultivation for normal method is Rs. 19,750/ha and for mechanization is Rs. 14,750/ha. There is a net saving of Rs. 5000 /ha.

Impact and Benefit

Seed to seed mechanization in redgram cultivation can save Rs. 5,000/ha compared to normal method of cultivation under labour scarce condition.

Sowing redgram with a seed drill

Insecticide spraying with a boom sprayer mounted on a baby tractor

Contact
Principal Scientist (Agronomy) & Head
Agricultural Research Station
Tandur-501141, Vikarabad District
Telangana State
Phone : 9959807891
E-mail : arstandur@gmail.com

Technology Transfer for Commercial Processing Methods for Underutilized Fruits and Vegetables

Salient Features

Indigenous underutilized fruits and vegetables found in the North eastern hilly regions of India are rich sources of vitamins, minerals, antioxidants and bioactive compounds which are used as folk medicine by tribal people (166 tribes). An effort has been made to design value added products from under exploited crops like Tree bean (Parkia roxburghii), Kachai Lemon (Citrus jambhiri), Bay leaf (Cinnamon tamala), Prunes (Prunus nepalensis), Kokum (Garcinia indica) and King chilli (Capsicum chinense). The objective was to address the challenges posed by the involvement of middle men in supply chain and establish appropriate processing techniques for the crops and develop nutraceutically rich functional foods.

Performance

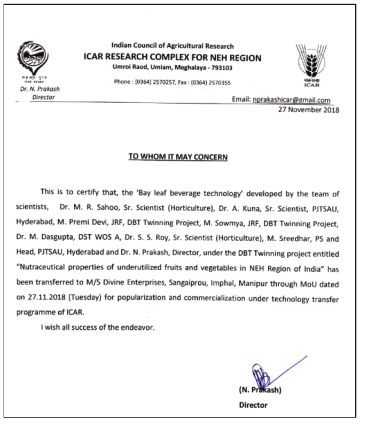
A total 84 processing technologies were developed including primary and secondary processing methods. The standardized technologies were validated and modules for commercialization have been developed. The deliverables of this work have given insight into sustainable development of functional foods by exploring underutilized crop species besides, retaining the nutritive values, to address the challenge of food and nutritional security and economic stability of the farmers.

Cost of Technology

Rs.1.2 lakhs to Rs. 2.6 lakhs for production of 1000 to 1250 kgs product per month. Rs.2.6 lakhs to Rs.5.5 lakhs for purchase and installation of processing equipment in 500 to 1000 sq.ft. area.

Impact and Benefit

Novel processed products such as Bay leaf beverage, Biryani cubes, spice powders, Tree bean spice powder, Tree bean RTE snacks; Prunus ice cream topping, Prunus crush, museli, health mix, weaning mix, osmotic dehydrated flakes; King chilli toffee, candy, curry paste, pickle, spice powders, Kachai lemon pickle, squash etc. have been developed. The bay leaf beverage technology has been transferred to M/S Divine Enterprises, Sangaiprou, Imphal, Manipur on 27/11/2018 and health mix, weaning mix and king chilli chocolates are transferred to M/S Green Biotech Ecosolutions Pvt. Ltd. Imphal, Manipur on 18/05/2019 through MoU for popularization and commercialization. Bay leaf Tea products are launched in Manipur market with brand name "Wild Urban" and is sold as a souvenir product. These technology transfers are testimony to commercialization of technologies through entrepreneurial development.



Indian Council of Agricultural Research
ICAR RESEARCH COMPLEX FOR NEH REGION
Umroi Raod, Umiam, Meghalaya - 793103
Phone : (0364) 2570257, Fax : (0364) 2570355
Dr. N. Prakash
Director
Email: nprakashicar@gmail.com
27 November 2018

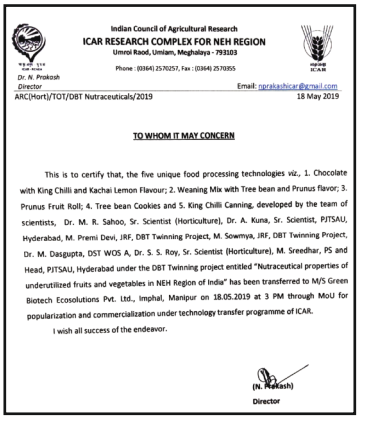
TO WHOM IT MAY CONCERN

This is to certify that, the 'Bay leaf beverage technology' developed by the team of scientists, Dr. M. R. Sahoo, Sr. Scientist (Horticulture), Dr. A. Kuna, Sr. Scientist, PJTSAU, Hyderabad, M. Premi Devi, JRF, DBT Twinning Project, M. Sowmya, JRF, DBT Twinning Project, Dr. M. Dasgupta, DST WOS A, Dr. S. S. Roy, Sr. Scientist (Horticulture), M. Sreedhar, PS and Head, PJTSAU, Hyderabad and Dr. N. Prakash, Director, under the DBT Twinning project entitled "Nutraceutical properties of underutilized fruits and vegetables in NEH Region of India" has been transferred to M/S Divine Enterprises, Sangaiprou, Imphal, Manipur through MoU dated on 27.11.2018 (Tuesday) for popularization and commercialization under technology transfer programme of ICAR.

I wish all success of the endeavor.

(N. Prakash)
Director

Memorandum of understanding for popularization and commercialization of technology



Indian Council of Agricultural Research
ICAR RESEARCH COMPLEX FOR NEH REGION
Umroi Raod, Umiam, Meghalaya - 793103
Phone : (0364) 2570257, Fax : (0364) 2570355
Dr. N. Prakash
Director
Email: nprakashicar@gmail.com
ARC(Hort)/TOT/DBT Nutraceuticals/2019
18 May 2019

TO WHOM IT MAY CONCERN

This is to certify that, the five unique food processing technologies viz., 1. Chocolate with King Chilli and Kachai Lemon Flavour; 2. Weaning Mix with Tree bean and Prunus flavor; 3. Prunus Fruit Roll; 4. Tree bean Cookies and 5. King Chilli Canning, developed by the team of scientists, Dr. M. R. Sahoo, Sr. Scientist (Horticulture), Dr. A. Kuna, Sr. Scientist, PJTSAU, Hyderabad, M. Premi Devi, JRF, DBT Twinning Project, M. Sowmya, JRF, DBT Twinning Project, Dr. M. Dasgupta, DST WOS A, Dr. S. S. Roy, Sr. Scientist (Horticulture), M. Sreedhar, PS and Head, PJTSAU, Hyderabad under the DBT Twinning project entitled "Nutraceutical properties of underutilized fruits and vegetables in NEH Region of India" has been transferred to M/S Green Biotech Ecosolutions Pvt. Ltd., Imphal, Manipur on 18.05.2019 at 3 PM through MoU for popularization and commercialization under technology transfer programme of ICAR.

I wish all success of the endeavor.

(N. Prakash)
Director

Contact
Principal Scientist (Plant Breeding) & Head
MFPI – Quality Control Laboratory
Rajendranagar, Hyderabad-500030
Telangana State
Phone : 040-24013456
E-mail : qclab_2008@rediffmail.com

ANNEXURE

List of Technologies Developed from Southern Telangana Zone		
S.No	Technologies	Research Station and Scientist Contributed
1.	Drought Affected Mandals to Guide Development of Resilient Farming Practices in Telangana	**Agro Climatic Research Centre (ACRC) Rajendranagar** Dr. G. Sreenivas, Dr. B. Balaji Naik and Dr. S.G. Mahadevappa
2.	Integration of Seasonal and Medium Range Weather Forecast for Climate Risk Management in Major Crops of Telangana	**Agro Climatic Research Centre (ACRC) Rajendranagar** Dr. G. Sreenivas, Dr. B. Balaji Naik and Dr. S.G. Mahadevappa
3.	Paired Row Planting for Yield Maximization of Redgram	**ARS, Tandur** Dr. C. Sudha Rani, Dr. C. Sudhakar and Smt. K. Sandhya Rani
4.	Fodder Oat Production in Telangana Under Irrigated Conditions	**AICRP on Forage Crops & Utilization, R'nagar** B. Murali, Dr. R. Susheela, Dr. M. Shanti and Dr. T. Shashikala
5.	Mechanization in Redgram Cultivation	**ARS, Tandur** Dr. C. Sudha Rani, Dr. C. Sudhakar and Smt. K. Sandhya Rani
6.	Nutrient Management in Rice-Maize Cropping Systems Under Different Tillage Practices	**Maize Research Centre, Rajendranagar** Dr. D. Sreelatha, Dr. P. Surendra Babu, Dr. M. Chandini Patnaik and Dr. T. Srijaya
7.	Optimization of Fertigation for Tomato Under Different Irrigation Levels With and Without Mulch in Open Field, Shadenet and Polyhouse Condition	**Water Technology Centre, Rajendranagar** Dr. M. Uma Devi , K. Chaitanya, Dr. Ibrahim Khaleel, Dr. Srinu, Mrs. C. Deepika, Mrs. G. Swathi, Dr. A. Krishna Chaitanya, Dr. K. Avil Kumar, Dr. V. Ramulu and Dr. K. Srinivas
8.	Flubendiamide for the Management of Maize Pink Stem Borer	**Maize Research Centre, Rajendranagar** Dr. M. Lava Kumar Reddy, Dr. S. Ameer Basha and Dr. B. Mallaiah
9.	Influence of Insecticides on Seed Quality and Insect Damage During Storage	**Seed Research & Technology Centre Rajendranagar** Dr. A. Padmasri, Dr. T. Pradeep and Dr. M.V. Nagesh Kumar
10.	Pre-harvest Management of Pulse Beetle in Redgram with Insecticidal Sprays	**Seed Research & Technology Centre Rajendranagar** Dr. A. Padmasri, Dr. T. Pradeep and Dr. M.V. Nagesh Kumar

ANNEXURE

List of Technologies Developed from Southern Telangana Zone

S.No	Technologies	Research Station and Scientist Contributed
11.	Seed dressing : An Effective Management Strategy to Maintain Seed Health in Soybean	**Seed Research & Technology Centre, R'nagar** Dr. B. Pushpavathi, Dr. M. Madhavi, Dr. V. Bharathi, Dr. T. Pradeep and Dr. M. V. Nagesh Kumar
12.	Technology Transfer for Commercial Processing Methods for Underutilized Fruits and Vegetables	**MFPI – Quality Control Laboratory Rajendranagar** Dr. K. Aparna and Dr. M. Sreedhar

List of Technologies Developed from Central Telangana Zone

S.No	Technologies	Research Station and Scientist Contributed
13.	Pigeonpea- a Remunerative Option to Replace Cotton Under Protected Irrigation	**RARS, Warangal** Dr. G. Veeranna, Smt. Ch. Pallavi, Dr. P. Jagan Mohan Rao, Dr. G. Padmaja and Smt. Tabassum Fatima
14.	Response of Different Maturity Groups of Pigeonpea to Protective Irrigations	**ARS, Tornala** Dr.Y. Sivalakshmi, Dr. M. Vijaya Sai Reddy, Dr.R.Susheela, D.Sravanthi, D. Swetha and Dr. A.V. Ramanjaneyulu
15.	Nipping in Pigeonpea Technology - to Enhance Yield	**RARS, Warangal** Dr. G. Veeranna, Smt. Ch. Pallavi, Dr. P. Jagan Mohan Rao, Dr. G. Padmaja and Smt. Tabassum Fatima
16.	Comparable Crops to Maize Under Rainfed Situations of Medak	**ARS, Tornala** Dr. Y. Sivalakshmi, Dr. M. Vijaya Sai Reddy, Dr. R. Susheela, D. Sravanthi, D. Swetha and Dr. A.V. Ramanjaneyulu
17.	Moisture Conservation Practices to Enhance Productivity in Maize	**ARS, Tornala** Dr. Y. Sivalakshmi, Dr. M. Vijaya Sai Reddy, Dr. R.Susheela, D. Sravanthi, D. Swetha and Dr. A.V. Ramanjaneyulu
18.	Efficient Chemical Treatments to Enhance Germination in Sugarcane During Low Night Temperatures	**ARS, Basanthpur** Dr. M. Vijay Kumar, Dr. G.S. Madhu Bindu and G. Vijaya Lakshmi

ANNEXURE

List of Technologies Developed from Central Telangana Zone		
S.No	Technologies	Research Station and Scientist Contributed
19.	Effect of Micronutrients (Zn, Mg and B) Application on Cotton	**RARS, Warangal** Dr. Ch. Ramulu and Dr. P. Raghu Rami Reddy
20.	Rescheduling of Fertilizer Doses for Cotton for Rainfed Red Soils of Warangal District	**RARS, Warangal** Dr. Ch. Ramulu, Dr. G. Veeranna and Dr. P. Raghu Rami Reddy
List of Technologies Developed from Northern Telangana Zone		
S.No	Technologies	Research Station and Scientist Contributed
21.	Effect of Dates of Sowing on Pigeonpea Under Rainfed and Irrigated Conditions	**RARS, Jagtial** Sri P. Madhukar Rao, Dr. P. Revathi, Dr. B. Balaji Naik and Dr. R. Uma Reddy
22.	Optimum Planting Density and Fertilizer Level for Increased Grain Yield in Maize	**ARS, Karimnagar** Dr.G.Manjulatha and Dr. E. Rajnikanth
23.	Effective and Economic Row Ratio for Seed Production of Single Cross Maize Hybrid, Karimnagar Makka 1 (KNMH 4010131)	**ARS, Karimnagar** Dr. G. Manjulatha, Dr. E. Rajnikanth and Dr. D. Sravani
24.	Profitable Intercrops in Sugarcane Grown in Northern Telangana Zone	**RS & RRS, Rudrur** Smt. Firdoz Shahana, Dr. U. Nagabhushanam and Dr. B. Joseph
25.	Sustainable Soybean Production Through Crop Diversification and Tillage Systems	**ARS, Adilabad** Dr. Sreedhar Chauhan and Dr. M. Rajendar Reddy
26.	Row Spacing and Seed Rate for Yield Enhancement in Soybean	**RS & RRS, Rudrur** Smt. Firdoz Shahana and Dr. B. Joseph
27.	Bridging Yield Gap of Soybean Through Site Specific Nutrient Management (SSNM)	**ARS, Adilabad** Dr. Sreedhar Chauhan and Dr. M. Rajendar Reddy
28.	Foliar Application of Nutrients on Soybean to Raise Productivity	**ARS, Adilabad** Dr. Sreedhar Chauhan and Dr. M. Rajendar Reddy
29.	Insecticide-Herbicide Combinations to Manage Pests and Weeds of Soybean	**ARS, Adilabad** Dr. Sreedhar Chauhan and Dr. K. Sukumar


PG LIBRARY
Striving for a greener tomorrow...