

PROCEEDINGS OF INSTITUTE RESEARCH COMMITTEE MEETING-2017

Inaugural Session: Institute Research Committee (IRC) meeting was held under the Chairmanship of Dr. D. Damodar Reddy, Director, ICAR-CTRI during 9-11 August, 2017. In the inaugural session on 09-08-17, Dr. Y. Subbaiah (Principal Scientist), welcomed the delegates. The Chief Guest, Dr. K. Deo Singh (Former Director, ICAR-CTRI), Director, ICAR-CTRI inaugurated the IRC by lightening the lamp. Dr. C. Chandrasekhara Rao (Member Secretary, IRC) welcomed the delegates, experts, Tobacco Board officials, Trade members and informed about the purpose and function of IRC.

Dr. D. Damodar Reddy welcomed all the delegates and placed on record his gratitude to the Secretary, DARE & Director General, ICAR for his message. The Chairman highlighted the revised mandate of the institute, approved ongoing projects (27 in-house and 4 external projects), research achievements during 2016-17 viz., with respect to new varieties released, drought management strategies, high density planting, evaluation of new insecticides, tray seedlings, tobacco stalk biochar, solar energy for curing, tobacco seed oil refinement and pre clinical toxicological evaluation. He mentioned about filling of scientific strength with seven additional staff. He informed about the achievements in pulses seed hub of the institute and also on proposed construction of seed processing cum storage facility for pulses. He appreciated the scientists for bagging several prestigious awards in recognition of their significant contributions. He made a note on RAC recommendations of the institute like tobacco germplasm core collections, solar energy for curing, minimizing *orobanche* menace, soil fertility mapping and online fertiliser recommendation, pest and disease management and assessment of socio-economic impact of tobacco and ICAR-CTRI. The infrastructure created in the institute, celebration of scientific days and significant contributions of scientists in the form of national and international publications was also presented.

Dr. K. Deo Singh, Chief guest, in his introductory remarks while complimenting ICAR-CTRI progress till date, he stressed the need for improving the productivity and enhancing the net returns to the farmers by exploiting the genetic potential, adoption of modern biotechnological tools, Good Agricultural Practices and new analytical techniques. He emphasized the need to develop flavourful varieties, improving the fuel use efficiency, reduction of TSNA and quality tobacco production. The progress on research efforts on tobacco seed oil for human consumption was very much appreciated. He emphasized to intensify the efforts to strengthen collaborations with Tobacco Board and Trade for proper dissemination of identified technologies to reach the unreached. He has expressed his anguish and deep concern on continuous increase in cost of cultivation of tobacco and fluctuation in prices and flagged the issue relating to identification of viable alternative crops to replace tobacco crop especially in the low productive zones. Dr. Singh urged scientists to identify the ways and means in reducing fuel consumption for tobacco curing which will be a revolutionary in tobacco research.

He mentioned about the diversified uses of tobacco and stressed upon the need to give due importance to non-FCV tobacco. At the end Dr. Singh expressed confidence over the proactive steps of ICAR-CTRI to cope up with new challenges in the present conflicting tobacco scenario.

Tobacco Scientist- Farmer-Board-Trade Interface

Tobacco Scientist- Farmer-Board-Trade Interface was organized on 9-08-2017 with an objective of eliciting the views of the stake holders on issues related to tobacco cultivation. At the outset, Dr. Y. Subbaiah, Principal Scientist, CTRI welcomed dignitaries and participants. Scientists of ICAR-CTRI, officials from Tobacco Board and Trade and tobacco farmers from NLS, SLS, SBS areas of Andhra Pradesh were special invitees to participate in the interface meeting. Dr. D. Damodar Reddy, Director, ICAR-CTRI, the Session Moderator briefed the delegates about the objectives of the interface. He appealed to farmers to put forth their field level constraints in tobacco cultivation and to interact with the scientists to get solutions. Some of the issues to be deliberated in the meeting were current tobacco production constraints and auctions-outlook for future, FCV tobacco curing-powered by solar energy, *orobanche* and its management, tobacco industry and trade related researchable issues, field level constraints for tobacco production. Two external experts were invited to deliver lectures, Dr. V. Vishnuvardhan Reddy (Director, METAS, Solar Project Services, Hyderabad) and Dr. C. Chinnuswamy (Professor, Agronomy, TNAU, Coimbatore).

On reduction of crop size by the Tobacco Board during 2014-15, 40,000 ha was made available for other crops. Regarding current tobacco production, moderator raised discussion of fixation of crop size by Tobacco Board and to reduce tobacco production in a gradual and consistent manner in the long run. Added to this, he made a mention on lack of drought resistant varieties in Karnataka, farmers demand for hybrids suitable to SLS & SBS areas, use of drip irrigation for tobacco, CPA residues, *orobanche* menace and fluctuation in prices.

Dr. B.N. Mitra, Extension Manager, Tobacco Board, made a mention that left over stock of FCV tobacco to be sold in NLS is 45 million kg and in SLS & SBS is 15 million kg and expressed concern over excess production by citing the example of Karnataka where the crop size for 2016-17 fixed was 95 million kg, but actual production was 105 million kg. Added to this, he said that the average price of FCV tobacco for 2016-17 in NLS is Rs 157-160/kg and in SLS & SBS is Rs 117-120/kg. He further stated that the percentage of quality leaf produced in the current year is 35% as against in the 55% last year.

Dr. Damodar Reddy mentioned about the situation of *Bidi* tobacco in Gujarat where in the area and production are continuously increasing. He has also mentioned about the delayed plantations of FCV tobacco due to late onset of rainfall in SLS and *orobanche* infestation and enquired the farmer representatives about their views to shift to alternative crops.

Mr. G. Konda Reddy, farmer representative from SLS was of the opinion that of other crops are not giving the expected profits to the farmers due to water scarcity, animal menace, price fluctuations and also uncertainty in payments. He expressed concern over the fluctuation in yield due to weather vagaries and explained that few farmers made efforts to cultivate Jute which failed due to low yield. In his opinion, tobacco comparatively gives higher returns than other crops. Added to this, the other farmer K.VenkataRao from the same region was of the view that financial security from tobacco cultivation improved their livelihood status and comparatively better education to children. He mentioned that he was habituated to cultivate tobacco eventhough it is highly labour intensive and is a year round activity. He stated that even in tobacco cultivation, the farmers face loss at times, but on

the other side there is no guarantee in terms of yield and price for other crops due to water scarcity in their regions. He also mentioned that financial rotation is possible with tobacco cultivation due to institutional support and this helps in meeting their basic needs.

Dr. Damodar Reddy enquired about the shifting to other crops in NLS area due to reduction in crop size. He opined that as there is no water scarcity in NLS area the farmers might have gone for alternative crops, in that case what might be the experience of those shifted farmers.

Mr. G.Satyanarayana, Member Tobacco Board from NLS explained that scheduled banks are extending financial support to the farmers having a structured barn and who wish to cultivate tobacco. This stimulates farmers to go for tobacco than other crops. At present, due to fixation of crop size, big farmers are opting towards palm oil, coconut, cocoa, eucalyptus, ground nut, red gram and maize. Even in these shifted crops, the returns are not stable due to fluctuation in yield, prices, weather conditions and demand for the produce in the market but, tobacco gets recovery at least once in 5 years. He stated that big farmers can shift to other crops but it is not possible for small farmers. He stressed that if it is to be shifted to crops than tobacco, there should be assured price fixation to farm produce and easy finance for other crops.

Shri. B.N.Mitra, Manager (Extension), Tobacco Board, informed that in SLS & SBS areas a part of the area is shifted to crops other than tobacco viz., red gram, bengal gram. But he expressed his concern on price reduction and farmer dissatisfaction to those commodities in the current year.

Dr. M. Mani, Chief Scientist, ITC-ILTD emphasized the need for development of drought tolerant varieties and also to develop a series of good agricultural practices to be followed under extreme weather conditions.

Dr. Prabhakar, GPI mentioned that the price fluctuations are more in FCV tobacco, whereas the price is stable for Vinukonda burley and the future is bright for Non-FCV tobacco farmers. Further he added, the low grades of FCV tobacco were not given remunerative price this year and the bright grades obtained were only 30%. Dr. Prabhakar GPI requested the institute to standardize package of practices for Vinukonda Burley.

Mr. Punith from GPI mentioned that they have taken initiative in developing farm profile for tobacco farmers, in response to this Dr. Damodar Reddy asked to share software with the institute for making systematic study.

With regard to FCV tobacco curing powered by solar energy, Dr. V. Vishnuvardhan Reddy, invited speaker, highlighted the importance of curing with solar energy, technological constraints and its opportunities. He explained about the possibilities of bulk curing with solar energy and need to establish the bulk curing barns with solar energy. The issues on cost, economics, comparison of fire wood and solar curing, feasibility of solar curing for small farmers, percent of extra bright grades from solar cured barns, possibility of renovation of the existing barns with solar curing was elaborately discussed. It was decided to discuss the issue at length by all the stake holders *viz.*, the CTRI-Tobacco Board-Trade to work on solar energy.

Dr. C. Chinnuswamy, invited speaker, given elaborate presentation on *orobanche* in view of its emerging seriousness in tobacco cultivation and touched aspects like extent of infestation, *orobanche* damage in other crops, biological characteristics of *OrobancheCernua* and integrated management methods. He further emphasized on strict vigil and our preparedness to tackle such problems effectively. The issues on pre-plant application to control *orobanche*, concept of crop rotation, germination of *orobanche* seed from root exudates of tobacco, interaction of VAM and *orobanche* was discussed.

The inaugural session was ended with the concluding remarks by the Chairman and he appreciated the valuable and constructive suggestions given by the invited experts and scientists. At the end, Dr. Y. Subbaiah proposed vote of thanks to the Chair, Invited Experts and all members.

Technical sessions:

IRC technical sessions viz., Crop Improvement, Crop Production, Crop Protection, Crop Chemistry and Soil Science were conducted from the 19-08-2017 afternoon to 11-08-2017 afternoon. In each session, Division Head presented the achievements, subsequently the scientists of the each division presented the salient achievements of their respective, proposed plan of work and also new projects, if any. Project wise achievements and recommendations are presented below.

Presented By	Project Title & Code	Research highlights	IRC recommendation
Dr. K. Sarala	Br-2: Evolving superior varieties of FCV tobacco through hybridization	<ul style="list-style-type: none"> • V-5061 (2478 kg/ha) and V-5136(2346 k/ha) were found superior to checks with respect to leaf yield in replicated yield trials (2346 kg/ha). • Among the bulks tested entries FCR-3 (2356kg/ha) and FCR-17 (2250kg/ha) are found superior along with two checks with higher cured leaf yield and grade index. • Two replicated yield trials were conducted with 24 advanced cross derivatives and 12 lines having promise for leaf yield and quality were identified. • In screening of <i>Nicotiana</i> species for <i>Orobanche</i> resistance, two wild species identified as resistance to <i>Orobanche</i> and one tolerant. 	<ul style="list-style-type: none"> • The House accepted the proposal to continue the project for the year 2017-18 • The <i>Orobanche</i> resistance <i>Nicotiana</i> species may be screened at Hunsur and Kandukur for confirming their resistance. • The proposal to include Dr. K. Bagyalakshmi, Scientist as Co-PI in the project was accepted. Further, her services will be utilised in germplasm maintenance and other breeding related activities.
Dr.K.Sarala	Biotech-6 : Molecular Mapping of Important	<ul style="list-style-type: none"> • Three immortal mapping populations (RILs) viz., HDBRG x BY 	<ul style="list-style-type: none"> • The House accepted the proposal to close the project after completing the on-going

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	Tobacco traits	<p>53, Candel xNisnicotinony 121 and A 145 x Jayalakshmi (WS) developed for important tobacco traits viz., solanesol, nicotine and seed oil were maintained.</p> <ul style="list-style-type: none"> • Mapping population were characterised for nicotine and solanesol contents. <p>DNA barcodes were developed using trnH-psbA and ycf1 for 24 <i>Nicotiana</i> species belongs to 13 different sections of sub genus <i>rustica</i>, <i>tabacum</i> and <i>petunioides</i></p>	<p>analysis.</p> <ul style="list-style-type: none"> • The high solanesol / nicotine yielding lines developed in the project may be tested in row trials for assessing their promise
Dr.K.Prabhakara Rao	Biotech-11: Biogenesis and regulation of TSNA (Tobacco Specific Nitrosamines) in tobacco	<ul style="list-style-type: none"> • Analysis of the expression database revealed that CYP genes associated with the TSNA regulation CYP82E2, CYP82E3, CYP82E4, CYP82E5 and CYP82E10 are differentially expressed in various tissues. • The isoforms of CYP82E2 and CYP82E10 with 96% similarity were identified from <i>Nicotianaattenuata</i> sequenced genome. 	The House accepted the proposal to continue the project for the year 2017-18.
Dr. A.V.S.R.Swamy,	JL.Br.2.1: Evolving flue-cured tobacco variety having high yield and better quality suitable	<ul style="list-style-type: none"> • In row trials, out of 80 lines assessed, 47 morphologically superior lines identified. 	The House accepted the proposal to continue the projects for the year 2017-18

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	for NLS area of Andhra Pradesh	<ul style="list-style-type: none"> • In replicated yield trials, RT-16-3 (2944 kg/ha), RT-20-1 (2711 kg/ha) were found superior. FCJ-15, FCJ-7 and FCJ-11 found superior in bulk trials than Kanchan. 	
	B- 50: Breeding non-FCV tobacco types for desirable traits	<ul style="list-style-type: none"> • Irrigated <i>Natu</i> tobacco entries, NF7-8 (1150 kg/ha) and NF7-1 (894 kg/ha) found superior in replicated yield trial. • YB-28 (2540 kg/ha) exhibited superior yields among all the burley entries tested in replicated yield trial. • YB-19 and YB-22 were superior among the lines tested in bulk trial. • Chewing Tobacco selection, F6 2-2 gave higher seed yield at Vedesandur. 	<ul style="list-style-type: none"> • The House accepted the proposal to continue the projects for the year 2017-18 • The advanced breeding lines can be added in the germplasm maintained at the main station CTRI, Rajahmundry. • YB 19 may be screened at Vinikonda region for its suitability • YB 22 may be assessed for TSNA
P.Venugopala Rao	K Br- 6: Breeding FCV tobacco varieties for yield and quality characters under SLS condition	<ul style="list-style-type: none"> • 19 light cast and eight medium cast advanced breeding lines identified for further evaluation • Sixty Aphid tolerant selections and 32 caterpillar resistant lines selected for further evaluation 	<p>The House accepted the proposal to continue the project for the year 2017-18</p> <p>Among the 19 selected lines, 10-12 top performing medium cast lines may be assessed in replicated trial. While selecting lines, entries showing leaf tip burning symptoms may be avoided.</p>

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		Generation advancement made in drought tolerant breeding material	Emphasis may be given for breeding drought tolerant varieties/hybrids. The breeding material involving drought tolerant parents may be screened for water stress. N 98, a drought tolerant variety can be promoted for drought prone areas.
C. Nanda	BR 19: Breeding for developing high yielding and/or disease resistance varieties/hybrids and evaluation of advanced breeding lines of FCV tobacco suitable to Karnataka Light Soil region	<ul style="list-style-type: none"> • Out of 21 crosses tested, seven found superior to check Kanchan for leaf yield. • Two advanced breeding lines viz., FCH-246 and FCH-248 were found to be promising in RYT. • Hybrid, KLSH-10 performed better than the checks in the bulk trial and OFT. <p>Nine entries found to be resistant to TMV and crosses made to initiate TMV resistance breeding.</p>	<ul style="list-style-type: none"> • The House accepted the proposal to continue the project for the year 2017-18 • From the seven promising crosses, 1-2 promising may be advanced for F2. • KLSH-10 may be assessed at CTRI RS, Kandukur for its yield potential and drought tolerance. Compile and submit the data of KLSH-10 for its identification in the ensuing workshop. • For submitting the release proposal of any variety, the checks used in the evaluation stages may be compared. The recently released variety or hybrid which is not in AVT/IVT as check need not be compared with the line proposed to be identified for variety release. • Common coding may be followed for all breeding lines.
S. Kasturi Krishna	A.83 : Integrated Management of <i>Orobanche</i> in FCV tobacco	<ul style="list-style-type: none"> • No <i>Orobanche</i> infestation was observed in tobacco grown succeeding sesamum with neem cake application at 30 days 	<ul style="list-style-type: none"> • Further screening of false host crops for <i>Orobanche</i> has to be done apart from Gingelly like sorghum, green gram etc.,

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		<p>after planting @10g per plant in alfisols.</p> <ul style="list-style-type: none"> In vitro studies confirmed that glyphosate inhibits <i>Orobanche</i> infestation under field conditions 	<ul style="list-style-type: none"> Before going for field experimentation for management of <i>Orobanche</i>, pot culture studies has to be done for better understanding <i>Orobanche</i> behavior. House advised to find out the techniques for control of <i>Orobanche</i> in other crops like potato and mustard. Efforts to formulate broad-based, multidisciplinary and innovative project involving all the possible approaches.
S.V. Krishna Reddy	<p>A.84 Studies on False Maturity and its mitigation strategies in FCV tobacco growing zones of Andhra Pradesh.</p> <p>A. Vertisol conditions B. Irrigated Alfisols</p>	<ul style="list-style-type: none"> Under Vertisol conditions, false maturity symptoms were not observed by application of organic manure (FYM) + balanced NPK, regular inter-culture with complete weeding and <i>Orobanche</i> removal. Under irrigated Alfisols, false maturity symptoms were not observed by application of FYM + balanced NPK (reco.) or FYM + (excess N) rec. PK and topping and sucker control by decanal (2%) + pendimethalin (0.3%). 	<p>Demonstration under field conditions is not accepted</p>
M.Mahadevaswamy	<p>A. 41. Studies on climate risk management in FCV tobacco based cropping systems in STZ of Karnataka.</p>	<ul style="list-style-type: none"> Sunshine hours and max. temperature regimes showed positive trends with cured leaf nicotine while RH at noon showed negative correlation with the nicotine levels Drought management practices involving supply of starter dose of N through calcium nitrate at planting coupled with 	<ul style="list-style-type: none"> Suggested for seed production of tobacco in off season (rabi) and check the germination in CTRI Hunsur station. The House accepted the proposal to continue the projects for the year 2017-18

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		foliar nutrition of N and K at 45 and 60 DAT or individually proved effective in maximizing the cured leaf yield and bright grade production in dry regions of KLS <ul style="list-style-type: none"> • High density planting indicated that productivity of cured leaf can be enhanced up to 15% by increasing the population to 24,691plants/ha (90 x 45 cm) 	
M.Mahadevaswamy	A 42: Evaluating the alternative nutrient sources to provide balanced nutrition for flue-cured tobacco grown in KLS	<ul style="list-style-type: none"> • Various nutrient sources did not show any significant differences with respect to cured leaf or bright grade production in most of the locations in the dry zone. • Treatments combinations involving 20:20:0 + Urea or A/S + SOP, CN + SSP + SOP performed comparatively better in semi wet and wet regions. 	The House accepted the proposal to continue the projects for the year 2017-18
Dr. Kumaresan,	Feeler trial : Evaluation of Integrated agro-techniques for increased productivity and farm returns		<ul style="list-style-type: none"> • House advised to incorporate all the techniques in project • Chairman suggested to try 2-3 types of polyethylene sheets for soil solarization to control weeds
D.Damodar Reddy	A 10 Permanent manurial trial on <i>Motihari</i> tobacco	<ul style="list-style-type: none"> • Balanced fertilizer regime consisting N, P and K (112 kg N + 112 kg P₂O₅ + 112 kg K₂O ha⁻¹) maintained significantly higher productivity of <i>Motiharitobacco</i> in terms of green leaf yield, cured leaf 	The House accepted the proposal to continue the projects for the year 2017-18

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		<p>yield and first grade leaf yield as compared to imbalanced fertilizer use.</p> <ul style="list-style-type: none"> • The fertilizer regimes with one or two nutrient omissions continued to result in yield losses and hence represented unsustainable practices. • Of all the nutrients, N proved to be “a-must-add” nutrient for obtaining optimum <i>Motihari</i> tobacco yield. 	
Y.Subbaih	Ag. Extension 50. Technology Evaluation, Demonstration and Impact Analysis	<ul style="list-style-type: none"> • Evaluated Advanced Breeding Lines in real farm situation of NLS area. Farmers preferred Tobios-6 over cv: Kanchan due to its high yielding potential and returns. • Drip fertigation gave superior cured leaf yield & bright grade outturn over check in the real farm situation (NLS) • Technology adoption has contributed to significant improvement in farm productivity and profitability in SLS area Observed significant difference in technology adoption behaviour of progressive farmers and other farmers in NLS and SLS areas. 	<ul style="list-style-type: none"> • House suggested that FLDs has to be conducted for those varieties which are already released and not for the varieties which are in pipeline. • Chairman advised that Impact analysis should be done before and after release of the varieties.
H.Ravi sankar	ARIS 15: Tobacco Agridaksh : An online expert system	<ul style="list-style-type: none"> • Global accessing of the two modules viz., Identification of weeds and their control on tobacco and Identification of nutrient deficiencies in tobacco and their control through Tobacco Agridaksh. Was done. 	The House accepted the proposal to continue the projects for the year 2017-18

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K. Suman Kalyani	NICRA: Gender specific adaptation programme in response climate change in Coastal Eco-system	<ul style="list-style-type: none"> • The gender roles of fishing communities in comparison to tribal communities in coastal ecosystems were identified using PRA techniques. • The problems, needs and interventions were analysed under various domains • Within the framework of fishing community, the consequences of natural disasters were assessed and suitable adaptation/coping strategies were recommended • Mitigation strategies viz. defensive seawalls, supply of marine safety devices, fish stock information through GPS, balanced fish catch for sustainable livelihood, advanced fishing equipment, drudgery reducing implements, provision of clean & safe water supply, primary health care centres were found to be highly prioritised needs. 	The House accepted the proposal to continue the projects for the year 2017-18
CROP CHEMISTRY AND SOIL SCIENCE			
Dr.K. MahadevaSwamy	SS 31: Evaluation of Crop Residue and Wood Ashes - Effects on Soil Fertility and Potassium Nutrition of Tobacco	<ul style="list-style-type: none"> • Application of 120 kg K₂O/ha in 4 splits (10, 25, 40 and 55 DAT) recorded the maximum cured leaf yield and top grade equivalent yields and was significantly superior to the same dose applied in one split application only as basal followed by 	The Project is concluded RPF III is to be submitted

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		120 kg K ₂ O (3 splits) or 90 kg K ₂ O (4 splits).	
Dr. J. PoornaBindu	SS-32: Evaluation of organic and inorganic soil amendments to minimize nutrient leaching losses and enhance nutrient use efficiency under NLS tobacco production system	<ul style="list-style-type: none"> • Application of TS Biochar with 100% RDF and TS Biochar+SZ+100% RDF caused a significant increase in GLY and CLY compared to the 100% RDF. • The relative yield of soil amendments ranged from 96 to 114% of the yield obtained with 100 % RDF. • Application of TS Biochar along with 100 % RDF has significantly improved the nitrogen and potassium uptake with the recovery efficiency of 39.1 and 59.9 per cent as against 100 % RDF alone with 31.0 and 51.5 percent, respectively. 	The Project is concluded and RPF III is to be submitted.
C.ChandrasekharaRao	SS 33: Energy management strategies for curing FCV tobacco	<ul style="list-style-type: none"> • The rise in temperature was 06 °F inside the barn prior to curing, due to polycarbonate roof chamber. • Fuel wood was saved in polycarbonate roof barn to an extent of 29% compared to traditional barn. • Wood consumption per one kg cured leaf was 3.13 kg with poly carbonate roof against 4.39 kg in traditional barn. • Percent excess wood consumed by the normal barn was 40.3%. 	<p>The work was appreciated by Dr. K. D. Singh. The Project is approved for continuation with the following suggestions.</p> <ol style="list-style-type: none"> 1. To quantify the temperature gradient at different heights in the barn 2. To quantify the moisture content of the leaf at different phases of curing. 3. To quantify the green leaf weights to be loaded in to the barn as such, instead of quantifying the green leaf weight along with sticks. <p>House accepted to continue the project for</p>

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			the year 2017-18
L.K.Prasad	SSK- 2: Assessment of leaf quality of FCV tobacco using hyper-spectral remote sensing and growth parameters	<ul style="list-style-type: none"> The % nicotine content varied from 0.65 to 2.83 % in spectrum tagged leaf at bud initiation stage and had a linear relation ($R^2 = 0.654$) with increasing N levels. Cured leaf nicotine content at X & L positions varied from 1.10 to 3.14 % & 0.95 to 2.21 % (R^2 values = 0.75 & 0.55), respectively 	The project is concluded and RPF III will be submitted
	SS-34: Evaluation of soil fertility and development of online fertilizer recommendation system for FCV tobacco	<p>Geo-reference points were collected from some representative villages under NLS for soil survey and fertility assessment.</p> <p>Digitization of the area boundaries and GPS polygons are being developed.</p> <p>The positive relationship was seen between % dry matter, leaf Zn concentration and soil test value of Zn.</p> <p>The project on Assessment of soil fertility and development of online recommendation system for FCV tobacco growing soils of India was approved with a total financial outlay of Rs. 45.35 lakhs by Tobacco Board, Ministry of Commerce & Industry, Govt. Of India</p>	<ul style="list-style-type: none"> The present Institute project was concluded and the objectives will be studied under the externally funded project "Assessment of soil fertility and development of online recommendation system for FCV tobacco growing soils of India" It was suggested to develop critical limits for Cu, Fe, Mn, Zn and Boron for FCV tobacco
Dr. D.V.Subhashini	SSMB 12: Tobacco	Silver nanopartcles @100 ppm	In view of the inconsistency of commercial

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	(<i>Nicotianatabacum L.</i>) and stem assisted green synthesis of silver nanoparticles and evaluation of its antimicrobial activity against agricultural plant pathogens	controlled the fungal growth effectively under laboratory conditions.	grade silver nanoparticles, tobacco based nanoparticles need to be evaluated under laboratory as well as in tobacco nursery against the Damping off disease and the synthesised tobacco based nanoparticles are to be supplied to Division of Crop protection for evaluation against <i>Spodopteralitura</i> insect pest in tobacco nursery and also under laboratory conditions. The House accepted the proposal to continue the project for the year 2017-18
Dr. K. Siva Raju	OC - 24: Studies on chemical constituents responsible for smoke flavor in tobacco grown under different agro-climatic zones	Neutral volatile aroma compounds (NVAC) in 10 chewing tobacco varieties were identified. Maximum formation of NVAC were observed in the variety Kaviri. Smoke cured varieties showed lower levels of NVAC. Estimation procedures of leaf cuticular components of tobacco was standardized on GC-MS.	The project is approved for continuation
Dr. K. Siva Raju	Externally funded project : Characterization, Value Addition and Utilization of Tobacco Seed Oil and its By-products	<ul style="list-style-type: none"> Refining technique was developed for tobacco seed oil in collaboration with IICT, Hyderabad. Acute pre-clinical toxicity evaluation of tobacco seed oil showed no effect on rats. Polyphenols are low and heavy metal are absent in tobacco seed cake. 	It was suggested to work on value addition to the tobacco stalks by standardising cellulose extraction technique.

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		<ul style="list-style-type: none"> • It was suggested to work on value addition to the tobacco stalks by standardizing cellulose extraction technique. 	
Dr. M. Anuradha	PHYK-1: Abiotic stress management interventions for climate resilient flue cured tobacco production in SLS Domain of A.P.	<ul style="list-style-type: none"> • Application of soil amendments helped to maintain more soil moisture in the root zone in turn enhanced productivity. • Foliar application of Gibberellic acid @ 50 ppm enhanced leaf expansion in flue cured tobacco grown in SLS domain. • Increased fertilization from 60:60:60 to 90:90:90 kg N, P₂O₅ and K₂O/ha, increased plant population (40,000/ha) increased leaf yield with without affecting the quality of the leaf 	<ul style="list-style-type: none"> • The project is approved to continue during 2017-18.
CROP PROTECTION			

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U. Sreedhar	<p>E-81: Bio-efficacy and field evaluation of new pesticides against tobacco pests</p> <p>A. Evaluation of new insecticides against <i>Spodopteralitura</i> Fabricius in tobacco nurseries</p> <p>B. Persistent toxicity of new insecticides against <i>Spodopteralitura</i> Fabricius on tobacco</p> <p>C. Field efficacy of new insecticides against tobacco budworm, <i>Helicoverpa armigera</i> Hubneron FCV tobacco</p>	<p>Novaluron 5.25 EC + emamectin benzoate 0.9 SC @ 0.012% was found promising against <i>S.litura</i> in tobacco nurseries.</p> <p>Persistent toxicity studies against <i>S.litura</i> on tobacco showed that novaluron 5.25 EC + emamectin benzoate 0.9 SC @ 0.012% recorded 100 per cent mortality up to 4 DAS with a mean period of persistency of 16 days, mean persistent toxicity (PT) of 69.13 and a mean persistent toxicity index (PTI) of 1106.08.</p> <ul style="list-style-type: none"> • Spinosad 45 SC @ 0.018%, chlorantraniliprole 25 SC @ 0.0075%, flubendiamide 480 SC @ 0.012% were found to be highly promising against budworm in FCV tobacco. • Management of ground beetle by planting of tray seedlings treated with chlorantraniliprole 25 SC @ 0.0075% recorded least seedling damage followed by transplant water treatment with chlorantraniliprole 25 SC @ 	<ol style="list-style-type: none"> 1. It was suggested to continue evaluation of new molecules as a long term project 2. The house suggested to calculate ICBR instead of BCR for effective molecules

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	<p>D. Management of ground beetle, <i>Mesomorphus villiger</i> Blanchard in FCV tobacco</p> <p>E. Management of tobacco whitefly, <i>Bemisia tabaci</i> Gennadius, a vector of tobacco leaf curl virus</p> <p>F. Validation of integrated management module for sucking pests in FCV tobacco</p>	<p>0.0075% and transplant water treatment with imidacloprid 200 SL @ 0.005%.</p> <ul style="list-style-type: none"> • Integration of barrier crop and three sprays of insecticides could protect FCV tobacco from leaf curl virus. This was achieved with better vector management. • Validation of management modules for sucking pests in FCV tobacco showed that chemical control module consisting of four sprays of insecticides at 10,25,40 and 55 recorded least sucking pest population and incidence of viral diseases. It was followed by IPM module consisting of two rows of sorghum as border crop + Application of 2 % NSKS @ 10 and 35 DAP, foliar spray with pymetrozine 50 WG @ 0.02% at 20 DAP and flonicamid 50 WG @ 0.02% at 45 DAP. • Studies on monitoring of insecticide resistance in <i>S.litura</i> indicated that, emamectin benzoate (12.34 ppm) was the most toxic insecticide followed by chlorantraniliprole (24.94 ppm) based on LC₅₀ values. Kandukur population exhibited slightly higher LC₅₀ values 	

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	<p>G. Monitoring and management of insecticide resistance in tobacco caterpillar, <i>Spodopteralitura</i> Fabricius</p> <p>H. Compatibility of selected fungicides with new insecticides against tobacco caterpillar, <i>Spodoptera litura</i>.</p> <p>I. Efficacy of new fungicides for the management of black shank disease in main field caused by <i>Phytophthora parasitica</i> sp. <i>nicotianae</i> (Breda de Haan) Tucker</p> <p>J. Evaluation of <i>Trichoderma viride</i> formulations for the management of soil borne fungal diseases in</p>	<p>for the insecticides tested as compared to Rajahmundry population.</p> <ul style="list-style-type: none"> • Studies on compatibility of new insecticides with selected fungicides against tobacco caterpillar, <i>S.litura</i> showed the stability of physical properties of all the combination treatments. However, the bio-efficacy of combination treatments was found to be slightly reduced except with chlorfenapyr 10 SC @ 0.01 % and chlorantraniliprole 18.5 SC @ 0.005 % in combination with all the tested fungicides; and combinations of emamectin benzoate 5 SG @ 0.0025 % with copper oxy chloride 50 WP @ 0.2 % and azoxystrobin 23 SC @ 0.1 %. • Application of fenamidone 10% + mancozeb 50% @ 0.3% is a promising alternative to metalaxyl 8% + mancozeb 64% for the management of black shank disease in FCV tobacco field crop. Spot application of new fungicide fenamidone + mancozeb 60 WG @ 0.3% is highly effective against black shank disease under sick field conditions in NLS (Farmers' fields). • Soil application of <i>T. viride</i> (2×10^7 	

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	<p>FCV tobacco nursery.</p> <p>K. Evaluation of new fungicides against fusarium wilts diseases in light soils of Karnataka</p>	<p>CFU/ g) with neem cake @ 30 g/m² can be effective in suppressing soil borne fungal diseases caused by <i>Pythium aphanidermatum</i> (Edson) Fitzpatrick and <i>Phytophthora parasitica</i> f. sp. <i>nicotianae</i> (Breda de Haan) Tucker in FCV tobacco nurseries.</p> <p>No incidence of <i>fusarium</i> wilt was observed. Experiment was vitiated.</p>	
G. Raghupathi Rao	<p>E-82: Evaluation of insecticide application technology for effective spray coverage on FCV tobacco in NLS</p>	<ul style="list-style-type: none"> • Studies on influence of varied nozzle discharge rates on spray fluid requirement, spray characteristics and insect pest infestation on tobacco indicated that Hi tech sprayer with nozzle discharge rate of 550 ml/min was superior over 650 to 1200 ml//min at 40 PSI, with 3.6-4 kmph operator speed and 50 cm above crop canopy in providing uniform coverage and effective management of insect pest infestation. • Nozzles with higher discharge rates (beyond 550 ml/min) resulted in poor spray spectrum due to run off from leaf surface and wastage of insecticide. 	<p>Project was concluded. RPF III will be submitted</p>

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P. Venkateswarlu	EG-16: Studies on monitoring and management of tobacco leaf curl caused by whitefly, <i>Bemisia tabaci</i> Gennadius in SBS	<ul style="list-style-type: none"> • The IPM module with four rows of Jowar as barrier crop, one spray of flonicamid @ 0.03% at 10 days, one spray of pymetrozine @ 0.03% at 25 days and one spray of imidacloprid @ 0.05% at 40 days of planting exhibited 82.10% reduction of infestation by tobacco whitefly (leaf curl), 7.18% increase of cured leaf yields with incremental benefit cost ratio of 3.12 over untreated control. • Chemical control module consisting of one spray of flonicamid 50 WG @ 0.03% at 10 days, one spray of pymetrozine 50 WG @ 0.03% at 25 days, one spray of thiamethoxam @ 0.03% at 40 days and one spray of imidacloprid @ 0.05% at 55 days of planting reduced leaf curl infestation by 83.58%, increased cured leaf yields by 7.98% and incremental benefit cost ratio of .34 over untreated control. • A survey covering major tobacco growing areas of SBS during 2016-17 revealed that leaf curl caused by whitefly, <i>Bemisia tabaci</i> and caterpillar, <i>Spodopteralitura</i> were the major insect pests (above ETL) in planted crop and nursery with 10.8 and 3.15% infestations, respectively. 	The house suggested not to, mention ETLs for viral vectors.

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K. C. Chenchiah	EK-19: Evaluation of IPM Modules for management of caterpillar and aphid in FCV tobacco under SLS condition	<ul style="list-style-type: none"> • The caterpillar incidence was from very low to moderate (<3.0 score) with 3.9 to 13.2 per cent plants damage. • The aphid incidence ranged 1.9 to 2.4 (score) with 4.91 to 12.1 per cent plants damage. • The cured leaf yield in the IPM module is 2066 kg/ha, which is 33.49% higher than control. 	The house suggested to -compute cured leaf yields based on net yields.
S. Ramakrishnan	N-20: Integrated management of Root Knot Nematodes in FCV tobacco	<ul style="list-style-type: none"> • RKR lines, RKR 2 and RKR 3 were found tolerant to root knot nematodes with $RKI \leq 2.0$ under micro plot conditions. • The advanced breeding lines FCJ-25, FCJ-26, FCJ-31, FCS-3 and FCK-6 recorded $RKI \leq 1.0$ and were found promising against root knot nematodes under sick field conditions. • Results of the survey in FCV tobacco growing regions of KLS revealed the presence of root knot nematode <i>Meloidogyne spp.</i>, <i>Rotylenchulus reniformis</i>, <i>Helicotylenchus spp.</i>, <i>Pratylenchus spp.</i>, and <i>Tylenchus spp.</i> in main field tobacco crop. Maximum mean population of root knot nematodes was found in Periyapatna region followed by Hunsur, Arakalgud and H.D. Kote. 	The House accepted the proposal to continue the project for the year 2017-18

New projects presented and approved.

S.No	Title of the project	Investigator	Remarks
1.	A-85: Crop intensification and diversification for higher system productivity and profitability on tobacco growing Vertisols	Kiran Kumar T	Chairman advised to include on soil scientist as Co-PI by deleting the agronomist and the project is Approved
2.	Critical Evaluation of Tobacco Sector and Its Socio-Economic Impacts	K. Viswanath Reddy	Chairman suggested that the focus is to be on determinants of tobacco in India. Socio-economic impacts of different tobacco types viz., <i>bidi</i> , chewing, FCV in comparison with other crops in relevant zones is to be studied under the project in collaboration with Extension scientists and also suggested to collect data on the dominant crops in tobacco zone. The project is approved
3.	A.43: Soil crust management for crop productivity enhancement in FCV tobacco grown under KLS	M. Mahadevaswamy	The activity is to be taken up as a part of the existing agronomy project.
4.	A103: Evaluation of integrated agro-technologies for increased crop productivity and farm returns.	M.Kumaresan	Chairman suggested to try 2-3 types of polyethylene sheets for soil solarization
5.	A104 : Integrated weed management in chewing tobacco	M. Kumaresan	
6.	Studies on Role of Arthropod Diversity in Tobacco Pest Management	B. Sailaja Jayasekharan	The house suggested to include studies on temporal distribution of insect pests
7.	Studies on insect vector transmitted viral diseases into tobacco	V.Venkateswarlu	Project was approved.

8.	Investigations on Various Options for Effective Use of Oil Palm Biomass Waste (Inter-Institutional Project)	J. PoornaBindu	Project was approved.
9.	Soil, water and crop management strategies to mitigate climate induced changes in rain fed ecosystem of South Coastal A.P. (Inter Institutional Project in collaboration with ICAR-CRIDA,	M. Anuradha	Project was approved.