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Pulses...the Pulse of Agriculture

Boosting the Pulses Production
The need of the hour for the Nation!!!


मुसीबत की जंजीरे
कितनी भी हो
मेरे कदमों को नही बांध पायेगी
मुश्किले जरूर है मगर
मिट्टी में अनाज उगा कर
हरेक के चेहरेपर मुस्कान आयेगी...

◆ Editor's message

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पी. ए. दळवी

रवि चौरपगार

दाल अनाज व्दाराही हो पायेगा आनेवाले भविष्य में परिवर्तन...

भारत कृषी प्रधान देश है और विश्व में सबसे अधिक मात्रा में दलहनी फसलों का उत्पादन करनेवाला देश है। मगर बढती हुई जनसंख्या, पर्याप्त मात्रा में कम उत्पादकता तथा शाकाहारी भोजन सेवन करनेवाले लोगों का अधिकतर प्रमाण के कारण दालों की उपलब्धता कम होती जा रही है । हमारी कुल दालों की क्षमता की आवश्यकताओंके अनुसार केवल 80 से 85 प्रतिशतही दालों का उत्पादन हो रहा है । इस कारण बची हूई शेष मांगे पुरी करने हेतु दुसरे अन्य देशोंसे दालों की आयात करनी पडती है । कुछ समय पहले तुवर (अरहर) दालों की किंमते 200 रूपये प्रति किलो तक पहुँची थी ।

दाल अनाजों में प्रोटीन घटकों का प्रमाण अधिक मात्रामें (20 से 25%) होने से भारतीय लोगों के भोजन आहारोमें दालोंका सेवन एक महत्वपुर्ण घटक एवं शक्ति प्रदान करनेवाला एक अहंम स्त्रोत माना जाता है । परंतु दाल अनाजों की उपलब्धियाँ दिन प्रति दिन घटती जा रही है । जमिन की उपजाऊँ और उत्पादन क्षमता घटती जा रही है । इसलिए दाल अनाजों के क्षेत्र एवं प्रति हेक्टर उत्पादकता बढाने की आवश्यकता है । दालों की अपर्याप्त मात्रा या महंगाई की वजह से हमें संतुलित भोजन मिल नही पा रहा है, इसलिए आज अनाज सुरक्षा के साथ पोषण सुरक्षा का संकट निर्माण हुआ है । और इस विषय में गंभिरतासे विचार करने की जरूरत है ।

विगत 5 वर्षोके अंतराल में हमारे दलहनी फसलों का क्षेत्र लगभग 230 लाख हेक्टेयर से भी अधिक था, जो देश के कुल जुताई क्षेत्र के 12 से 13 प्रतिशत है । हस वजहसे अनुमान लगाया जा सकता है की, जनसंख्या में वृद्धि हुई है परंतु उत्पादकता और क्षेत्र में वृद्धि नही हो पाई है । विगत 6 दशकों में अगर देखा जाए तो हम दलहनी फसलों की उत्पादकता एवं वृंद्धि में अपेक्षित यश हासिल नही कर पाए । आज धान अनाज, गेहूँ जैसे फसलों पर जितना हमने महत्वपुर्ण ध्यान दिया उतना महत्व दलहनी फसलों को हम नही दे पाये । और यही कारण हमें प्रति वर्ष दालों की आयात करनी आवश्यक हो जाती है यही हमारी समस्या है ।

पोषण सुरक्षा का विचार करें तो बढती हुई जनसंख्या का ध्यान रखकर दलहनी फसलों के क्षेत्र में हरीतक्रांति की आवश्यकता है । और इसलिए नये अनुसंधान की जरूरत है । अगर हमें हरीत क्रांति लाना है तो केवल सार्वजनिक क्षेत्र के बलबुतें पर होना यह असंभव है । हरीत क्रांति हासिल करने हेतु सार्वजनिक और निजी इन दोनों क्षेत्रो ने एकसाथ मिलकर दलहनी फसलों के लिए भविष्य की दिशा निश्चित करना होगा । आज निजी क्षेत्र में बढिया अनुसंधान है, बेहतरीन उत्पादन क्षमता है । विस्तार प्रसार यंत्रणा है । अत्याधुनिक तंत्रज्ञान उपलब्ध है, विकास कौशल्य है । बेहतरीन इनपुट्स है और इसलिए आज निजी क्षेत्र ने अच्छी प्रगति हासिल की है । इसी का एक उदाहरण है निर्मल सिड्स । निर्मल सिड्स ने दलहनी फसलो में जो अनुसंधान किया उस अनुसंधान को निजी क्षेत्रमें उत्कृष्ट अनुसंधान का पुरस्कार देकर निर्मल सिड्स को नवाजा गया है । निजी क्षेत्र के पास नई तकनिके है, विविधता है, अनुठे तरीके है । इसके बावजुद भी निजी क्षेत्रको दुर्लक्षित रखा जाता है यही समस्या है । जब तक निजी क्षेत्र को इन प्रक्रिया में सामिल नही किया जाता या प्रोत्साहित नही किया जाता तब तक इन परिस्थितीयों में बेहतरीन सुधार नही होगा ।

आज के वर्तमान स्थिती में दालों की गंभिर समस्या सामने खडी है और इसे सुलझाने के लिए केवल सार्वजनिक क्षेत्र पर जिम्मेदारी डालकर पर्याप्त मार्ग नही निकल सकता । यह समस्या सुलझाने के लिए सार्वजनिक और निजी क्षेत्र को सक्षम क्रियाशिलता से कार्य करना होगा । वर्तमान परिस्थिती में निजी क्षेत्र के विकास पर नजर डाला जाए तो सार्वजनिक क्षेत्र के अंतर्गत सरकारी स्तरपर कार्यरत

प्रणाली की क्रियाशिलता अधिकतम सक्षम होने की आवश्यकता है। अनुसंधान कार्योकी गुंजाईश एवं व्याप्ती संख्यात्मक और गुणात्मक होना अनिवार्य है किंतु आज यह चित्र नही दिखाई दे रहा है । इस कारण ही निजी क्षेत्र इस विषयमें एक कदम आगे है और यह सच भी है । इसका कारण है उनका बेहतरीन अनुसंधान कार्य में अनूठापन, गुणवत्ता और विविधता है ।

दालों की आयात करने से अगर छुटकारा पाना है तो केंद्र सरकार तथा राज्य सरकारोंने निजी क्षेत्र को अपने साथ लेकर, जिम्मेदारी देकर सार्वजनिक और निजी क्षेत्र को एकसाथ जोड देना चाहिए । उत्पादकता में अगर वृद्धि लाना हो तो दलहनी फसलों में जल्दी पकनेवाली किस्मोंका निर्माण करना होगा । दाल फसलों का शास्त्र समझना होगा । प्रति हेक्टेयर उत्पादन क्षमता में वृद्धि लाने हेतु वैज्ञानिको ने ज्यादा से ज्यादा प्रयास करना होगा । विश्वकी उत्पादन क्षमता ध्यानमें रखकर हमें अपनी उत्पादन क्षमता बढाना चाहिए । भारत में जिन जिन राज्यों मे दलहनी फसलें उगाई जाती है उन राज्यों में उत्पादकता की तुलना कर कहाँ कहाँ उत्पादन में वृद्धि की गुंजाईश, अवसर है यह जानकर उन राज्यों को प्रोत्साहित करना चाहिए । नये तंत्रज्ञान का उपयोग करना चाहिए । सरकारी योजनाओं का जादा से जादा अमल होने की जरूरत है । उत्पादकता की कमी होनेवाले कारणों को खोजना चाहिए । हवामान पुरक फसल प्रणाली का उपयोग कर नये नये किस्मों, बिजों को निर्माण करना होगा । जिसमें जैविक तथा अजैविक तनाव सहने की क्षमता होनी चाहिए । खरीप फसलों में दलहनी फसलों की खेती करने का प्रमाण अधिक है उसी तरह रबी एवं गर्मी मौसम में दलहनी फसलों का प्रमाण बढाना चाहिए । इससे दलहनी क्षेत्र बढकर उत्पादकता में अधिकतम बढोतरी होगी । उत्पादकता में वृद्धि होने हेतु जैविक चिजों का भारी मात्रा में उपयोग करने के लिए प्रोत्साहित करना चाहिए । दुसरी महत्वपुर्ण बात यह है की, किसानों का उत्पादन बढाने के लिए उन्हे उत्कृष्ट इनपुट उपलब्ध कर देना चाहिए, जैसे की सर्वोत्तम बीज, कृषी निविष्ठा और अनुसंधान आदी उपलब्ध कर देना चाहिए । साथमें उन्होने उगाये हुये फसलों के उत्पादन को बाजारमें उचित दाम मिलना चाहिए । इन सभी बातों पर ज्यादा ध्यान दिया जाए तो यह समस्या हल हो जायेगी । दलहनी फसलों के क्षेत्र में परिवर्तन होकर एक नई क्रांति होगी, आयात भी कम होगा । दालों के बढते हुये दामों पर रोक लगेगी । इतनाही नही तो हमारी जरूरत पुरी होकर अन्य देशों में निर्यात करना भी संभव होगा । उत्पादकता में वृद्धि करने की भारतमें निश्चित रूपसे क्षमता है । यही क्षमता दर्शाने का समय आ चुका है । भारत सरकार और राज्य सरकारों ने एवं सार्वजनिक तथा निजी क्षेत्र ने इन बातों पर एकसाथ जुडकर,विचार कर और विशेष रूप से प्रयास कर इस दिशा में कदम उठाने की आवश्यकता है । इन बातों की आपूर्ती से हम दलहनी क्षेत्र में सफलता पूर्वक स्वयंपुर्ण और सक्षम हो पायेंगे । अनाज सुरक्षा के साथ पोषण सुरक्षा भी महत्वपुर्ण है इस पोषण सुरक्षता के माध्यम से ही कल की क्रांति का निर्माण होगा ।

CONTENT

We welcome your suggestions and valuable comments. Please e-mail us your view on the magazine at info@nirmalseedsindia.com

◆ CMD's message

निर्मल साथियों,

15 अगस्त का दिन भारत वासियों के जीवन का एक मंगलमय दिन है । आप सभी को इस सुनहरें क्षण एवं मंगलमय स्वतंत्रता दिवस की बहुत–बहुत बधाई और ढेर सारी शुभकामनाएं ।

हरित क्रांती के बलबुतें पर पायी गई उत्पादन बढ़ोत्तरी और सार्वजनिक वितरण प्रणाली की साथ की बदौलत भारत आज अन्न सुरक्षा के पडाव पर पहुँच पाया है । परंतु दुर्भाग्यता से इस काल में पोषण सुरक्षा (Nutritional Security) दुर्लक्षित हुई दिखायी देती है । इसलिए दुसरी हरित क्रांती गेहूँ एवं चावल इन फसलों तक सिमित न रखकर बाजरा, ज्वार और दाल जैसे पोषक फसलों के आधार पर करनी होगी । यह फसलें प्राकृतिक दृष्टि से अधिक पोषण मुल्य देनेवाली है । इसी कारण श्री. नरेंद्र मोदीजी ने दुसरी हरित क्रांती की जरूरत कहते हुए दाल (दलहनी) फसलों पर जादा बल दिया है ।

मुझे लगता है की, अधिक पोषण मुल्य पाये जाने वाली दालवर्गिय फसलों के व्दारा ही यह क्रांती होगी । क्योंकी, इसमें दो बातें है, पहली बात इन फसलों में प्रोटीन्स की मात्रा अधिक होती है और दुसरी बात सभी दालो के पौधे अपनी जड़ों से बैक्टीरिया व्दारा वायुमण्डलीय नत्रजन का स्थिरीकरण कर भूमि की उर्वरा शक्ती को बनाए रखते है, मतलब शाश्वत खेती ।

दलहनी फसलों में अरहर, मुंग एवं उड़द जैसे महत्वपुर्ण फसलें है । यह फसलें गरीबों के लिए प्रथिनेयुक्त भोजन का स्त्रोत है । इनसें अधिक मात्रा में प्रोटीन्स मिलता है । जिन जिन पदार्थों में प्रथिने शामिल है, उन सभी पदार्थो के उपयोग से भी दालों का उपयोग भारी मात्रा में किया जाता है । भारत विश्व का सबसे बडा दाल उत्पादक देश है । फिर भी अधिक मात्रा में दालों की आयात की जाती है । उत्पादन में आने वाली लक्षनिय घट, लागत खर्च में वृद्धि और ग्राहकों के बजट के बाहर वाले दाम इसी कारण आज बडी समस्यायें निर्माण हुयी है ।

भारत की उत्पादन क्षमता अन्य देशों की तुलना में बहुत कम है । इस उत्पादक क्षमता कों 1 मे. टन प्रति हेक्टेयर तक बढाने की आवश्यकता है । और यह मुमकीन है । निजी क्षेत्रों के अनुसंधान कार्यो को प्रोत्साहीत करना और सार्वजनिक व निजी क्षेत्रों ने अपने सहयोग से हाथ से हाथ मिलाकर चलना इसपर यह सफलता निर्भर है ।

कम लागत वाले तंत्रज्ञान विकसित कर इसका उपयोग किसानों व्दारा अधिक मात्रा में होने के लिए खास नीति अपनाने की आवश्यकता है । जिससे लागत खर्चा कम होगा और सभी सामान्य ग्राहकों को भी लाभ मिलेंगा । भारत में अरहर की फसल महाराष्ट्र, कर्नाटक, मध्यप्रदेश, उत्तर प्रदेश, गुजरात, आन्ध्र प्रदेश और अन्य राज्यों में कुल मिलाकर 38 लाख से जादा हेक्टेयर क्षेत्र है। इस से 30 लाख 20 हजार मे. टन उत्पादन मिलता है।

मुंग के उत्पादन वाले राज्यों में राजस्थान, महाराष्ट्र, आंध्र प्रदेश, बिहार, तामिलनाडू, कर्नाटक, ओडीशा, उत्तर प्रदेश व मध्य प्रदेश मिलाकर लगभग 24 लाख हेक्टेयर क्षेत्र है । और इससे प्राप्त होने वाला उत्पादन 10 लाख मे. टन है । उड़द का उत्पादन वाला क्षेत्र तामिलनाडू, आंध्र प्रदेश, उत्तर प्रदेश, महाराष्ट्र, मध्य प्रदेश, राजस्थान, पं.बंगाल, कर्नाटक और ओडिशा मिलाकर 23 लाख 10 हजार हेक्टेयर क्षेत्र था और इसमे 18 लाख मे. टन उत्पादन हुआ । इन राज्यों की उत्पादन क्षमता को देखते हुए भविष्य में इन अवसरों का चिंतन किया गया तो उचित ढंग सें भारत की उत्पादन क्षमता बढाने की बडी गुंजाइश है ।

इसी कारण दलहनी फसलों की आवश्यकता और भविष्य के अवसरों का प्रयोजन रखकर महाराष्ट्र सरकारने अहम कदम उठाया है । यह है "महाराष्ट्र दलहनी मिशन" । उत्पादनकता में आत्मनिर्भरता लाना और दलहनी फसलों को नगद फसलें मानकर उनके वृद्धि हेतु किसानों को प्रोत्सोहित करना यह मिशन का उद्देश है । परंतु हमे यह महसुस हो रहा है की, यह मिशन केवल सार्वजनिक क्षेत्र में सिमित न रहकर निजी क्षेत्रों को भी साथ में जोडना चाहिए । निजी क्षेत्र के अनुसंधान कार्योको भी मौका देकर उन्हें प्रोत्साहित करें । अगर इस प्रकार का सहयोग हो पाया तो निश्चित रूप से यह मिशन फलदायी होकर कामयाब होगा । भारत की उत्पादन क्षमता बढकर एक नया बदलाव होगा । हमें बाहर सें आयात करने की आवश्यकता नही होगी ।

शाश्वत खेती पर अधिक बल देकर फसलों की उत्पादकता बढाने की चुनौती को स्विकार कर हमनें लगभग तिन दशकों से अनुसंधान की शुरूआत की हुयी है । हमारे पास आज अरहर, मुंग एवं उड़द इन फसलों में दर्जेदार अनुसंधान है । आधुनिक तंत्रज्ञान का उपयोग कर उत्पादन क्षमता में वृद्धि लायी है । अन्य प्रचलित किस्मों की जगह प्रतिकुल परिस्थिती में अधिक उपज देनेवाली अनेक किस्में आज हमारे पास है । जैविक तथा अजैविक दोनों प्रतिबलों का अध्ययन कर प्रतिरोधितावाली उच्च उपजशील गुणवत्तापुर्ण फसल किस्मों को हमनें विकसित किया है । इन बीजों की भारत के अनेक राज्यों में फसलें उगायी जाती है । अकेले महाराष्ट्र में लाखों एकड क्षेत्र में इन बीजों की फसलें उगायी जाती है । गुणवत्ता और अधिक उपजशील होने के कारण हमारी दलहनी फसलों के अनुसंधान को निजी क्षेत्र सें देश का सर्वोत्तम अनुसंधान पुरस्कार प्राप्त हुआ है ।

गरीबों को प्रोटीन्स युक्त आहार मिलना चाहिए और ज्यादा प्रोटीन्स दालों में पाये जाते है । इसलिए सभी को दाल–अनाज मिलना चाहिये, पोषणीय गुणवत्ता बढाना चाहिए । इसलिए दलहन की उत्पादन क्षमता बढाने की आवश्यकता है, ताकि बाहर से आयात करने की नौबत नही आयेगी । देश की आवश्यकताओं की आपूर्ती होनी चाहिए, यही हमारी भुमिका एवं कामना है ।

हमनें राष्ट्रीय एवं अंतर्राष्ट्रीय संस्थाओं का सहयोग लेकर अनुसंधान कि दिशा तय कर दलहनी फसलों में उच्च उपजशील नई फसल किस्मों, संकरों को विकसित किया है । हम दलहन में अग्रणी उत्पादक है । कृषि समृद्धि को सुनिश्चित करने के लिए हमारे निरंतर प्रयास शुरू है । मुझे विश्वास है कि, आनेवाले दिनों में दलहन उत्पादन में भारत अग्रणी बनेगा । हम सक्षम है, हमें कल का नया भारत निर्माण करना है । भारत की इस मिट्टी में वह ताकद है, जो भारत को महाशक्ती बना सकती है ।

आर. ओ. पाटील
(चेअरमन तथा प्रबंध निदेशक)

◆ **Articles**

आधुनिक तंत्रज्ञानातुन फुललेली शेती आणि तिचा इतिहास...

आर.ओ.पाटील
व्यवस्थापकीय संचालक

शेती ही फार मोठी व्यापक संकल्पना असुन तिला स्वतःचा एक इतिहास आहे. माणूस आणि निसर्ग यांचे जसे अतुट नाते आहेत तसेच शेती आणि शेतकरी यांचेही आहे. अर्थातच जशी माणसाची नाळ शेतीशी जोडली आहे तशी शेतीची नाळ निसर्गाशी जोडलेली आहे. म्हणून शेतीचे महत्व लक्षात घेतांना तिचे मुळ स्वरूप आणि इतिहास याकडे दुर्लक्ष करता येणार नाही. आताच्या कृषी प्रधान भारत देशाच्या शेतीला अनेक वर्षांचा इतिहास आहे. जगातली शेती ही दऱ्या–खोऱ्यातुनच फुललेली आहे.

शेतीच्या युगातील सुरूवातीचा काळ जर बघीतला तर तो म्हणजे इ.स.पुर्व तीस हजार ते दहा हजार– या काळात माणूस शिकार करून कंदमुळे गोळा करत जगत होता. ज्या ठिकाणी अन्न मिळेल त्या ठिकानाचा शोध घेत तो भटकत असायचा. तेव्हा लहान लहान टोळीने रहायचा. पुढे भटकता भटकता झाडे झुडपे, वनस्पती विषयी त्याला ओढ निर्माण झाली. वसाहती करून तो समुहाने राहु लागला आणि शेती करू लागला. हेच कृषी क्रांतीतील पहिले पाऊल होते. त्यानंतर पशुपालनाला सुरूवात झाली. जे समुदाय स्थिरावलेत त्यांनी गावे उभी केली याचे दाखले वेदकालीन संस्कृती मध्ये आढळून येतात.

पुढे इ.स.पूर्व आठ हजार ते सहा हजार या काळात इराक, जार्डन, लेबेनन, इस्त्रायल या भागात गहू आणि सातु पिकांचा शोध लागला. जमिनीत बियाणे रोऊन पिकांच्या लागवडीला सुरूवात झाली. जिथे भरपूर पाणी आहे तिथे भाताची लागवड झाली. मका आणि बटाट्याचीही लागवड याच काळात झाली. शेती बऱ्यापैकी फुलत असतांनाच पशुपालनाचा मेळ घालणाऱ्या शेतीचा उदय झाला. शेतीबरोबर गाय, म्हैस, कोंबडी पालन सुरू झाले. उत्पादनासाठी निसर्गातील जलस्त्रोतांचा वापर होऊ लागला.

त्यानंतर पुढचा टप्पा म्हणजे इ.स.एक हजार ते सोळाशे याकाळात शेतीसाठी लागणारे पाणी, जलसिंचन आणि पाणी साठवणूकीची गरज निर्माण झाली आणि त्या गरजेतुन पाणी साठवणूक व्यवस्था उभी झाली. त्यासाठी जलाशये तयार झालीत. सोळाव्या शतकामध्ये शेतीमध्ये सुधारणा, पिकांचे नियोजन आणि शेतीसाठी लागणारी वैज्ञानिक दृष्टीकोन विकसित होऊन शेतीच्या परीवर्तनासाठी चालना मिळाली. पंधराव्या शतकाला शोधांचे युग म्हटले जाते. नवनव्या वनस्पतींचे शोध लागले. एका देशातली पिके दुसऱ्या देशात जाऊ लागली अर्थातच देवानघेवाण सुरू झाली. जमिनीची सुपिकता वाढविण्यासाठी रासायणिक पद्धतीचा अवलंब करण्याची प्रथम सुबुद्धी ही खऱ्या अर्थाने सतराव्या शतकात सुचली. पहिले खनिज खत तयार झाले. १८४० च्या दशकात सुपर फॉस्फेट हे पहिले रासायणिक खत तयार झाले आणि येथुनच खऱ्या अर्थाने रासायणिक खत उद्योगाची किंवा निर्मितीची मुहूर्त मेढ रोवली गेली. शेतीसाठी सर्वात महत्वाचा कालखंड मानला जातो तो म्हणजे विसावे शतक ! याच शतकात शेतीसाठी उपयोगी तंत्रज्ञानाचा विकास वेगाने झाला. याच काळात पश्चिमेकडील औद्योगिक देशात यांत्रिकीकरणाला चालना मिळाली. १८९२ मध्ये पेट्रोलवर चालणारा पहिला ट्रॅक्टर अमेरीकेत तयार झाला. दुसरी महत्वाची गोष्ट म्हणजे याच शतकात जनुकिय विज्ञानाला सुरूवात झाली. त्याचा परिणाम म्हणून तांदुळ, गहू, मका आणि कापुस ही पिके मैलाचा दगड ठरली. जागतिक उत्पादनाच्या सरासरीपेक्षा गव्हाचे उत्पादन कमी असल्यामुळे मेक्सिकोमध्ये गव्हावर संशोधन होऊन मेक्सिको गहु तयार केला गेला आणि इथेच भारतीय हरीत क्रांतिचा पाया रचला गेला.

पहीली हरित क्रांती –

भारतामध्ये शेतीच्या वाटेवरचा सर्वांत मोठा टप्पा म्हणजे भारतीय हरीत क्रांती ! स्वातंत्र्यानंतरच्या दोन दशकांच्या कालावधीत वाढत्या लोकसंख्येच्या पोटाची खळगी भरण्यासाठी अमेरीका आणि पाश्चिमात्य देशातील धान्य आयातीवर आपला देश अवलंबून होता. कृषी तज्ज्ञांच्या अथक प्रयत्नातुन सत्तरीच्या दशकात हरीत क्रांती झाली. सुवर्णाक्षरांनी उल्लेख करावा अशा हरीत क्रांतीच्या माध्यमातुन भारताने स्वबळावर आज अन्न सुरक्षा प्रस्थापित केली आहे. याच काळात संकरण शास्त्राच्या माध्यमातुन पिकांच्या अनेक वाणांमधील चांगले गुणधर्म शोधून ती एकत्र करून नविन संकरीत वाण शोधले गेलेत. गहु आणि भाताची उन्नत वाणे विकसित केली गेली. जलसिंचन, आधुनिक खते आणि किटक नाशके यांचा वापर करून उत्पादन वाढविण्यात आले. अशाच संकरीत गव्हाचा वापर करून १९६५ मध्ये गव्हाचे उत्पादन १२.३ दशलक्ष टनावरून २०.२ दशलक्ष टनापर्यंत (१९७० मध्ये) वाढले. याच काळात किटकनाशकांचा व रासायनिक खतांचा वापर अनेक पटीने वाढला. त्याचाच परीणाम म्हणून जनावरांऐवजी ट्रॅक्टर आलेत. मोट ऐवजी विजेवर चालणारे पंप आलेत. विहीरींचे पाणी कमी पडू नये म्हणून बोअरवेल (कुपनलिका) चा पर्याय आला. त्यामुळे पाण्याचा उपसा वाढला. अशा एकूनच शेतीतील बदलामुळे उत्पादनात भरघोस वाढ झाली आणि भारत देश अन्न धान्याने स्वयंपूर्ण झाला. निसर्गावर अवलंबून असलेल्या शेतीमध्ये झालेला हा सर्वात मोठा बदल असुन आजच्या वर्तमान शेतीला खऱ्या अर्थाने येथूनच दिशा मिळाली.

ट्रान्सजेनिक तंत्रज्ञान –

शेती अनेक अंगानी विकसित होत असतांना ती नवनव्या बदलांना सामोरे जात आहे. एकविसाव्या शतकात शेतीचा सर्वात मोठा

आधार किंवा बदल असेल तर तो म्हणजे ट्रान्सजेनिक तंत्रज्ञान ! शेतीसाठी ही फारमोठी उपलब्धी मानली जाते. या तंत्रज्ञानाच्या माध्यमातुन पिकांमध्ये कृत्रिमरीत्या एक किंवा त्यापेक्षा अधिक जनुके घातली जात आहेत. यामुळे पिकांचे अधिक उत्पादन, किड व रोगांसाठी प्रतिकारक क्षमता, गुणवत्ता व अनुकूलता असे अनेक गुणधर्म हव्या त्या पिकामध्ये निर्माण करता येतात. जनुकिय परिवर्तीत पिकांच्या वापरामुळे पिकांचे उत्पादन वाढले आहेत. उदाहरणादाखल सांगायचे झाल्यास कापूस, मका, सोयाबिनमध्ये काय १ एसी हे जनुक घालुन बिटीवाण तयार करण्यात आले आहे. आधुनिक शेतीसाठी ही फार मोठी उपलब्धी आहे.

आता हायटेक तंत्रज्ञानाने शेती –

नवनव्या शोधामुळे जग ग्लोबल व्हिलेज बनले आहे. शेतीक्षेत्रात अनेक आमुलाग्र बदल होत आहेत. नवनवे शोध लागुन नवे तंत्रज्ञान येत आहे. त्यामुळे शेतीचे स्वरूप बदलत आहे. शेतीच्या प्रगतीमध्ये सोशल मिडियाचाही वापर होत आहे. इंटनेट, फोन, मोबाईल, संगणक, व्हॉटस्अप, फेसबुक आणि कृषी आधारित पुस्तकांचा होणारा वापर आणि त्यामुळे शेतकऱ्यांमध्ये आलेली जागरूकता, निर्माण झालेली ओढ यामुळेच शेतीने नवे रूप धारण केले आहे. कमीत कमी पाण्यावर पिके घेण्यासाठी सुक्ष्म सिंचन प्रणालीचा वापर वाढला आहे. स्वयंचलित यंत्रे, पेरणी यंत्रे, कापणी व मळणी यंत्रे अशा अनेक यंत्रसामुग्रीच्या वापरामुळे शेतीचे यांत्रिकीकरण होतांना दिसत आहे. शेतीमध्ये विविधता आली आहे. पॉलिहाऊसेस, ग्रिन हाऊसेस यांचाही वापर मोठ्या प्रमाणात केला जात आहे. शितगृहांचाही उपयोग होत आहे. पारंपारीकतेला पुर्णपणे फाटा देऊन आताची शेती ही आधुनिक व शास्त्रिय पद्धतीवर अवलंबुन असुन तिला नव्या तंत्रज्ञानाची जोड मिळाली आहे.

आधुनिक शेतीने दिली पोषण सुरक्षा –

गेल्या चार दशतकात भारताने हरीत क्रांतीला मिळालेल्या यशाच्या जोरावर अन्न असुरक्षित परीस्थितीतुन अन्न सुरक्षा कायद्यापर्यंत मजल मारली आहे. हे स्वप्न आधुनिक शेतीच्या तंत्रज्ञानामुळेच साकार झाली आहे. जगामध्ये कुपोषण आणि भुकबळींची मोठी समस्या निर्माण झाली आहे. एका पाहणीनुसार जगातील २०० कोटी लोक कुपोषण ग्रस्त असुन त्यातील सर्वांत जास्त संख्या भारतात आहे. या समस्येवर मात करण्यासाठी आणि एकूणच आहारातुन अन्नद्रव्यांचे पोषण मुल्य वाढविण्यासाठी जगभरातील कृषी क्षेत्रात संशोधन सुरू आहे. भारतीयांमध्ये लोह व जस्त (झिंक) या अन्नद्रव्यांची कमतरता भरून काढण्यासाठी नविन संशोधनातुन लोहयुक्त बाजरा व झिंक युक्त गहु बाजारामध्ये उपलब्ध झाला आहे. मानवी जीवनासाठी खरोखरच हे क्रांतिकारी संशोधन असुन शेती विकासामधला हा महत्वपुर्ण टप्पा आहे.

भविष्यातील शेती – स्मार्ट शेती –

भविष्यातील शेती कशी असेल तर ती शेती स्मार्ट शेती असेल. बदल हा सृष्टीचा नियम आहे. निसर्गातील प्रत्येक घटक यासाठी बांधिल आहे. काळाबरोबर चालणे, सुसंगता पाळणे हीच मानवी जीवनाची अपरिहार्यता आहे. नवनवे शोध, उत्कृष्ट संशोधन यामुळे होणार बदल या सर्व अंगाने शेती विकसित होत असुन नवे रूप धारण करण्यासाठी ती आता सज्ज आहे. परंतु तिच्या समोर अनेक आव्हाने उभी आहेत. त्यापैकी महत्वाचे संकट म्हणजे ग्लोबल वार्मिंग ! हवामान व वातावरणात बदल झाल्यामुळे त्याचा विपरीत परिणाम शेतीवर होतांना दिसत आहे. वाढते तापमान, मान्सुनच्या आगमनातील अनिश्चितता, पुर आणि दुष्काळ याचा परीणाम जगभरातील शेतीवर विशेषतः पिक उत्पादनावर होत आहे. अशा दुष्परीणामांची तिव्रता कमी करण्यासाठी एकच पर्याय सक्षमपणे दिसुन येतो तो म्हणजे स्मार्ट शेती!

स्मार्ट शेती हीच भविष्यातील शेतीच्या विकासाची नांदी ठरू शकते. वैज्ञानिक दृष्ट्या शेतीच्या सर्वच अंगांचा विचार स्मार्ट शेतीमध्ये सामावलेला आहे. म्हणूनच जगाचे पाऊलही स्मार्ट शेतीच्या दिशेने पडले आहे. म्हणूनच शेती अधिक हायटेक होतांना दिसत आहे. संपर्क साधनांमुळे शेतकरी ग्लोबल होत आहे. उत्कृष्ट व दर्जेदार बियाण्यांचा वापर होत आहे. हवामान पुरक पिक प्रणालीचा अभ्यास करून पिकांच्या जाती विकसित होत आहेत. उष्ण वातावरणात टिकाव धरणारी वाणे तयार होत आहेत. पिकांच्या जातीमध्ये विविधता आली आहे. हवामान बदलात टिकून राहण्याचे गुणधर्म निर्माण केले जात आहेत. दिवसेंदिवस शेतीच्या यांत्रिकीकरणाकडे कल वाढतो आहे. रासायनिक किटकनाशके व खतांचा बेसुमारपणे होणारा वापर टाळून आता शाश्वत शेतीसाठी प्रयत्न केले जात आहेत. जमिनीच्या आरोग्याविषयीची जागरूकता वाढली आहे. आधुनिक सिंचन प्रणालीचा वापर करून ग्रामिण भागातही पॉलिहाऊसेस, ग्रिनहाऊसेस मध्ये शेती करण्याचे प्रमाण वाढत आहे. इतक्या सर्व बाबी सकारात्मक असुनही स्मार्ट शेती सध्या प्रारंभावस्थेतच आहेत. तिला पुर्णतावस्था येण्यासाठी आपल्याला वाट बघावी लागेल. जेव्हा ती पुर्णता येईल तेव्हा शेतीमध्ये फार मोठी क्रांती झालेली असेल. कृषी क्षेत्राला सबल करण्यासाठी स्मार्ट शेतीशिवाय पर्याय नाही. तिची फळे चाखण्यासाठी तो काळ सुद्धा जास्त दुर वाटत नाही. परंतु यासाठी सरकारी व खाजगी क्षेत्राने एकमेकांशी समन्वय साधुन हातात हात घालुन चालणे गरजेचे आहे. तरच शेतीच्या नव्या पर्वाला सुरूवात होईल. कारण आजची शेती ही त्या निर्णायक वळणावर उभी आहे आणि तिला दुसऱ्या हरित क्रांतीची आशा आहे.

Role of Nirmal Seeds in productivity enhancement of major pulses presented at MSSRF, Chennai (TN)

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Pulses have been traditionally recognized as an indispensable constituent of Indian diet. A major proportion of the population in India is highly dependent on pulse crops. Pulses have gone a long way in benefitting the people of this country by ideally supplementing the cereal rich diet of predominantly vegetarian masses by virtue of their being rich in protein and several essential amino-acids. The fineness with which they fit into various cropping systems and cropping mixtures. The unique ability of biological nitrogen fixation which thereby facilitates soil fertility. The potential of yielding something even under adverse conditions and finally the high demand that they face from the consumers side are precisely the reasons why pulses have become highly popular amongst the Indians. Pulses are the integral part of sustainable crop production system since time immemorial, especially in the dry areas. India is the largest producer, consumer, importer and processor of pulses in the world. Unfortunately, India has not been able to meet the demand of the growing population. Thus, there has been a rising trend in the Indian imports every year in order to bridge the ever -increasing gap between demand and supply. The per capita availability of pulses has also declined sharply in recent years. Although India is the largest producer of pulses in the world, the nation has not been able to achieve self-sufficiency. This has been due to the presence of a number of impediments in terms of raising the pulse production in India, such as yield gaps, abrupt climatic changes, pests and diseases, lack of quality seeds, low adoption rates, cultivation on marginal lands etc. But there are ways to boost the production, viz., adoption of improved cultivars, integrated pest and disease management, better access to improved seeds, reduction of yield gaps, use of precise package of practices and many more. Now, it is a known fact that the improved varieties and hybrid technology especially in pigeonpea have been gaining popularity amongst the pulse growing farmers of India due to their increased productivity to harvest better yield.

Nirmal Seed Pvt. Ltd. (NSPL) working on pulses since 1998 especially on redgram, greengram and blackgram. Company has wide range of germplasm in pulse crops (redgram, greengram and blackgram) with desirable traits to meet out future goals. Company has developed high yielding varieties of redgram, greengram and blackgram coupled with quality traits and hybrids in redgram well suitable for different agro climatic conditions. The production and sales figures of different pulses during last 4 years were 2100, 1500 and 1200 tonnes of redgram, greengram and blackgram, respectively. These figures shows the coverage of NSPL varieties in different major pulse growing parts of the country. The total coverage is about up to 4,00,000 hectares under redgram, 1,20,000 hectares under greengram and 92,000 hectares under blackgram.

Nirmal seeds also work on pigeonpea hybrid technology from last 9 years. NSPL received the CMS source from SDAU. S K Nagar Dantewada (GJ). Sincere efforts of NSPL developed pigeonpea hybrid having better yield potential. The experimental data reveled that hybrids shows 20-25 % heterosis over commercial recommend varieties.

Company has developed varieties/hybrids according to suitability zone of pulse crops (Redgram, Greengram and Blackgram) are given below.

Sr. No.	Crop	Variety	Features	Suitability zone
1	Redgram	Hybrid-77	1. Mid early maturity. 2. High yielding (2.8 T ha-1)	CZ & SZ
		NTL-30	1. Mid early Maturity 2. Resistant to wilt and SMD disease	CZ & SZ
		NTL-900	1. Mid early Maturity 2. Long fruiting branches	CZ & SZ
2	Greengram	NTL-724	1. Early maturity. 2. High yielding (2.1 T ha-1)	NZ
		NTL-539	1. Mid early maturity. 2. White seeded	CZ
		NTL-2	1. Mid late Maturity 2. Sweet bold grains	CZ & SZ
		NTL-873	1. Mid early maturity. 2. Vegetable purpose	CZ & SZ
		NVL-1	1. Maturity 65-70 days 2. Shiny bold grains	CZ
		NVL-516	1. Maturity 60-65 days 2. Resistant MYMV disease	NZ
		NVL-585	1. Maturity 65-70 days	SZ

			2. For rabi cultivation	
3	**Blackgram**	NUL-7	1. Maturity 65-70 days and Synchronous maturity 2. Govt. notified for CZ	CZ & SZ

Therefore, both production and productivity needs to be stepped up to great extent through future development of high yielding varieties of pulses having multiple disease resistance and suitability under different agro climatic conditions. Also development of pod borer resistance using molecular approach like transgenic and marker assisted breeding in redgram. Efforts are being made to collaboration with National and International institutes to develop varieties having resistance to moisture stress.

Nirmal's Research Product Registration under Protection of Plant Varieties and Farmers Rights Authority Act [(PPV & FRA) Government of India]

I. S. Halakude
Research Co-ordinator

Nirmal Seed's R & D division has filed total 107 research products for registration of plant varieties under PPV & FR Authority, New Delhi. Out of total 107 products, 28 products certificate of registration are issued. The registered products are as follows.

Sr No	Crop	Variety/ Denomination	Registration No.	Date of Grant
1.	A. Cotton	Navinya-6 (NACH-6)	126 of 2012	4th September 2012
2.	H. Cotton	Aishwarya (NCH-744)	211 of 2015	2nd September 2015
3.	H. Cotton	Chandramukhi (NCH-996)	55 of 2016	1st February 2016
4.	H. Cotton	NS-222	141 of 2016	27th April 2016
5.	K. Sorghum	RATNA (NJH-40)	79 of 2014	27th March 2014
6.	R. Sorghum	Suvarna (NSRR-259)	36 of 2015	20th January 2015
7.	R. Sorghum	Aparna (NSRR-676)	52 of 2016	1st February 2016
8.	Pearl Millet	Nirmal-40 (NPH-40)	282 of 2013	16th December 2013
9.	Wheat	Nirbhay (NW-1)	38 of 2016	18th January 2016
10.	Wheat	Ajay (NW-72)	56 of 2015	3rd February 2015
11.	Wheat	Vinay (NW-404)	84 of 2015	11th March 2015
12.	Paddy	Saguna (NR-28)	726 of 2014	20th November 2014
13.	Paddy	Parvati (NR-48)	286 of 2013	19th December 2013
14.	Paddy	Kranti (NR-89)	215 of 2013	5th November 2013
15.	Paddy	Sai (NR-212)	284 of 2013	19th December 2013
16.	Paddy	Vaishnavi (NR-241)	634 of 2014	18th September 2014
17.	Paddy	NB-3 (Madhumati)	39 of 2015	21st January 2015
18.	Hybrid Paddy	Nirmal-30 (NPH-30)	413 of 2014	21st July 2014
19.	Hybrid Paddy	Nirmal-101 (NPH-101)	45 of 2015	28th January 2015
20.	Hybrid Paddy	Nirmal-150 (NPH-150)	30 of 2015	19th January 2015
21.	Greengram	Naval (NVL-1)	170 of 2015	23rd June 2015
22.	Blackgram	Vishwas (NUL-7)	141 of 2014	5th May 2014
23.	Pigeon pea	DURGA (NTL-30)	738 of 2014	3rd December 2014
24.	Soybean	NSO-15 (ANJALI)	177 of 2015	14th July 2015
25.	Soybean	NSO-84	113 of 2016	9th March 2016
26.	Indian Mustard	Black Gold (NML-100)	765 of 2014	11th December 2014
27.	Indian Mustard	Palak	731 of 2014	2nd December 2014
28.	Indian Mustard	Nirmal Bold (NML-64)	100 of 2015	27th April 2015

मातीतील सेंद्रिय कर्बाचे महत्व

डॉ. जितेंद्र सोंलकी
बिझिनेस डेव्हलपमेंट एक्झीक्युटिव

काल एक शेतकरी व्यथा सागंत होता, ''सर दोन वर्षापासुन आमच्या भागात टोमॅटो जमतच नाही, व्हायरस कंट्रोल होतच नाही, कितीही भारी औषधे मारा काही फरकच पडत नाही, आपल्या भागातुन टोमॅटोचा विषय संपला.'' मी त्यांना म्हटले, भाऊ जर टोमॅटो रोगामुळे जात असते तर कुठल्यातरी औषधाने ठिक झालेच असते, मुळ समस्या पिकाची नाही, मातीची आहे, तिचा कस (सेंद्रिय कर्ब) कमी झाला. बरं किती कमी झाला असेल...!!

थोडी आकडेवारी पाहुया, सुपिक जमिनीचा सेंद्रिय कर्ब ३-४% असतो, तर वाळवंटात तो ०.५% म्हणजे अर्धा टक्का असतो तर मग आपल्या जमिनीचा किमान यापेक्षा जास्तच असायला हवा पण दुर्देवाने वस्तुस्थिती अशी आहे, बागायती जमिनीचा सरासरी सेंद्रिय कर्ब ०.३% म्हणजे वाळवंटापेक्षा दुप्पटीने निकस जमिन. आजचा शेतकरी पिकवण्याची कसरत करत आहे, परिणामी कमजोर मातेच्या पोटी अशक्त व अपंग बाळ जन्माला येते, त्याप्रमाणे कोणतेही पिक लावा रोग त्याच्या पाचविला पुजलेला असतो. रोग कमी यावे व अनुकूल वातावरण मिळावे याकरीता शेतकरी हायटेक टेक्नोलॉजी वापरतात, मल्चिंग करतात, शेडनेट, पॉलिहाउस करतात. पण होते काय?? ८०% शेतकऱ्यांचे कर्जदेखील फिटत नाहीं मग ओपन मधील शेतकऱ्यांचे हाल विचारायला नकोत. एक वर्ष पिक चांगले येते, मग पुढचे काही वर्ष त्याचे झालेले पैसे पुन्हा त्यातच खर्च करायचे व पुन्हा पहिल्यासारखे उत्पन्न निघण्याची वाट पहायची, हे दृष्ट चक्र चालुच राहते. हेच उदाहरण घ्या सोयाबिन चे पिक! चार पाच वर्षांपर्यंत केवळ पेरले की पावसाच्या पाण्यावर काहीही न करता येत होते. पण आजची परिस्थिती पहा, सोयाबिनला कोराजन मारायची वेळ आली. कुठे चाललाय शेतकऱ्यांचा खर्च...कशी परवडणार अशी शेती??

मित्रहो, विचार करा समस्या निट समजुन घेणे गरजेचे आहे. मुख्य उपाय मातीच्या व पिकांच्या पोषणावर करणे गरजेचे आहे. मग दुय्यम उपाय रोगासाठी करायला हवे पण होते ते उलटेच!

पावसाळी वातावरणात किंवा प्रतिकूल वातावरणात पिकांचे पोषण अत्यल्प होते किंवा थांबते. पिकांमध्ये अन्नद्रव्यांची कमतरता निर्माण होते. परिणामी प्रतिकारशक्ती कमी होते, पिक विविध रोगांना बळी पडते. शेतकरी किडी व रोगावर नियंत्रण मिळवण्यासाठी खुप खर्च करताना दिसतात पण, ह्या समस्येची तीव्रता न्युट्रीयंट डिफीसिएन्सी (अन्नद्रव्यांची कमतरता) मुळे वाढत आहे., हे त्यांच्या लक्षात येत नाही. किडी व रोगावर औषधे मारण्याबरोबर पिकांची अन्नद्रव्यांची गरज भागवणे त्याहुन महत्वपूर्ण आहे. अन्यथा शेतकरी किडी व रोगावर औषधे मारत रहातो व पिक कमजोर पडत जाते. एक दिवस पिक कायमचे सोडून द्यावे लागते. २०-२५ वर्षापुर्वी तर एवढे रोग नव्हते. कांदा, गहु इत्यादि पिके कोणतीही विशेष काळजी न घेता आजच्या पेक्षा छान पिकायचे. असे काय होते जमिनीत त्या वेळी... जे आज नाही?? जमिनीचा कस म्हणजे सेद्रिंय आपल्याला माहित आहे, जमिनीचा कस (सॉईल कार्बन) वाढविण्यासाठी हिरवळीचे खते, सेंद्रिय खते, शेणखत आदि पर्याय उपलब्ध आहेत, पण वस्तुस्थिती अशी आहे. आजचा शेतकरी हायटेक झालेला आहे, त्याला स्पर्धेत टिकायचे आहे. मग फास्ट रिजल्ट पाहिजे. मग इथेच सगळा अतिरेक सुरू होतो. हिरवळीचे खत करायला, तेवढा वेळ व अतिरिक्त जमिन शेतकऱ्याकडे नाही. दुसरा पर्याय सेंद्रिय खते यांची गुणवत्ता हा एक मोठा काळजीचा विषय आहे. मग एकच पर्याय उरतो तो म्हणजे शेणखताचा! पण शेणखताच्या नावाखाली, तबेल्यांमधले अर्धवट कुजलेले शेण किंवा त्याची पातल रबडी शेतात आणुन टाकली जाते व परिणामी पिकाचे पोषण होण्याऐवजी, हानिकारक बुरश्यांचे पोषण सुरू होते. पिकांमध्ये मुळकुज होऊन मर रोग येण्याचे हे प्रमुख कारण आहे. शेतकरी भांबावुन जातो, मी शेणखत, रासायनिक खते टाकतोय तरी माझी जमिन निकस का होत चलाली आहे? त्याचे कारण, ज्या प्रमाणात सेंद्रिय कर्बाचे ज्वलन होते, त्या तुलनेत पुनर्भरण अल्प प्रमाणात होते.

रासायनिक खतांच्या प्रत्येक ॲप्लिकेशन सोबत सॉइल कार्बन चे ज्वलन होते, चिलेशन व न्युट्रिइन्ट अपटेक साठी जिवांणुच्या सक्रियतेसाठी तो खर्ची पडतो, म्हणजे आजच्या हायटेक, सुपर फास्ट शेती मध्ये शेणखत, सेंद्रिय खत यासोबत 'सॉइल ओरगॅनिक कार्बन' च्या संतुलनासाठी हायटेक टेक्नॉलाजी वापरण्याची गरज आहे. त्यामुळे सेंद्रिय कर्बासाठी केवळ पारंपरिक स्त्रोतांवर अवलंबुन न राहता, ज्याप्रमाणे आज आपण रासायनिक खतांच्या मात्रा टप्याटप्याने देतो, तशी सेंद्रिय कर्बाची मात्रा नियमितपणे पुरवणारे आधुनिक तंत्रज्ञान वापरणे ही काळाची गरज बनली आहे. सेंद्रिय कर्ब वाढविण्यासाठी सेंद्रिय पदार्थांचा व जैविक उत्पादनाचा जास्तीत जास्त वापर केला पाहिजे. आज बाजारामध्ये अनेक सेंद्रिय खत, सेंद्रिय शेतीला पोषक असणारे जैविक उत्पादने उपलब्ध आहेत. जसे की परिपुर्णा सारखे सेंद्रिय खत, निर्मल बायोपॉवर, निर्मल बायोफोर्स, बेरिलॉन सारखे सेंद्रिय व जैविक अर्क तसेच जैविक किटकनाशक व बुरशीनाशका मध्ये बायोप्रहार, बायो संजिवनी, ट्रायडेंट, जास्पर, एमरल्ड, गारनेट, मारवेल आणि मॅजिक हिट अशी उत्पादने आहेत की जे सेंद्रिय शेतीसाठी वरदान ठरली आहेत. निश्चितच याचा वापर करून रसायनमुक्त अन्नधान्य निर्मीतीला आणि सेंद्रिय शेतीला चालना मिळू शकेल.

The effect of curing period on bottle gourd germination

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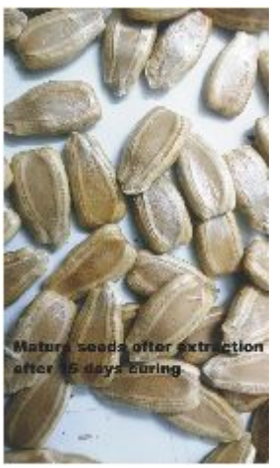
Bottle gourd is one of the most important crops in cucurbitacea family. Although it is considered as poor mans crop due to socio-economic restrictions governing its production and use. It has a pan tropical distribution with regional economic importance and is used as a vegetable container, musical instrument or float while its seed are used for oil and protein. Seed quality has been described as a multiple concept comprising several components. Seed quality is the standard of excellence in certain characteristics that will determine performance when the seed is either stored or sown. Seed germination capacity and vigour are therefore, the key measures of seed quality. Bottle gourd germination and and vigour area greatly affected by the stage of harvesting and curing of the bottle gourd fruits after harvesting. By considering these views, quality control department has conducted the experiment on bottle gourd curing and it's effect on germination and vigour of the seed.

Six bottle gourd fruits were collected from healthy production plot in Deulgaon Raja area which was ready for harvesting. The seeds from first fruit were extracted on same day of harvesting & seeds from second fruit were extracted 10 days after harvesting. The seeds from third, fourth, fifth and sixth fruit were extracted at five days interval i.e. 15, 20, 25 and 30 days after harvesting. Initial germination was taken and recorded immediate after completion of extraction and drying of each lot in two replications. The seeds of same lots also tested after two months of storage for study the storage effect on germination. The results, showed that the seeds which were extracted on same day of harvesting has showed the only 38% germination and also 28% germination after two months of storage. The seeds extracted from 10^{th} and 15^{th} days of curing, showed 88% and 90% initial germination respectively, but the germination percentage of these lots drastically reduced in two months of storage. The seed extracted from 20^{th} days of curing has showed excellent germination percentage i.e. 86% and it is not too much reduced in two months of storage condition. The seeds extracted from the 25^{th} and 30^{th} days of curing showed less germination percentage in initial record but it is significantly increased in two months of storage. From the experiment it is concluded that, for the good quality and better germination of the bottle gourd seeds, harvested fruit should be kept 20-25 days for curing.

Fruits	Curing days after harvesting	Initial Germination% (Immediate after extraction)	Germination% (After two months storage period)
T1	No curing	38	28
T2	10^{th} day	88	72
T3	15^{th} day	90	78
T4	20^{th} day	86	74
T5	25^{th} day	74	76
T6	30^{th} day	62	94

Matured seed after 25 days of seed extraction



Nirmal Rice Technique (NRT): A modified direct seeding method

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Rice is the most important food crops cultivated under submerged conditions by transplanting. This method of cultivation requires large quantities of water, and is labour intensive. It is estimated that 5000 liters of water is needed to produce 1 kg of Rice. Nirmal Rice Technique (NRT) is a unique new method of cultivation of rice to grow rice without ploughing & transplanting (rice) on permanent raised beds. Nirmal Rice Technique is a projected sustainable rice production methodology for the immediate future to address water scarcity and environmental safety in the scenario of global warming.

What's so special about NRT?

The permanent raised beds used in this method facilitates ample of oxygen supply to root zone area while maintaining optimum moisture condition there. The NRT facilitates planting of crop in predetermined distance enabling precise plant population per unit area.

NRT planting method:

- In this method we have to till the soil and make the raised beds only once. The same permanent beds will be used again and again to grow various rotation crops after rice. The best time to make this beds is immediately after kharif paddy harvesting. After ploughing add desirable quantity of any organic manure.
- Draw parallel lines with the help of rope & lime or wood ash at 136cm i.e. 4.5 feet apart. Use tractor drawn 'Bed maker' or any other means to open furrows at marked lines & make raised bed.
- Approximately 3 to 4 days before rain begins, make holes on beds 25 x 25 cm spacing. At the time of sowing put 3-4 treated rice seeds in each hole and cover the seed with soil. Irrigate the plot with best possible available method. After sowing within a 24 hours spray the plot with selected pre emergence weedicide like Goal (Oxyfluorfen 23.5% EC) @ 1 ml/liter of water. Goal should be applied in moist soil.
- At about 4 leaf stage carry out gap filling by using extra seedling from nearby hills. Between 25-30 days carry out manual weeding without walking on the beds and press Urea (DAP Briquettes) or teaspoon full of suphala (15:15:10) in between 4 hills per plant.
- Soon the plots starts looking very nice. We need to pay attention for control of water level in the field.

Note:- After 2-3 days of harvesting of rice crop, spray the plot with Glyphosate (100ml/15 liter water). NRT insist that all roots and small portion of stem should be left in the beds for slow rotting which improve fertility of soil. Same raised beds are to be used again without any ploughing or puddling for rabi season. In rabi season the crop like green gram, black gram, dolichous bean, cow pea or any vegetable crop can be taken on the same beds for 8-10 years.

Treatments/inputs used.

1) 50% RDF chemical + 62.5kg Bio power+ 15kg phorate/ha. (4 Spilit)
2) Bio Sanjivani (Tricho+Pseudo) each 5gm/lit. Spray 25 DAS & 60 DAS against BLB disease.
3) Bio force 2ml/lit (20 DAS, 60 DAS & Pre-flowering)
4) Berrylon (1ml/lit.) at the time of flowering.
5) Phosphorous Solubilizing Bacteria, Potash Solubilizing Bacteria & Azotobacter 2.5kg/ha. mixed with organic manure at the time of basal application.

Multiple advantages of NRT:

- As puddling is not required in this method, the 30-40 % expenses on puddling, transplanting & hand hoeing, labour are saved.
- The root network prevents soil from cracking and makes it more spongy. The same roots become valuable source of organic carbon which is uniformly distributed and oxygen pathways to root zone of the next crop.
- Loss of valuable silt (about 20%) during puddling can be prevented thus more fertile land can be handed over to next generation.
- Leaves of rice plants on NRT beds seem to be more broader & head more upwards to sunlight than their counterparts in conventional method. They are likely to produce more biomass, means higher yield.
- Profuse rooting and High tilling, less lodging and high grain and fodder yield.
- Rice crop gets ready for harvesting 8-10 days earlier as compared to conventional method. Also it saves time required for soil tilling between 2 crops.
- Avoiding of puddling will drastically reduce diesel consumption, emission of CO_2 over thousands of acres of paddy cultivation. Also NRT being aerobic method it will prevent methane generation.
- This could be the best solution in natural calamities such as hail storm, floods, etc. because the crop cycle is shortest and it involves multiple choices of short term rotation crop such as pulses, vegetables and so on.

The yield of Nirmal Rice Technique is comparable with transplanted rice. Thus, it is an alternative option to reduce labour problem and to increase water productivity. Further, in environmental point of view, emission of methane is lower substantially in NRT.

Desi Cotton: May Resolve Emerging Problems of Cotton Cultivation in India

Dr. S. A. Patil
Plant Breeder

Cotton, the most important fibre crop of India plays a dominant role in its agrarian and industrial economy. It is the backbone of our textile industry, accounting for 70 per cent of total fibre consumption in textile sector, and 38 per cent of the countrs export, fetching over Rs. 42000 crores. Area under cotton cultivation in India (12.9 million ha) is the highest in the world, i.e., 43 per cent of the world area and employs seven million people for their living. Reports predicted that India would replace China as the world's largest cotton producer. This did not come as a surprise. India's cotton area was increasing during the past 12 years to reach a record 12.9 million hectares in 2014. In stark contrast, cotton area was shrinking progressively every year in major cotton growing countries such as China and US. The area decline across the globe could probably be due to the following reasons. Australia has been experiencing drought on and off; Brazilian farmers realised that the profits were shrinking; China continued to pile huge stocks through imports mainly from India; production costs in Africa were increasing and cotton exports from US declined. Production costs are increasing in India and elsewhere in the world. There is also increase problems of production in India

Major Problems for Cotton Cultivation in India

1. Erratic and Deficient Rainfall

During 2015, deficits and erratic rainfall distribution in Central & South India. In Maharashtra and Telangana more than 90% of cotton is grown under rain-fed conditions. The two states account for 50% of India's cotton area. Due to drought/ low rainfall in these states the yield of Bt cotton is decreased drastically.

2. Cotton leaf curl virus disease in North Zone of India

In North Zone, cotton crop is more prone to severe infestation by whiteflies and the most dreaded CLCuD (Cotton leaf curl virus disease) that is transmitted by the whiteflies. The yield level in North zone is drastically reduced due to cotton leaf curl virus. The development of resistance in whitefly against major insecticide; it severally affected Bt cotton crop in North zone.

3. Leaf reddening and sudden wilt

Rain-fed cotton is more prone to environmental stress factors such as high temperatures, soil moisture and nutrient deficit at critical times and cloudy weather. These factors negatively affect photosynthesis and thereby result in nutrient deficit to the developing bolls. Bt-cotton hybrid plants need more nutrients when they retain a fairly large number of bolls due to efficient protection from bollworms. Moisture and nutrient stress at this stage generally results in leaf reddening and sudden wilt.

4. Indian cotton production systems have become costly and unsustainable The shifting away from Desi cotton and the change from a mere 40% hybrid area in 2001 to 92% area under Agriculture, the average cost of cultivation was Rs. 15,961 per hectare in 2002, which increased to an average of Rs. 71,115 per hectare in 2011. The yields may have increased, but fertilizer usage per hectare increased by 3.6 times from an average of 74.1 kg per hectare in 2002 to 267 kg per hectare in 2011. With the increase in fertilizer usage, predominantly urea on hybrid cotton, insect pest infestation increased. The average expenditure on insecticides was Rs. 1073 per hectare in 2001, which increased to Rs. 2925 per hectare in 2011. Thus, India's cotton is now characterized with a constant increase in chemical fertilizers and insecticide usage, to move away from sustainability. This shift towards unsustainable cotton production systems makes farmers highly vulnerable to economic risks.

5. Pink Bollworm Return

The pink bollworm is back with a vengeance. This insect was a serious concern for cotton in India about 30 years ago. There were very few reports of any major damage by pink bollworm to cotton since 1982 in the country. But all that has changed now. Last year, severe damage to bolls by pink bollworm and yield-losses were observed in Bt-cotton in many regions of Gujarat and some parts of AP, Telangana and Maharashtra. More concerning is the fact that the worm is happily chewing up Bollgard-II-Bt-cotton which contains two genes (cry1Ac+cry2Ab) that were supposed to be highly effective in controlling the pest. Pink bollworm infestation on Bt cotton also increased insecticide use for control, it may directly increase cost of production for farmers.

DESI COTTON OFFERS THE MOST RESILIENT OPTIONS FOR COTTON CULTIVATION IN INDIA

1. Desi cotton varieties are deep rooted and overcome drought with ease.
2. Whiteflies have been causing immense damage to almost all the Bt cotton hybrids in North India, whereas almost all the Desi cotton varieties are resistant to whiteflies and leaf hoppers.
3. Desi cotton species are immune to the dreade 'cotton leaf curl virus disease' CLCuD which is a major menace in North India and not in other parts of the country
4. The market price of Desi Kapas (seed-cotton) was 15-20% more than the kapas of Bt-cotton hybrids due to more demand of short and coarse fibre that are suitable for absorbent cotton, surgical, denims, mattresses, technical textiles etc.,
5. Desi varieties hardly need any chemical inputs such as fertilizers or insecticides for higher yields, thus the cost of production is less than half of Bt-cotton hybrids
6. Even with moderate care, the yields of Desi cotton varieties/hybrids can easily exceed the yields of Bt cotton in rain-fed regions of country.

Nirmal's Contribution

It is important for India to break away from the current imbroglio mired in chemical matrices. We need to move towards robust and sturdy climate resilient cotton production methods that are in consonance with natural ecosystems. Desi cotton provides exciting prospects towards sustainability. Unfortunately research on Desi cotton was grossly neglected in India by Private sector, as a result of which there was a slow progress in development. Despite the neglect, Nirmal Seed Pvt Ltd have continued the research in Desi cotton from last 25 years and developed outstanding Desi cotton hybrids which can bring in a 'soft revolution' in the country.

NSPL have released high yielding, desirable fibre quality G. arboreum hybrids. Among them, NACH-12 (Ambika-12) and 18 (NACH-18) are having medium long (25.7 & 25.2 mm, respectively) staple lenght, coarse fibre with big boll size (up to 4 gm) with tolerant to drought and sucking pests. These hybrids are very popular among farmers due to its stable yield performance in rainfed condition with tolerance to biotic stress (Sucking pests). These two hybrids were also performed better in All India Cotton Improvement Project and one notified for Central and South Zones of India. In continuation, Nirmal Seeds has also released another hybrid NACH-461 (Radha) during 2015. This hybrid is having ability to give stable yield in rain-fed regions of Maharashtra. This hybrid his having big boll size ranging from 4 to 4.5 gm with desirable fibre quality, early maturity, high yield potential, excellent boll opening, non spreading, erect, sturdy & open plant type and tolerant to biotic and abiotic stress (Sucking pests and drought).

There are two G. arboreum hybrids under testing, one of them is 'NACH-436' having big boll size ranging from 5.0 to 5.5 gm with desirable fibre quality, early maturity, high yield potential, excellent boll opening, non spreading, erect, sturdy & open plant type and tolerant to biotic stress (Sucking pests). Another hybrid is NACH-433 having big boll size, high yield potential, early maturity, excellent boll bursting, retention, erect strudy plant type with short staple length with coarse fibre (7.0 micronaire value). This hybrid ranked first from three year testing in All India Cotton improvement Project trial.

NACH-461 (Radha)

Advanced Technique of Microbial Culture Preservation

M. S. Paprikar
Microbiologist

Preservation and maintenance of bio efficacy of microbial culture was major challenge. Culture preservation by periodic transfer on agar or in liquid medium, keeping agar cultures under mineral oil are conventional methods, Some advanced culture preservation techniques are freezing and low temperature storage in or above liquid nitrogen, freezing and low temperature storage below-70°C, preservation by shelf freeze-drying, liquid drying (L-drying) and vacuum drying. Most methods are appropriate for routine culture maintenance purpose but not always suitable for conserving bio efficacy level, because repeated subculturing always invite loss of bio effectiveness of cultures. In microbes, mutation rate is very high, repeated subculturing may not loss culture purity but may affect vital metabolite secretions which is related with bio efficacy of cultures.

In order to focus this issue and increase quality and performance of Microbial formulations, team of Microbiologists under support of NSPL management have initiated project titled "To establish microbial culture preservation facility by lyophilization of microbial cultures" and successfully implemented. In Culture bank of Bio division of Nirmal Seeds various agriculturally beneficial microbial cultures are screened and maintained, Out of these 40, fungal cultures and 125 bacterial species are preserved under ultra low temperature.

Culture preservation by freeze drying involves series of steps, viz, purity verification, addition of suitable percentage cell protectants as per specific requirement of microbial species, keeping cultures in glass vial, transfer of vial in ultra low temperature, primary drying in vacuum with ultra low temperature, preparation of constriction notch on vials, secondary drying, final sealing , testing of vacums seal, labeling for identity of cultures and cultures inventory maintenance.

This highly skillful scientific technique will be major milestone in quality of NSPL's microbial products .

Importance of Soil Testing in Agriculture.

Mrs. Pratima Patil
Sr. Executive QA

"A single soil sample can Seldom Accurately Characterize the Nutrient Status of a fertilized Field (Perur et al.,1973)".

Why Soil Testing Necessary ?

Good crop production requires the application of lime and fertilizers. Soil testing enables to find out the make up of your soil and helps you to determine how much lime and fertilizer you need to apply.

How you can improve Quality of your Soil-

To find out what you need to do to improve the quality of soil, you should know each of the following properties of soil.

1) Current p^H level of your Soil.
2) Fertility level of major nutrients.
3) Quantity of lime your soil needs.
4) Nutrients need to be added to your soil as fertilizers.
5) Amount of fertilizer your crop and soil needs. If you do not have this information soil test may help.

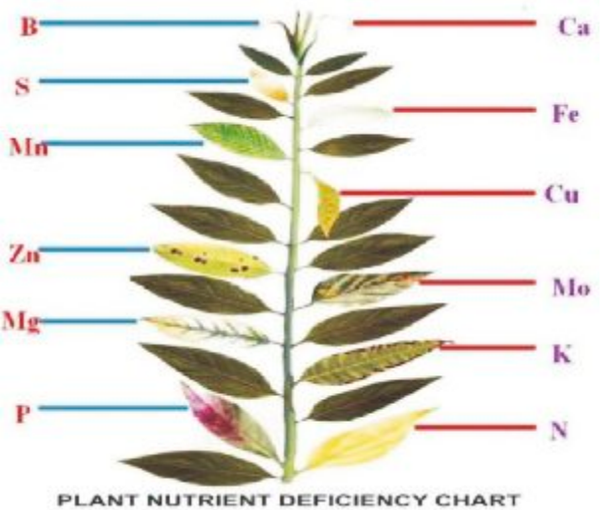
Constraints of Soil Testing -

Soil testing can let you know where your soil needs treatment or improvement. Soil testing cannot do any of the following.

1) Tell you which crop to cultivate.
2) Prevent poor crops cause by droughts ,diseases insect, too much water, or other problem.
3) Substitute for proper cultural practices.
4) Replace good management.

Preventive measures during Soil Sampling -

1) Sample should be collected before sowing of next crop. Sample should be collected after harvest of crop as soil are dry enough.
2) Avoid areas recently fertilized field, old bunds, marshy spots, near trees, compost heaps and farm sheds.
3) Variation in slope, colour, texture and cropping pattern should be noted.



PLANT NUTRIENT DEFICIENCY CHART

Rating of electrical conductivity of soil in Relation to Plant growth -

0-1 mS/m	Good Soil
1-2 mS/m	Poor seed emergence
2-3 mS/m	Harmful to some crops e.g Pulses
3 or more mS/m	Harmful to most of the crops.

Rating limits for Soil test values traditionally used in India.

Nutrient	Low	Medium	High
Organic Carbon	Below 0.5	0.5 - 0.75	Above 0.75
Available- N(Kg/ha)	Below 280	280-560	Above 560
Available - P(Kg/ha)	Below 10	10-24.6	Above 24.6
Available - K (Kg/ha)	Below 108	108-280	Above 280

Source - Muhr et al.(1965)

Seed Dormancy and Probable Reasoning For Hardseed

Mrs. Pratima Patil
Sr. Executive QA

Dormancy of Seed - Inability of a viable seed to respond to the favorable environmental conditions, i.e temperature, water, oxygen for germination, the phenomenon is known as dormancy.

Types of Dormancy

1) Primary Dormancy/Innate Dormancy - The viable seed does not germinate immediately after maturity under favorable condition is considered as dormant. It starts germination under favorable condition after resting period. It is known as primary dormancy.

Exogenous dormancy - Dormancy because of unavailability of water, oxygen or mechanical restriction due to physical barrier is considered as exogenous dormancy.

Hardness seededness - Dormancy due to unavailability of water or oxygen or both to the embryo due to impermeable seed coat is considered as hard seededness. Hard seeds are formed due to forced maturity.

Impermeability of seed coat to Water - It is most abundant type seed coat dormancy. The impermeability of seed coat to water due to genetic or environmental factors prevent a viable seed from germination under favorable conditions. Seed coat is responsible for impermeability to water in family Leguminosae and Malvaceae, whereas nuclear membrane in Cucurbitaceae. In crops of given families and in seed testing the dormant seed are considered as germinated. These seeds start germination after resting period. Structure of testa, testa thickness, no pore and wrinkling on testa surface, closed hilum fissure, closed micropyle and deposition of phenol, tannin, calcium, wax, cutin (watermelon), suberin (Grasses), lignin, pectic substances etc. in testa, pericarp, or nucellar membrane are responsible for impermeability to water.

Impermeability of seed coat to Oxygen:- In many crop species hard seed coat allows water to enter but not oxygen. Oxygen is essential for germination. In initial stage these seeds are viable but in later stage due to unavailability of oxygen, embryo is not able to remain viable. Hard seed observed in crops from families other than Leguminosae are not considered as germinated seed during seed testing. **Mechanical dormancy** - In many plant species hard and strong seed coat offers a mechanical resistance to the growth of germinating embryo inside and does not allow to emerge out. eg cherry, walnut.

Endogenous dormancy - Failure of viable mature embryo to germinate even when it is isolated from seed coat is considered endogenous or embryo dormancy. It is of following type. i.e Immature embryo, Dormant embryo, Chemical dormancy.

Physiological or intermediate seed dormancy- Seed require some type of physiological

condition to be met in order to germinate. Seed of some crop species has to be dried down. dehydrated after maturity to make them capable of germination. Other seeds requires light to initiate the process of germination. Brief exposure to light, Dehydration, or slight chilling treatments can overcome this type of dormancy.

2) Secondary dormancy - Seed with secondary dormancy imbibe water as a normal seed without any sign of germination. The activation process of germination is started in seed but does not progress. Causes of secondary dormancy includes unfavorable environmental condition for germination viz. thermo (temp), photo (light), skoto (darkness) extremes.

Other type of dormancy - Deep dormancy, Light dormancy, Relative dormancy, Combination of dormancy.

Methods to overcome dormancy -

1 **Dry Storage -** Seeds with physiological dormancy are stored under ambient temperature for required period. eg Sunflower.
2. **Soaking in Water** - To break physical and chemical dormancy, seeds are soaked in cold or hot water for few hours.
3. **Scarification** - Seeds of some crops are scarified mechanically to break the hard seededness by piercing, filing, chipping, acid scarification, bio scarification, removal of structure around the seed
4. **Stratification** - Exposure of imbibed seed to cool or warm temperature prior to germination
5. **Treatment with Chemicals.**

Screening technique for Soybean seed coat resistance to mechanical damage

Vijay Hande
Plant Breeder

Soybean (Glycine max L. Merrill) has a predominant place among modern agricultural commodities, as the world's most important seed legume which contribute 25% to the global edible oil, about two thirds of world's protein concentrate for livestock feeding and is a voluable ingredient in formulated feeds for poultry and fish. Production of high quality of soybean seed which could retain its viability through out a storage season is a major challenge in most areas of the humid tropics and sub-tropics. The rapid seed deterioration of soybean is thought to be due to lipid peroxidation, subsequently resulting in loss of seed quality and viability. Soybean seed reaches its maximum potential for germination and vigour at physiological maturity and starts deteriorating on plant itself if harvesting is delayed (field weathering) (Shelar V R; 2007). Mechanical damage is another major factor responsible for deterioration in seed quality during post harvest processing and storage. The seed of soybean have only moderately thick seed coat. The radical or embryonic root has practically no protection except that provided by seed coat. Thus soybean seeds are vulnerable to mechanical damage which affects viability of the seed.

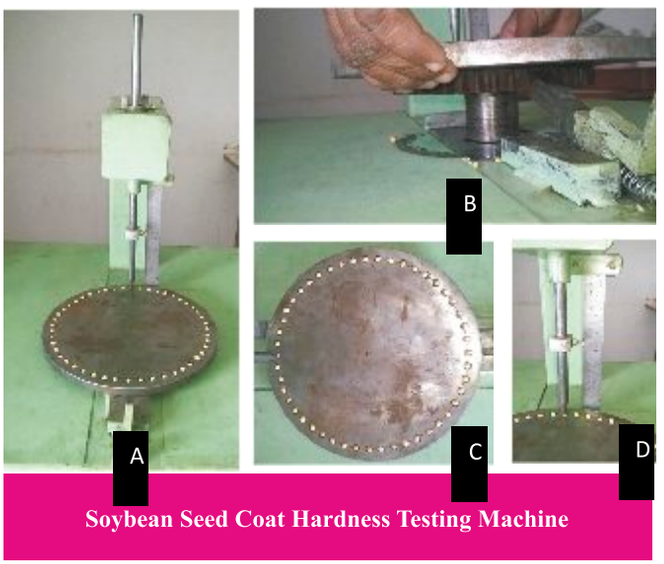
(Yet, the screening techniques to judge the soybean seeds coat hardness are not available). (Keeping this in view, a) machine has been developed for verification of soybean seed coat hardness to cater the selection of hard seed coat soybean genotypes from transgressive segregants. This might be a best tool for selection of cultivars with few degree resistance to mechanical damage during post harvest handling and storage of soybean seed.

A:Direction of iron rod stroke on soybean seed with specific height

B: Shifting gear to adjust each slot for iron rod stroke

C: Iron plate with 48 slots of 9 mm diameter for soybean seed placement

D: Measuring scale for height adjustment of iron rod



Soybean Seed Coat Hardness Testing Machine

The seed coat hardness testing machine is aggregate of various parts i.e. iron rod which is used to stroke on soybean seed placed on the iron plate having 9 mm diameter slots. The shifting gear is used to adjust each slot for iron rod stroke while measuring scale is placed for iron rod stroke on fixed height.

The moisture contain of seed and height of iron rod stroke are major factors to record unbiased observations. The initial testing data has been recorded to verify influence of moisture content on seed coat breaking and it was concluded that 7% moisture content is ideal for testing of soybean seed on above machine. Beside this, height of iron rod stroke was also standardized. Based on the study, height of iron rod stroke was standardized up to 2 cm. As per the standardization of above two major testing parameters, the observations of soybean transgressive segregants has been initiated.

Reference

V. R Shelar (2007) strategies to improve the seed quality and storability of soybean - a review; Agric. Res. 28 (3) : 188-196.

Commercial Production Technology of Cucurbitaceous crops

Mukesh B. Patil, Plant Breeder
B.P. Jadhav, Sr. Scientist

Cucurbitaceous crops especially gourds are cultivated all over India due to its natural potential to produce the economically important yield from 45-55 days and its bumper yield potential with less inputs for production. Presently, the cucurbits cultivation is tremendously affected due to the Cucumber Mosaic Virus, Bittergourd Mosaic Virus, bud necrosis virus coupled with downy mildew in gourds, Alternaria leaf blight, gummy stem blight and Melon Bud necrosis virus in melons. Climatic and edaphic conditions play a major role in the development of diseases and their dissemination. Viral diseases in cucurbits are spread through aphids and white flies and their control is most essential to get the high yield. The cloudy weather for 3-4 days coupled with water logging followed by sudden high temperature favors the incidence of downy mildew up to such extent which able to destroy the crop completely due to fast growth of downy mildew in humid condition.

Cucurbits cultivation is well proven for its high economic return within short period but due to viral diseases and unexpected undesirable biotic and abiotic factors it became a major challenge to growers. High temperature, insufficient soil moisture and severe incidence of aphids, white flies and thrips generally promote the different strains of viral diseases. These problems in cucurbits can be overcome with proper management of crop growth by control of sucking pest incidence, providing sufficient soil moisture and recommended fertigation or fertilizer application, use of silver coated mulch and essential recommended production techniques.

Sr. No	Content	Bitter gourd	Ridge gourd
1	Season/Sowing Time	Kharif (June- July), Summer (Jan- Feb)	Kharif (June-July), Summer (Jan.-Feb)
2	Soil	well drained, light or sandy loam to clay loam fertile soil	Medium black well drained clay loam fertile soil
4	Varieties/Hybrids	NBGH-951, NBGH-676, NBGH-815, NBGH-470 (Apurva), NBGH-167 (Savitri), NBG-162 (Raksha), NBGH-517 (Everest) (White), NBG-88 (white)	NRGH-22 (Rajani), NRGH-370, NRGH-744, NRGH-726, NRG-9
5	Seed Rate/Acre	800-900 g	500-600 g
6	Spacing	180 x 90 cm OR 150 x 75cm	180 x 90 cm
7	Care at the time of sowing	There should be sufficient moisture in soil, Apply Phorate per hill, Drench the soil with Bio sanjivani @ 5 + 5 g/ lit of water or Carbendazim or M-45 @ 2 ml/lit.	Proper irrigation should be given after sowing, Apply Phorate per hill, Drench the soil with Bio sanjivani @ 2 kg/ acre or Dithane M-45 or Carbendazim @ 2 ml/lit.
8	Fertilizer/ Acre	At the time of sowing: 50 kg Urea, 50 kg DAP, 50 kg MOP After 30 days: 50 kg urea. **(For open field condition).** **For Mulching:** 8 DAS: 19:19:19 @ 2kg /200 lit. Water. 14 DAS: 19:19:19 @ 4 kg/200 lit. water, 21 DAS: 19:19:19 @ 4 kg/200 lit water. 28 DAS: 12: 61: 00 @ 3 kg/200 lit water, 38 DAS: 19:19:19 @ 4kg/ 200 lit water, 50 DAS: 00:52:34 @ 4kg/200 lit water. 58 DAS: 00:52:34 @ 4kg/200 lit water. 65 DAS: 13:00:45 @ 3 kg/ 200 lit water, 70 DAS: 00:52:34 @ 4 kg/200 lit water, 75 DAS: 12:61: 00 @ 3 kg/200 lit water. 85 DAS: 19:19:19 @ 5 kg/200 lit water.	At the time of sowing: 60 kg urea, 150 kg SSP, 50 kg MOP After 30 days: 40 kg urea. **(For open field condition).** **For Mulching:** 8 DAS: 19:19:19 @ 3kg /200 lit. Water. 14 DAS: 19:19:19 @ 4 kg/200 lit. water, 21 DAS: 19:19:19 @ 4 kg/200 lit water. 28 DAS: 12: 61: 00 @ 3 kg/200 lit water, 38 DAS: 00:52:34 @ 4kg/ 200 lit water, 50 DAS: 00:52:34 @ 4kg/200 lit water. 58 DAS: 00:52:34 @ 4kg/200 lit water. 65 DAS: 13:00:45 @ 3 kg/ 200 lit water, 70 DAS: 00:00:50 @ 4 kg/200 lit water, 75 DAS: 12:61: 00 @ 3 kg/200 lit water. 85 DAS: 19:19:19 @ 5 kg/200 lit water.
9	Intercultivation	Keep crop weed free up to 60 days by hand weeding or hoeing, proper earthing up should be done 10-12 days interval according to necessity. Vertical trailing should be done by using Bamboo and Iron wire when vine strarts elongation (25-30 days after sowing)	Keep crop weed free up to 60 days by hand weeding or hoeing, proper earthing up should be done 10-12 days interval according to necessity. Vertical trailing should be done by using Bamboo and Iron wire when vine strarts elongation (25-30 days after sowing)

10	Harvesting Detail	First harvesting in bitter gourd could be done from 50-55 days after sowing and subsequent harvesting should be done at regular interval. Immature tender fruits should be harvested at 5-7 days interval. Regular harvesting at shorter intervals will increase the fruit number and irregular harvesting may delay the formation of successive fruit production.	The crop is ready for first harvest 45-50 days after planting. Fruits attain marketable maturity at 5-7 days after anthesis of female flower. Fruits should be harvested when they are tender and still immature. The flesh should not turn fibrous and picking should be done earlier.
11	Yield t/Acre	8 to 10	10 to 12

Sr No	Content	Sponge gourd	Bottle gourd
1	Season/Sowing Time	Kharif (June-July), Rabi (Oct-Nov), Summer (Jan.-Feb)	Kharif (June-July), Rabi (Sept. end to October) Summer (Jan.-Feb)
2	Soil	Well drained, sandy loam fertile soill	Well drained, light or sandy loam soil
4	Varieties/Hybrids	NSGH-21 (Champa), NSGH-88, NSGH-341, NSGH-393, NSGH-389 (P.Green), NSGH-309 (P.Green), NSG-28, NSG-99 (P.Green)	NBBH-48 (Vikram), NBBH-200 (Ramdev), NBBH-168 (Virat), NBBL-12 (Raja)
5	Seed Rate/Acre	400-500 g	800-900 g
6	Spacing	180 x 90 cm	210 x 90 cm OR 180 x 90 cm OR 150 x 75 cm
7	Care at the time of sowing	Maintain sufficient moisture level in soil prior to germination, Apply Phorate per hill, Drench the soil with Bio sanjivani @ 2 kg/ acre or Carbendazim 2 ml/lit.	Apply Phorate per hill, Drench the soil with Bio sanjivani @5 +5 g/ lit or Carbendazim 2 ml/lit.
8	Fertilizer / Acre	At the time of sowing: 50 kg urea, 50 kg DAP, 50 kg MOP After 30 days: 50 kg urea. **(For open field condition).** **For Mulching:** 8 DAS: 19:19:19 @ 3kg /200 lit. Water. 14 DAS: 19:19:19 @ 4 kg/200 lit. water, 21 DAS: 19:19:19 @ 4 kg/200 lit water. 28 DAS: 12: 61: 00 @ 3 kg/200 lit water, 38 DAS: 00:52:34 @ 4kg/ 200 lit water, 50 DAS: 00:52:34 @ 4kg/200 lit water. 58 DAS: 00:52:34 @ 4kg/200 lit water. 65 DAS: 13:00:45 @ 3 kg/ 200 lit water, 70 DAS: 00:00:50 @ 4 kg/200 lit water, 75 DAS: 12:61: 00 @ 3 kg/200 lit water. 85 DAS: 19:19:19 @ 5 kg/200 lit water.	At the time of sowing: 60 kg urea, 50 kg DAP, 50 kg MOP After 30 days: 30 kg urea. After 60 days 20 kg urea. **(For open field condition).** **For Mulching:** 8 DAS: 19:19:19 @ 2kg /200 lit. Water. 14 DAS: 19:19:19 @ 4 kg/200 lit. water, 21 DAS: 19:19:19 @ 4 kg/200 lit water. 28 DAS: 12: 61: 00 @ 3 kg/200 lit water, 38 DAS: 19:19:19 @ 4kg/ 200 lit water, 50 DAS: 00:52:34 @ 4kg/200 lit water. 58 DAS: 00:52:34 @ 4kg/200 lit water. 65 DAS: 13:00:45 @ 3 kg/ 200 lit water, 70 DAS: 00:52:34 @ 4 kg/200 lit water, 75 DAS: 12:61: 00 @ 3 kg/200 lit water. 85 DAS: 19:19:19 @ 5 kg/200 lit water. 90 DAS: 00:52:34 @ 4 kg/200 lit water.
9	Intercultivation	keep crop weed free up to 60 days by hand weeding or hoeing, proper earthing up should be done 10-12 days interval according to necessity. Vertical trailing should be done by using Bamboo and Iron wire when vine strarts elongation (25-30 days after sowing)	keep crop weed free up to 75 days by hand weeding or hoeing, proper earthing up should be done 10-12 days interval according to necessity. Vertical trailing should be done by using Bamboo and Iron wire when vine strarts elongation (25-30 days after sowing)

Sr No	Content	Sponge gourd	Bottle gourd
10	Harvesting Detail	The crop is ready for first harvest 40-45 days after sowing. Fruits attain marketable maturity at 5-7 days after anthesis of female flower. Fruits should be harvested when they are tender and still immature. The flesh should not turn fibrous and picking should be done earlier.	When Bottle gourd is to be harvested for vegetable purpose, it should be harvested at edible stage. In bottle gourd, tenderness and edible maturity are judged by pressing the skin and little pubescence persistent on skin, picking is done about 13-15 or 15-18 days after fruit set.
11	Yield (T/acre)	10 to 12	20 to 22

SN	Content	Cucumber
1	**Season/Sowing Time**	Kharif (June-July), Summer (Jan.-Feb)
2	**Soil**	Well drained, fertile sandy loam to Medium Black soil
4	**Varieties/Hybrids**	NCH-525, NCH-527, NCH-160, NCH-311, NCH-388 Long melon type: NCS-61, NCS-701
5	**Seed Rate/Acre**	200-250 g
6	**Spacing**	120 x 90 cm OR 150 x 75 cm OR 180 x 60 cm
7	**Care at the time of sowing**	Aplly Phorate per hill, Drench the soil with Bio sanjivani @ 5 + 5 g/ lit. or Carbendazim 2 ml/lit.
8	**Fertilizer/ Acre**	**At the time of sowing:** 50 kg Urea, 50 kg DAP, 50 kg MOP After 30 days: 50 kg urea. **(For open field condition).** **For Mulching:** 8 DAS: 19:19:19 @ 3kg /200 lit. Water, 14 DAS: 19:19:19 @ 4 kg/200 lit. water, 21 DAS: 19:19:19 @ 4 kg/200 lit water, 28 DAS: 12: 61: 00 @ 5 kg/200 lit water, 38 DAS: 00:52:34 @ 4kg/ 200 lit water, 50 DAS: 00:52:34 @ 4kg/200 lit water. 58 DAS: 00:52:34 @ 4kg/200 lit water, 65 DAS: 13:00:45 @ 3 kg/ 200 lit water, 70 DAS: 00:00:50 @ 6 kg/200 lit water, 75 DAS: 12:61: 00 @ 3 kg/200 lit water. 85 DAS: 19:19:19 @ 5 kg/200 lit water.
9	**Intercultivation**	keep crop weed free up to 60 days by hand weeding or hoeing, proper earthing up should be done 10-12 days interval according to necessity. Vertical trailing should be done by using Bamboo and Iron wire when vine strarts elongation (25-30 days after sowing)
10	**Harvesting Detail**	Cucumber ready for first harvest 45-50 days after planting, then subsequent harvestings should be done at regular interval of 6-8 days. In cucumber fruits reaches edible maturity within 6-8 days after fruit set. In salad or slicing cucumber, dark green skin or greenish white skin colour should not turn in to brownish yellow or russeting and white spine colour will also be a useful indication for edible maturity. Optimum length of fruit will be 15-22 cm at edible maturity.
11	**Yield (T/acre)**	6 to 8

(**DAS -** Days after sowing.)

In cucurbits the major pest and diseases are common except one or two disease pest. For disease and pest management in cucurbits following recommended chemicals are very useful.

Sr No	Pest	Chemical	Dosage
1	Leaf miner	Bioprahar or	2 ml/lit
		Nuvan or	1 ml/lit
		Chloropyriphos or	2 ml/lit
		Quinolphos	2ml/lit
2	Aphids, jassids	Bioprahar or	2 ml/lit
		Trident or	5-7 g/lit
		Confidor or	1 ml/lit
		Monocrotophos or	2ml/lit
		Actara	0.66 g lit
3	White fly	Bioprahar or	2 ml/lit
		Trident or	5-7 g/lit
		Pegasus or	12.5 g/15 lit
		Pride	0.50 ml/lit
4	Thrips	Bioprahar or	2 ml/lit
		Trident or	5-7 g/lit
		Regent or	2 ml/lit
		Actara	0.66 g lit
5	Leaf eating caterpillar	Nuvan or	1 ml/lit
		Bioprahar or	2 ml/lit
		Quinolphos or	2ml/lit
		Chloropyriphos	2 ml/lit

Sr No	Diseases	Chemical	Dosage	Remarks
1	Downy Mildew	Ridomil MZ Gold or	2.5 ml/lit	Foliar application
		Aliete or	3 g/lit	Foliar application
		Mancozeb or	2 g/lit	Protective spray 5-7 day interval
		Folicur	1 g/lit	Foliar application
2	Fusarium Wilt	Biosanjivani	5+5 g/lit	Drenching at root zone at time of sowing and 20-25 days after sowing
		Pearl or BavistinorDithane M-45	2 ml/lit	Drenching at root zone at time of sowing and 20-25 days after sowing
3	Powdery Mildew	Marvel	2 ml/lit	Foliar application 7-10 interval
		Folicur or cabrio	1 g/lit	Foliar application 7-10 interval
		Score	0.5 ml/lit	Foliar application at 7-10 day interval
4	Alternaria Blight	Ridomil MZ Gold or Pearl or DM-45	2.5 ml/lit	Foliar application at 4-6 day interval
5	Angular leaf spot	Agrimycin	6 g/10 lit	Foliar application only at initial stage of crop growth

Organic Cotton Cultivation With Use Of Nirmal's Eco-friendly Bio –Organic Inputs

Ravi Chaurpagar,
Product Promotion Officer

BIO ORGANIC INPUTS:

NSPL manufactures different bio organic inputs like plant growth vitalizers, soil enrichers, bio fungicides, bio insecticides and bio fertilizers in state-of-the-art bio tech laboratory.
The Bio Organic products viz. Bio Force & Bio Power has received the process patent from Government of India.
Company has tested the bio efficacy of these bio organic inputs on different economically important crops through State Agricultural Universities and National Research Centers of ICAR. Results revealed that by use of these products the productivity of agricultural crops can be increased to the tune of 30-35% by reducing chemical fertilizer doses by 25%. Moreover, the products helped to improve the soil fertility and soil microflora which in turn has increased absorption of essential nutrients.

Cotton (Gossypium spp.) is one of the important commercial crops in India and plays a key role in the economic and social affairs of the world. Now a day the demand for organically grown cotton is growing gradually. In view of this following are the guidelines for cultivation of organic cotton.

Soil: Black cotton soils with an average water content (AWC) ranging from 100-500 mm/m, a slope of 0.5-3%, well to moderately drained, with a soil depth ranging from 0.6 to 0.9 m and a pH of between 7.0-8.2 are most suitable. Soils having an AWC below 100 mm are not suitable for cotton.

Pre-cultivation practices: Deep ploughing once in three years, and two shallow ploughings every year, are essential during the summer. One or two deep ploughings once in three years are necessary to control deep rooted weeds and to destroy pest larvae or pupae. After 1-2 showers, the soil should be prepared 2 – 3 harrowings before the seeds are sown. Crop residues are one of the major sources of nutrients. The entire crop residue from previous crop should be incorporated into the soil. For decomposition of crop residues BHUPARIS DB a de-composting culture shall be used @ 12kg/ha.

Nutrient Management: For organic cotton cultivation following nutrient doses should be applied

- **A)** FYM/Compost: 10 – 12 t/ha
- **B)** Bio Organic Manure " PARIPURNA": 10-12 q/ha
- **C)** Bio Power : 50kg/ha
- **D)** Bio Sanjivani: 8 kg/ha
- **E)** PSB (Phosphate solubilising bacteria): 5kg/ha
- **F)** AB (Nitrogen fixing bacteria): 5kg/ha
- **G)** Rock Phosphate: 200 kg/ha
- **H)** Neem-cake: 200 kg/ha
- **I)** Bio-Pickup (Potash uptake bacteria) : 5 kg/ha

Plant Vitalizer Bio Force @ 2ml/litre of water and Berrylon @1ml/litre should be sprayed @ pre-flowering, flowering and boll development stages.

Selection of Varieties: Preferably early varieties need to be selected to avoid late bollworm attacks. Seeds should not be treated with any chemicals. Variety selected should be non GMO.

Seed Treatment: Treat the seeds with a mixture of Trichoderma viride (8-10 gm/kg of seed) and Pseudomonas fluorescence (8-10 gm/kg of seed) along with Berrylon (liquid) @ 10 ml/kg of seed. Dry the seeds in the shade. After this, again treat the seeds with Azotobacter and PSB (10gm each per kg of seed) and dry the treated seeds in the shade. The treated seeds should be sown within 6-8 hours of treatment.

Sowing: Cotton is sown using a tractor or bullock-drawn seed drill or by dibbling. Hand dibbling of seeds at recommended spacing ensures proper plant stand, uniform geometry and utilizes a lesser quantity of seed. Later, the crop is thinned to the recommended population i.e. 1-2 plants per hill as per the soil conditions. Seeds are sown in north-south direction. A north-south orientation ensures better sun harvesting and prevents loss of carbon dioxide (CO2) that is emitted by the crop during the night. The crop can re-absorb it during the day, resulting better photosynthesis and a better growth. For better sun-harvesting, some organic farmers adopt wide spacing.

Major Insect-pest Diseases & Their Control

Sr No	Name of the Major insect-pest & Disease	Control measure
1	American Bollworm (Heliothis armigera)	Spray Bio-Prahar @ 4ml/litre of water , trap crops like marigold or hibiscus. 10-12 bird perches to be installed /ha. Insect traps using different lures to attract the insects (pheromone traps/light traps). Release of Chrysoperla eggs and hanging of Trichogramma spp. Egg cards 5-6 cards/ha. Foliar spray of 5% NSKE (neem seed kernel extract). A 5-10% HNPV spray. Spray Garnet @ 5 gm/litre of water. Spray Jasper @ 5gm/litre of water.
2	Pink boll worm (Pectiniphora gossypiella)	-do-
3	Spotted Bollworm (Earias Vittella)	-do-
4	Cut worm (Agrotis sp.)	Spray Emerald @ 4 gm /litre of water
5	Aphids (Aphis spp.)/Mealy Bugs	Bio Prahar @ 4 ml/litre of water or Trident 5 gm/litre of water spraying
6	White Fly (Bemisia tabaci)	-do-
7	-do-Jassids (Amrasca biguttula)	-do-
8	Thrips (Thripidae spp.)	-do-
	DISEASES	
1	Root rot, wilt, browning of leaves, flower drop, reddening etc.	Use plant vitalizer Bio Force/Berrylon with bio fungicides like Bio Sanjivani, Trichoderma viride for spray. Plant vitalizers will help to reduce physiological flower drops and will increase flower set and boll size. Bio fungicides shall be used as foliar spray as well as for soil application mixed in organic manure. In severe case drenching of the same is found beneficial.

Role of moisture content and germination behavior of Soybean seed.

Sachin Meher QC Officer,
M.T. Sable Manager QA

Material and method

» Seed sample were collected randomly 500 gm of six lots of variety NSO-15 from plant. Three samples from T/L N-13375(N-15) Lot no.831464(T1), 829357(T2),828686(T3) and three samples of F/S N-692 Lot no.623106(T4), 613136(T5), 714230(T6).
» Experiment have been conducted in hot summer day
» After determining initial moisture percentage & it was in the range of 6-7.4%, all these seed lots were mounted for germination at 25 c temp & 75% RH. 400 seeds of each lots kept in four replication of 100 seeds each as per ISTA norms.
» To obtain 12-13 % moisture in seed remaining seeds of each lot were kept in germination chamber for gaining moisture, where there is RH is 75 % and temperature is 25 degree Celsius.
» Moisture percentage has checked at 24 hours interval and we have got required moisture i.e 12-13 % at six days .
» These all lots of gained moisture were again mounted for germination. 100 seeds of each lot kept in four replication each .

Result and Conclusion

Lot No	Initial moisture %	Germination % at Initial Moisture	Moisture % (After gaining)	Germination %
T1	6	66	12.5	73
T2	6	78	12.5	79
T3	7.4	68	12.9	74
T4	6	67	12.6	76
T5	6	61	12.4	79

» Our results suggest that there is improvement in germination % after gaining moisture up to 12-13 %.
» However no significant difference observed in lot which gets qualified by higher germination percentage (T2) & there is good physical quality of in-coming seed.
» Hence Moisture % should not have gone below the 10% to retain the viability of seed moisture up to 12-13 % before seeding could improve the germination behavior.

Post harvest handling techniques for Soybean:-

» The seed coat is the seed's primary defense against adverse environmental condition. Hard seed coat protect the seed not only from mechanical stress but also from microorganism invasion and from temperature and humidity. Phenolic compounds in the seed coat contribute to the seed hardness.
» Unlike this, in Soybean ,seed has very thin seed coat and embryo is placed exterior, hence even if seed fells from just 2feet it leads in decline the germination.
» It should be harvested at physiological maturity only.
» Soybean threshing should have to be done at 400-450 rpm for self power thresher & it should be in between 700-800 rpm for combine-harvestor.
» During storage too much natural drying should be avoided .
» It is recommended that for retaining viability and longevity Soybean seed lots should have to be stored at 25-30 C .
» Processing should be done before December i.e. at 12-15 % moisture content of seed lot.
» During storage, stack should not more than 7 layer or not > 10 feet.
» For seed treatment Bio-fungicides can be used.
» Post harvest management will helps in retain the viability of incoming seed until it reaches to the end user.

Prospect of Mungbean Yellow Mosaic Virus (MYMV)

S.Y. Patil
Plant Breeder

Introduction

Mungbean [*Vigna radiata* (L.) Wilczek] is one of the thirteen food legumes grown in India and ranks third in production after chickpea and pigeon pea. In India it is cultivated with a production of 3.38 million tonnes from an area of 1.61 million ha with average productivity of 474 kg/ ha. The major mungbean producing states in India are Andhra Pradesh, Orissa, Maharashtra, Madhya Pradesh and Rajasthan accounting for 70 per cent of total country's production.

The standard yield of mungbean worldwide is very low (474 kg/ha) and the mungbean production has not considerably increased yet. The main cause for the low yield is the susceptibility of the crop to insects, weeds and diseases caused by fungus, virus or bacterium, of which Mungbean Yellow Mosaic Virus (MYMV) is one of the most prevalent and destructive viral pathogens in mungbean. Mungbean yellow mosaic (MYMV) virus has been found widely distributed in northern and southern mungbean growing states of India, it is most destructive disease of mungbean during summer season. Depending on the severity of the MYMV infection, the yield penalty may reach up to 85%.

What is Mungbean Yellow Mosaic Virus? (MYMV)

Mungbean yellow mosaic virus (*Begomovirus*) is a major exotic disease of mungbeans causing leaf discoloration. MYMV important virus diseases on mungbean transmitted by the whitefly vector (*Bemisia tabaci* Genn.).

The virus causes a range of symptoms. These first appear as scattered yellow specks on the leaves. As the disease progresses the leaves show irregular green and yellow patches and new leaves may emerge completely yellow. Green areas on the leaf often become raised and the leaf may become papery white and thin. Infected plants produce fewer flowers and pods. The pods that are produced tend to be small, mottled and contain fewer and smaller seeds than non-infected pods. The infected pods also tend to curl upwards and mature later.

Picture: Infected plants

Picture: Close up of infected leaf

Conclusion and Nirmal's Contribution

Mungbean yellow mosaic virus (MYMV) is widespread in the major mungbean-growing parts of India. A severe outbreak of MYMV in the southern and northern states is currently causing serious concern to mungbean growers. With all these problems in mind Nirmal seeds screened 80 genotypes in 2013-14, 62 genotypes in 2014-15, 39 genotypes in 2015-16 and 23 genotypes in 2016-17 at hot spot during summer season. Developed high yielding, early maturity, compact plant type and highly tolerant to mungbean yellow mosaic virus variety NVL-516 for cultivation in India.

Munbean variety NVL-516

Characters

Days to maturity	: 60-65 days
Growth habit	: Erect, semi spreading
Plant height	: 50-55 cm
No. Of seeds per pod	: 9-11
Grain	: Med bold Shiny green

Special Features

- ✧ Highly tolerant to MYMV disease.
- ✧ Non shattering
- ✧ Highly tolerant to powdery mildew disease
- ✧ High yielding
- ✧ Suitability for through out year cultivation

Susceptible Entry

NVL-516 ➡

Picture: MYMV Screening at Hotspot

◆ CMD & Director's Visit

Seed production of hybrid paddy field visit in Telangana

Hybrid bajra seed production plot visit in Telangana

Hybrid chilli commercial plot visit at Bhadrachallum (AP)

Seed Production of Black gram in AP

Seed Production plot of Watermelon in Karnataka

Plantation at Chikhali Plant (Buldhana) by Hon. Director Production Shri. D. R. Deshmukh

Mr. Narendrasing Suryavanshi (Executive Business Development) and Mr. B.P.Jadhav (Sr. Scientist) observing seed production plot of tomoto in Karnatka

Mr. Sanket Patil (Executive Business Development), Mr. N. D. Deshmukh (Plant breeder) and Mr. Shinde observing performance of bhendi

Mr. Tushar Deshmukh (Executive Business Development), Mr. A. N. Kale (Sr. Manager Production), Mr. A.B. Birajdar (Plant breeder), Mr. Santosh Patil (RM) observing performance of paddy in CG

Dealer and marketing staff training programme at Kenya

Dr. Jeetendra Solanki and Mr. Patrick Muthengi during training programme

Product Performance

Performance of Nirmal Sponge gourd-NSGH-88 in Buldhana (Maharashtra)

Farmer Name-Sunil Khandare
Village-Mandka Tal-Khamgaon Dist-Buldhana

Remarks: High yielding hybrid, good quality & shiny fruits

Performance of Nirmal Tomoto-NTH-2925 in Bihar

Farmer Name-Loko Mahto
Village-Lupun, P.O. Jelam
P.S. Katkamsandi Dist-Hazaribagh

Remarks: Big fruits, good fruit weight, tolerant to TyLCV

Performance of Nirmal Bajra-4915 (Yeshwant) in Gujrat

Mr. R. P. Thakare (RM), Mr. C. C. Patel
(Krushi Sales Agro Agency Vijapur) & farmer

Farmer Name-Dineshji Narsingji Thakur
Village-Juna Aspa, Tal-Kheralu, Dist-Mehsana

Remarks: High yield, good fodder quality,
tolerant to downy mildew & good cob length

Field day programme-Hybrid Bajra NPH-4915 (Yashwant) in at Tundla, Dist-Agra (UP)

Mr. M.P.Kulkarni (Sr. Scientist), Mr. Abhisek Chauhan (RM),
with Dealer-Distributers & farmers

Farmer Name-Mr. Rajpal
Village-Tundla, Dist-Agra

Remarks: Excellent performance, bold grains, highly tolerant to
downey mildew disease & high yielding hybrid.

Performance of Nirmal Tomato- NTH-3104 in Gujrat

Mr. R. P. Thakare (RM), Mr. Bharatbhai Patel, Mr. Dilipbhai Patel.
Farmer Name-Bhikabhai Patel
Village-Kadpur Tal-Prantij Dist-Himmatnagar
Remarks: Good keeping quality, high yield & dark red fruit

Use of Nirmal Bio Power & Bio Force double on Okra NOH-1684 (Kajri)

Farmer Name-Mahadev Koli
Village-Bhada, Tal-Ausa, Dist-Latur
Remarks: Good result, increased in yield, improved quality & decrease in fruit & flower drops and increase fruit setting.

Performance of Nirmal Okra NOH-1684 (Kajri) in Telangana

Farmer Name-Mohd. Basha, Village-Ramallakota, Dist-Kurnool
Remarks: Good keeping quality, dark green fruits & high yielding hybrid, tolerant to YVMV & PM diseases

Performance of Nirmal Maize NMH-3493 in UP

Farmer Name-Shatish Saksya, Village-Nainpuri, Dist-Nainpuri
Remarks: Midlate maturity, orange bold grains, good fodder quality & got yield 37.5 qt/acre

Use of Bio Sanjivani on Papaya

Farmer Name-Vitthal Jagtap Village-Belsar,
Tal: Purandhar Dist-Pune
Remarks: Good result on papaya

Performance of Nirmal Tomato & Chilli in Buldhana region

Nirmal Tomato NTH-3104

Farmer Name-Kailash Jhine
Village-Giroli, Tal-Deulgon raja, Dist-Buldhana
Remarks: Good keeping quality, high yield & dark red and very firm fruits

Nirmal Chilli NCH-1747 (Siya)

Farmer Name-Santosh Kharde
Village-Alan, Tal-Deulgon raja, Dist-Buldhana
Remarks: Highly pungent fruits, medium fruit length, tolerant to PM & high yielding hybrid.

Field demonstration programme: Hybrid Mustard NIMH-10

Hon. CMD, Director Research, Research Co-ordinator & Plant breeder during field demonstration programme.

Farmer Name-Krushna Gopal
Village-Sikandarabad, Dist-Agra
Remarks: Excellent performance, early maturity, grayish brown seed & highly tolerant to PM, rust diseases. High yielding hybrid

Use of Nirmal Bio Power granule on Betelvine

Farmer Name-Sanjay Chormale
Village-Nimgaon Ketki, Tal-Indapur, Dist-Pune
Remarks: Excellent result on betel vine

Performance of Nirmal Cucumber NCH-311 in Bihar

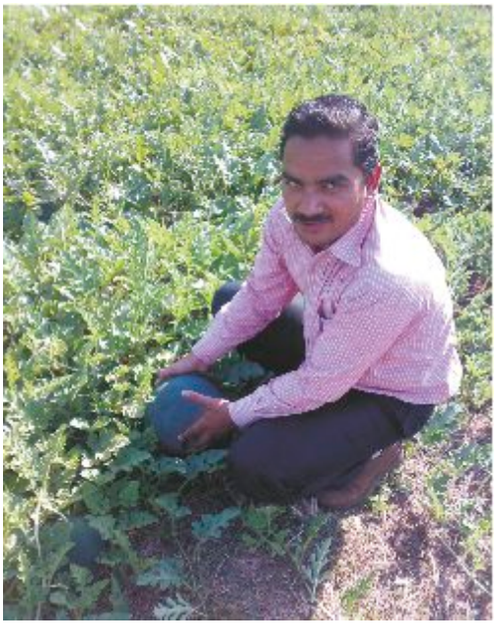
Farmer Name-Tilakchand Singh
Village-Chakai, Dist-Araria

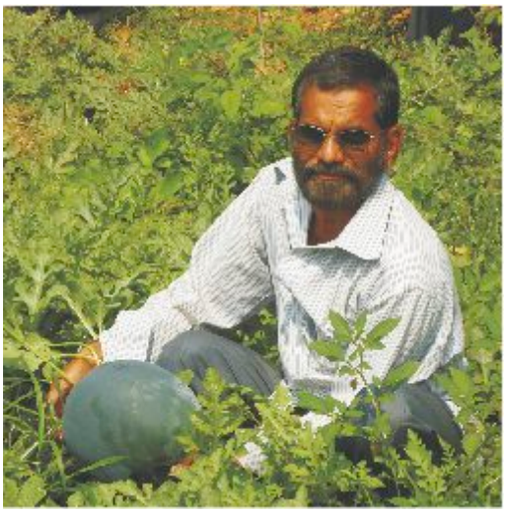
Remarks: Medium long fruits, crispy taste, good keeping quality. Tolerant to PM & DM diseases and high yielding.

◆ Success Story

कलिंगडाने वाढवली शेतीची गोडी....

रत्नागिरी जिल्हयातील एक शेतकरी श्री. हुसेन अ. मुजावर हे बरेच वर्षे परदेशामध्ये राहिले. घरची परिस्थिती जेमतेम असल्यामुळे त्यांनी पुन्हा परदेशात जाण्याचे टाळले. मग करायचे काय हा प्रश्न निर्माण झाल्यानतंर त्यांनी शेती करायचे ठरवले. निर्मल सिड्सचे अधिकृत विक्रेते श्री. अभय शेट्टे (संचालक विश्वकर्मा एंटरप्राईजेस संगमेश्वर) यांच्याशी संपर्क साधुन शेती विषयी माहिती घेतली. कंपनीचे प्रतिनिधी श्री. राहुलसिंग राजपुत व श्री. अभय शेट्टे यांनी निर्मल कलींगड एनडब्लूएमएच-३५४ या वाणाची माहिती देऊन त्याची लागवड करायला सांगितले. त्यानुसार श्री. हुसेन मुजावर यांनी कलिंगडाची लागवड केली. सर्व प्रकारची रासायनिक व जैविक खते यांची सांगड घालुन नजरेत भरेल असे पिक उभे केले. हा प्रयोग बघण्यासाठी गावातील अनेक शेतकरी त्यांच्या शेतात आलेत. पिकाच्या व्यवस्थापनाविषयी माहिती सांगताना सदर शेतकऱ्याने निर्मल बायोपॉवर व बायो पिकअप या उत्पादनाचा वापर केल्याची माहिती दिली. या दोन उत्पादनांच्या वापरामुळे कलिंगडाची वाढ होऊन फळे साधारणत: ६ ते ७ किलो वजनाची भरली. तसेच प्रत्येक फळाचा आकार एकसारखा व आतील गर देखील घट्ट व गोड असुन २ एकर क्षेत्रात जवळपास ३० ते ३२ टन उत्पादन घेतले. या आर्थिक नफ्याच्या शेती मुळे त्यांची शेती व्यवसायात गोडी वाढली. शेतकऱ्यांच्या फायद्यासाठी कंपनीचे प्रतिनिधी श्री. राहुल राजपुत यांनी सिंधुदुर्ग व रत्नागिरी जिल्हयात अनेक ठिकाणी शेतकरी मेळावे आयोजित करून कलिंगडाविषयी माहिती सांगितली.





◆ Eminent guests

माननीय आमदार श्री. गुलाबरावजी पाटील (जळगांव) आणि माननीय आमदार श्री. अर्जुनजी खोतकर (जालना) यांची प्रथमच महाराष्ट्राच्या मंत्रीमंडळा मध्ये निवड झाली. निर्मल सिड्स मध्ये प्रथमच आगमन झाल्यानंतर त्यांचे मनस्वी स्वागत रानमेवा म्हणुन ओळखली जाणारी आणि औषधी गुणधर्म असलेली जांभूळ फळे देऊन मंत्रीव्द्यींचे मनापासुन स्वागत करण्यात आले. जनतेची सेवा करतांना त्यांना उर्जा मिळावी आणि सुदृढ आरोग्य प्राप्त व्हावे यासाठी अशा अनोख्या पद्धतीने या हृदयीचे त्या हृदयी स्वागत करतांना निर्मल परिवाराचे सदस्य व सोबतच पाचोरा–भडगांवचे आमदार मा. श्री. किशोर आप्पा पाटील.






मा. ना. श्री. अर्जुनजी खोतकर (वस्त्रोद्योग, पशु व दुग्धविकास राज्यमंत्री) निर्मल सिड्स कंपनीची आणि जांभूळ बागेची पाहणी करतांना

मा. ना. श्री. गिरीषभाऊ महाजन (जलसंपदामंत्री) यांचे स्वागत करतांना कंपनीचे चेअरमन तथा व्यवस्थापकीय संचालक श्री. तात्यासाहेब आर. ओ. पाटील, उपमहाव्यस्थापक (लेखा व प्रशासन) श्री. एस. एस. पाटील व आमदार श्री. किशोर आप्पा पाटील.

तत्कालीन कृषीमंत्री मा. श्री. एकनाथराव खडसे यांच्याशी शेतकऱ्यांच्या पाणी व शेती विषयीच्या समस्यांवर चर्चा करतांना श्री. तात्यासाहेब आर. ओ. पाटील (चेअरमन तथा व्यवस्थापकीय संचालक)

Visit of Hon. Director of Agriculture, Department of Agriculture, Govt. of Maharashtra, visited Nirmal Seeds. During his visit, he has interacted with different department Heads like R&D, Biotech, Bio Input, Quality Assurance and Processing and given inputs for improvement. Scientist of R&D and Biotechnologist from NSPL explained him the different research activities carried out at NSPL.

Hon. CMD sir felicitating Shri R.T.Patil, Chairman Benevole Welfare Society for Post Harvest Technology

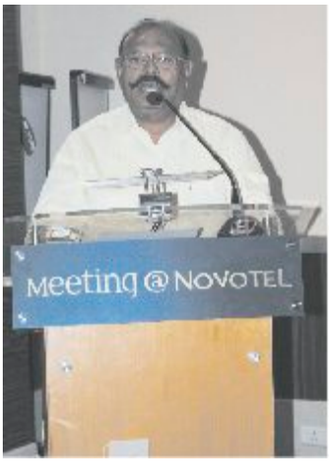
Exposure visit of farmers from Odisha

Annual Budget Meet of Marketing

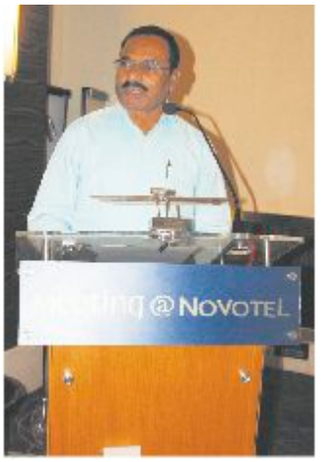
Hon. CMD, Hon. Director Production and Hon. Director Research, inaugurating the budget meeting by lighting of lamp

Launch of New Bio-Power packing and formulation

Annual budget meet of marketing was held at Hotel Novotel, Mumbai during April 2016 to review the financial & sales achievements of different states. Hon. CMD Shri Tatyasaheb R.O. Patil, Hon. Director Production Shri D.R. Deshmukh, Hon Director Research Dr. J.C.Rajput, AGM-Finance & Admin Shri. S.S. Patil, AGM-Marketing Shri G.M. Patil, Shri P.A.Dalvi, Research Co-ordinator Shri I.S. Halkude, Head-Bio Input Division Mr. M.S. Paprikar, Manager-Legal & Admin Mr. Vaibhav Kulkarni and Zonal & Regional Managers of Marketing & Product Promotion were present. During 4 days session achievements 2015-16 and budget 2016-17 was reviewed and finalized .



Hon. Shri R.O.Patil
CMD



Hon. Shri D.R.Deshmukh
Director Production

Hon. Dr. J.C.Rajput
Director Research

Shri S.S.Patil
AGM (Finance & Admin)

Shri G.M.Patil
AGM (Marketing)

Shri P.A.Dalvi
AGM (Marketing)

Shri I.S.Halkude
Research Co-ordinator

Mr. M.S.Paprikar
Microbiologist

Mr. V.V.Kulkarni
Manager Legal & Admin

All India team of Marketing Heads with Hon. CMD, Director Research, Director Production, Sr. Scientist and AGMs

◆ Award

"TOP Performer" Award

The Govt of India's Ministry of Labour and Employment during this year have assessed different Industries under Digital India concept. The assessment was based on making regular statutory payment, regulatory compliances, digitalization, online systems developments, various legal compliances etc. Assessment of different Institutes was also made on their role and activities pertaining to Employee's welfare. The department has selected different Institues for felicitation under different categories.

We are delighted to share you that we Nirmal Seeds has received award "TOP PERFORMER" in all above categories.This is a prestigious award given by the Central Government.

Regional PF Commissioner has conferred this Award to NSPL at Nashik. Certainly, this is one more feather of recognition in Nirmal's crown. We congratulate each and every family member of Nirmal for the contribution in this great.

AGM (Finace & Admin) Mr. S.S.Patil receiving 'Top Performer' Award

वित्तीय वर्ष (2015-16) वर्कींग रिजल्ट प्रस्तुती

सक्षम अर्थव्यवस्था के विकास में कार्पोरेट क्षेत्र के विकास का एक अहम स्थान है, क्यो की औद्योगिक क्षेत्र के प्रगति पर ही उस देश की आर्थिक उचाई मापी जाती है | इसलिए हमारे कम्पनी (उद्योग) का कल और आज का विकास, बजट नियोजन, समस्या और उपाय, कम्पनी का लक्ष्य एवं आर्थिक नीति आदि का लेखा जोखा निदेशक बोर्ड के समक्ष प्रस्तुत करते हुए श्री. एस. एस. पाटील (सहायक महाप्रबंधक वित्त एवं प्रशासन)

अभिनंदन....

स्पर्धेच्या युगात टिकायचे असेल तर कार्पोरेट क्षेत्रात प्लॅनिंगला अतिशय महत्व आहे. मार्केटिंग क्षेत्रामध्ये सकारात्मक दृष्टीकोन, पुर्व व सुक्ष्म नियाजन, वाटचालीची दिशा, निर्धार, विक्री व वितरण कौशल्य, समर्पण, वचनबध्दता, सघटन कौशल्य आणि कालमर्यादा या गोष्टींचे काटेकोरपणे पालन केले तर केवळ लक्ष्यच (टार्गेट) नव्हे तर त्याही पुढे जाऊन डोंगर पार करता येतो. ध्येयं स्मार्ट असावी लागतात तरच माणुस स्मार्ट बनतो. याचे उत्तम उदाहरण म्हणजे मराठवाडा विभागातील श्री बि. एस. इंगळे (नच) यांच्या मार्गदर्शनाखाली कार्यरत असलेली मार्केटिंग टिम ! या टिमने आपले टार्गेट पुर्ण करतांना ३१ जुलै पर्यंत निर्मल बायोपॉवरच्या १२५ गाड्यांचा सेल पुर्ण केला. त्यासाठी या सर्व टिमचे अभिनंदन!

◆ Seed Production Traning Programme

Hon. CMD Shri Tatyasaheb R.O. Patil and Hon. Director Production Shri D.R. Deshmukh
inaugurating the Seed Production Traning Programme arranged for the production team by lighting of lamp

(L-R) Shri D.R.Deshmukh (Director Production), Shri R.O.Patil (CMD), Mr. S.S.Patil (AGM Finance & Admin),
Mr. G.M.Patil (AGM Markting), Mr. I.S.Halkude (Research Co-ordinator) & Mr. V.V.Kulkarni (Manager Legal & Admin)

Team of Seed Production Department during traning programme.

Addressing the Seed Production training programme

Hon. CMD
Shri Tatyasaheb R.O.Patil

Hon. Director Production
Shri D.R.Deshmukh

AGM (Finance & Admin)
Shri S.S.Patil

AGM (Marketing)
Shri G.M.Patil

Research Co-ordinator
Mr. I.S.Halkude

Sr. Manager (Processing)
Mr. A.N.Kale

Manager Legal & Admin
Mr. V.V.Kulkarni

Manager (Processing)
Mr. Sandeep Dandge

Manager (Processing)
Mr. Mahesh Patil

Regional Manager (Production)
Mr. Sharad Patil

Q.C. Officer (Bio Input)
Mr. Valmik Patil

◆ Birthday Celebration of Hon. Directors

◆ Promotional Activities

Mr. Sanjeev Pawar (RM Product Promotion) and Mr. B.S. Ingle (ZM Marketing) in farmer meeting

Mr. S.P. Deshpande (RM Product Promotion) farmer meeting in temple at Marathwada region

Marketing team giving information to the farmers in Bazarmadi (Market), at Nanded

Field day programme on Bajra NPH-4915 in Rajasthan Mr. V.K.Kaushik (RM) with farmers

◆ Exhibition & Workshop

Visit of Hon. Shri Girishbhau Mahajan (Minister Water Resources) to Nirmal's stall at Krushi Exhibition Chopada

Hon. Shri Pratapraoji Jadhav (Member of Parliament) visit to Nirmal's stall at Buldhana

Shri Kailashbapu Patil (Ex. MLA) at Nirmal's stall

(L-R) Mr. Mahesh Patil, Mr. M.T.Sable and Mr. Sandeep Dandge during workshop on"Effective Storage Practices for Seed Viability" Preservation of seed from harvest to sales' organised by SIAM (Seed industries association of Maharashtra) in association with Gubba Cold storage at Aurangabad.

OP Mustard plot visit: Mr. A. N. Kale (Sr. Manager Production), Mr. Santosh Patil (RM) & organizer in Rajasthan

New Joinings

Tatyaba Bhaskarrao Sapkal
RM - Production

Narayan Bhaurao Ghuge
RM - Production

Neeraj Kumar Verma
ASM (Guwahati)

B. Chandra Sekhar
RM - Marketing (Guntur)

Kiran Santosh Pawar
ASM - Marketing (Rajkot)

Jitendra Kumar Yadav
ASM - Marketing (Bareilly)

Chittaranjan Pratapsing Parihar
ASM - Marketing (Sagar MP)

Vipin Kumar Singh
ASM - Marketing (Azamgadh)

Narayan Tulsiramji Pisalkar
ASM - Marketing (Chandrapur)

Shatrughan Shahi
ASM - Marketing (Gorakhpur)

Vikram Singh
ASM - Marketing (Raipur)

Pakala Rajender Reddy
ASM - Marketing (Karimnagar)

Vikas Vasantrao Baraskar
Plant Breeder R & D

Sumit Prakash Kale
RA - Molecular

Shashikant Tiwari
Accoountant - (Jabalpur)

Umedsing Laxman Suryawanshi
Artist

Biswajit Patra
Accountant (Bhubneshwar)

Accredited for their Commandable and Creditworthy Performance

Mr. B. S. Ingle
Zonal Manager
(Marathwada (MS),
Telangana & AP)

Mr. S. V. Gandham
Zonal Manager
(W. Maharashtra,
Karnataka & Tamilnadu)

Mr. S. M. Jadhav
Zonal Manager
(Vidarbha (MS), Chhattisgarh)

Mr. Pankaj Kumar
Zonal Manager
(Bihar, Jharkhand, West Bengal)

Twinkling Stars

Harshada Mahesh Patil
98.80% in SSC exam.

Vikrant P. Dalvi
94.8% in SSC exam.

Abhishek B. Ingle
89% in HSC exam.

Yash Gunaji Sawant
88.80% in SSC exam.

Khan Amenashifa Abbas Alikhan
83.54% in HSC exam.

Khan Afashasaba Abaas Alikhan
83.08% in HSC exam.

Harshal M. Alone
78% in HSC exam. (JNV)

Namrata Gotu Patil
73.66% in HSC exam.

Sau. Nayana S. Patil (Mahale)
B. Com in B+ Grade

Tejas Sandeep Dandge
92.80% in 8th Class
Happy Birthday 15 August

Yash Shrikant Garad
95.6% in 3rd Class

Tanisha Jagdish Ghodake
Grade A-1 in 1st Std.

New Depot Opening

New depot opening done by the auspicious hands of Shri G.M.Patil (AGM Marketing), Shri V.K.Kaushik (Regional Manager) and Mr. Praveen Sharma at Jodhpur. **Address**-NSPL, F-141 D Road No. 4, Near Purva Hospital, Basni 2nd Phase, Jodhpur (Raj)

Wedding Bells

Chi. Rahul
S/o. Shri Dilip Shivaji Shelke
With
Chi Sau. Kan. Jyoti
D/o. Shri Suresh Daga Shinde
On 19th April 2016

Chi. Sagar
S/o. Shri Sureshsing Jaysing Solanke
With
Chi Sau. Kan. Sheetal
D/o. Shri Indalsing Patil
On 8th May 2016

Chi. Charudatta
S/o. Shri Gokulsing Jamsing Nikumbh
With
Chi Sau. Kan. Dnyaneshwari
D/o. Shri Sampatrao Fulsing Pawar
On 11th July 2016

Chi. Amol
S/o. Shri Ravindra Shripatrao Savale
With
Chi Sau. Kan. Ashwini
D/o. Shri Gajananrao Dayaram Wankhade
On 19th May 2016

Chi Sau. Kan. Ashwini
D/o. Shri Pradiprao Chindha Mahale
With
Chi. Rahul
S/o. Shri Santoshrao Vaijusing Mandwale
On 25th April 2016

Chi. Sachin
S/o. Late Shri Tejabsing Sandu Patil
With
Chi Sau. Kan. Giteshwari
D/o. Shri Kalyansing Lalsing Patil
On 20th May 2016

Chi Sau. Kan. Savita
D/o. Shri Anandsing Chindha Jadhav
With
Chi. Sushant
S/o. Shri Kailash Namdev Raundale
On 30th April 2016

Chi. Premsing
S/o. Jaysing Thansing Patil
With
Chi Sau. Kan. Rohini
D/o. Shri Mahendrasing Bhavsing Jadhav
On 24th February 2016

Chi Sau. Kan. Khushi
D/o. Shri Ramesh Abhiman Patil
With
Chi. Somnath
S/o. Late Shri Namdeo Kashinath Ghotekar
On 17th April 2016

संचार

मान्सून लाभदायी, नियोजन गरजेचे

अभियांत्रिकीतून कृषी क्रांती करा

पुण्य नगरी

दुष्काळावर मात करून लाखो रुपयांचा

जमिनीचा पोत सुधारण्यासाठी जैविक खताचा वापर करावा : पाटील

शेतीवाडी

अवघ्या दोन इंच पाण्यावर फुलविला २० एकर तुरीचा मळा

हाईब्रिड बाजरा 'यशवंत' में प्रचुर मात्रा में लौह तत्व

लोकमत

निर्मल सीडसचा ग्राम स्वच्छता अभियानाला हातभार-तात्यासाहेब पाटील

जाफ्राबाद । भगवानसिंह इंगळे

जळगाव जिल्हयातील पाचोरा येथील निर्मल सीडस प्रा.लि.या बियाणे उत्पादनातील अग्रगन्य कंपनीने त्यांच्या अधिकारी व कर्मचा-यांमार्फत गावागावात जाउन कच-यावर जैविक प्रक्रिरुया करण्याबाबतचा स्तुत्य उपक्रम हाती घेवुन ग्राम स्वच्छता अभियानाला

पान २ वर ⏭

निर्मल सीडसची व्यवसायात उंच भरारी

स्वातंत्र्य दिनाच्या हार्दिक शुभेच्छा!

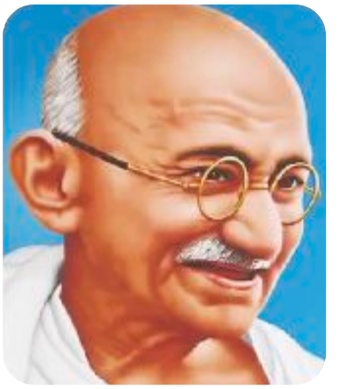
मरण आले तरी चालेल
पण शरण येणार नाही...

छत्रपती श्री. शिवाजी महाराज

कार्यात यश मिळो वा न मिळो,
प्रयत्न करण्यात कधीही माघार घेता कामा नये

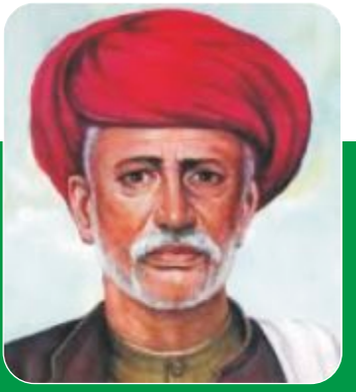
लोकमान्य बाळ गंगाधर टिळक

तुमच्या मताची किंमत मीठ-मिरची
इतकी समजू नका.
त्यातील सामर्थ्य ज्या दिवशी तुम्हाला कळेल.
तेव्हा ते मत विकत घेऊ पाहणाऱ्यांइतके
कंगाल कोणीच नसेल
डॉ. बाबासाहेब आंबेडकर



खुद वो बदलाव बनिए
जो दुनिया में आप देखना चाहते है

महात्मा गांधी



विद्या बिन गई मति, मति बिन गई गति,
गति बिन गई नीति, नीति बिन गया वित्त,
वित्त बिन चरमराये शुद्र एक अविद्याने किये कितने अनर्थ
महात्मा ज्योतिबा फुले

हे मातृभूमी, तुजसाठी मरण ते जनन।
तूजविण जनन ते मरण।

विनायक दामोदर सावरकर

On the occasion of Republic Day 26th January 2016, Hon. CMD hoisted the flag.

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