

NIRMAL SEEDS PVT. LTD., PACHORA



Nirmal Doot

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Lead and Succeed





स्वतंत्रता दिवस के अवसरपर
निर्मल परिवार के सभी सदस्य गण,
वितरक तथा विक्रेता एवं किसान भाईयों
को हार्दिक शुभकामनाएँ !!!

निर्मल परिवार

Newly established Bio manufacturing unit of
Nirmal Seeds Pvt. Ltd. in Gujarat





कौशल से समृद्धि.....



एस. एस. पाटील



पी. ए. दळवी



रवि चौरपगार

आज सूचना प्रौद्योगिकी से पूरा विश्व एक गाँव बना है। पूरे विश्व में सूचना प्रौद्योगिकी का युग आ चुँका है। इंटरनेट क्षेत्र में हर दिन नये नये बदलाव के प्रवाह बहने लगे हैं। उपग्रह संवाद तंत्र प्रणाली से विचारों का आदान-प्रदान के नये तंत्र उपलब्ध हो चुके हैं। कृषी क्षेत्र में भी बदलाव हो रहे हैं, वह अधिक विस्तारित हो रहा है। दुनिया में नये नये संशोधन हो रहे हैं। प्रसार माध्यमों का स्वरूप भी बदल रहा है। कृषी क्षेत्र में भी मुलभूत बदलाव आये हैं। नई नई कला, गुणविशेषताएँ निर्माण हो रही हैं। नई नई संकल्पनाओं का विस्तार हो रहा है। उद्योग विश्व तेजी से बढ़ रहा है, साथ ही कॉर्पोरेट क्षेत्र में कॉर्पोरेट संवाद नामक संकल्पना एक जरूरत बन गयी है। भारतीय उद्योग क्षेत्र में अब कॉर्पोरेट युग आ गया है। कम्प्यूटर युग के बाद केबल, टेलिविज़न का विस्तार, उसके बाद मोबाईल, इंटरनेट और सोशल मिडिया जैसे नये अविष्कार विकास के चरण रहे हैं। पूरी तरह से इन प्रगत-विकास प्रक्रियो में हम निश्चित रूप से कहाँ हैं, हमारा स्थान क्या है, इस प्रवाह में हम कहाँ गुम तो नहीं हुये हैं ना ? इन बातों का विचार करने की अब आवश्यकता है।

अन्य क्षेत्रों की तरह कृषी क्षेत्र में भी नये नये खोजों से मुलभूत परिवर्तन आया है। पारंपारिक खेती की जगह अब आधुनिक खेती ने लिया है। किसान शास्त्रीय तरीके से खेती करने लगे हैं। उनकी खेती विज्ञान की है। विश्व जैसे बदल रहा है वैसे ही खेती स्मार्ट हो रही है, किन्तु उसी तुलना में क्या हम स्मार्ट बन रहे हैं ? यही एक सवाल है ! क्या कृषी क्षेत्र के लिए आवश्यक कुशलता हमारे पास है ? अगर है तो हमारे प्रगती में रुकावट क्यों आयी ? इन बातों को ढुँढ़ना अब आवश्यक हुआ है। समय बदल गया है, लेकिन हम में बदलाव आया है क्या ? संदर्भ बदले परन्तु इनके नये अर्थ ढुँढ़े गये हैं क्या ? सुविधाएँ आयी, नये संसाधन की प्राप्ति हुयी मगर हमारी कार्यक्षमता बढी है क्या ? अगर आपकी जिम्मेदारी बढ गयी है तो उस जिम्मेदारी को निभाने में आपके पास ताकद या मनोबल बढा है क्या ? क्या हम काम के प्रति

तत्पर एवं समर्पित हैं ? ऐसे अनेक सवालों की घेरे में आज हम खडे हैं। अगर भविष्य का सफर आपको सुखदायी या कामयाब बनाना हो तो इन सभी सवालों के जवाब ढुँढ़ना आवश्यक है।

समय बदल रहा है, और समय के अनुसार परिवर्तन करना यह प्रकृति का नियम है। गतिमान बदलाव के साथ हमारी कार्यक्षमता को बढाना चाहिए। कॉर्पोरेट जगत का जोर अचूकता, तत्परता, कार्यशिलता एवं गुणवत्ता आदी तत्वों पर होता है। स्पर्धात्मक युग में प्रतियोगी भी अनेक होते हैं। वे नाम कमाने के लिए अपने अपने तरीके से प्रयास करते हैं। इसलिए सही नियोजन की रणनीति महत्वपूर्ण होती है। इस रणनीति में पारंपारिक तरीके का इस्तेमाल नहीं होना चाहिए। शिघ्रता से बदलनेवाले समय के अनुसार अपने जीवन के उद्देश्य भी बदलते रहे हैं। हमेशा बदलते जानेवाले समय के कसौटी पर ही आपके पास होनेवाले तंत्रज्ञानकी, कुशलता की कसौटी लगती है। वह सक्षमता आपके पास होनी चाहिए। बुद्धि से ज्यादा कुशलता श्रेष्ठ होती है। खुद पर भरोसा रखो। अपनी कार्यकुशलता और प्रभावशिलता बढाना चाहिए, तो ही आपको सफलता मिलेगी। बरसों से बडे गर्व से अपराजित एवरेस्ट जैसे ऊँचे पर्वत को भी मानवने अपने साहस, चातुर्य से जीता है। यह एक प्रेरणादायक उदाहरण है।

राष्ट्र की महानता जिस तरह देश के नागरिकों पर निर्भर होती है वैसेही हर कोई कंपनीकी महानता उस कंपनी के कर्मचारीयोंपर निर्भर होती है। वर्तमान, भूत एवं भविष्य इन तिनो समय का विचार करते समय आपके भूमिका में समन्वय होना चाहिए। आजकी और कलकी कुशलता, हुनर कौनसी है इसे पहचानना चाहिए। कल की कुशलता क्या है वह खुदमें विकसित करना चाहिए। उनकी वृद्धि करना चाहिए, ना केवल वृद्धि करना है किन्तु इन कुशलता का उपयोग अपने कार्य में पूरे ढंगसे करना है। तबही हम अपने लक्ष्य तक पहुँच सकेंगे। विगत 3 दशकों से हम किसानों को सेवा दे रहे हैं।



समय बदल रहा है, और समय के अनुसार परिवर्तन करना यह प्रकृति का नियम है। गतिमान बदलाव के साथ हमारी कार्यक्षमता को बढ़ाना चाहिए। कार्पोरेट जगत का जोर अचूकता, तत्परता, कार्यशिलता एवं गुणवत्ता आदी तत्वों पर होता है। स्पर्धात्मक युग में प्रतियोगी भी अनेक होते हैं। वे नाम कमाने के लिए अपने अपने तरीके से प्रयास करते हैं। इसलिए सही नियोजन की रणनीति महत्वपूर्ण होती है। इस रणनीति में पारंपारिक तरीके का इस्तेमाल नहीं होना चाहिए। शिघ्रतासे बदलनेवाले समय के अनुसार अपने जीवन के उद्देश्य भी बदलते रहे हैं। हमेशा बदलते जानेवाले समय की कसौटी पर ही आपके पास होनेवाले तंत्रज्ञान की, कुशलता की कसौटी लगती है। वह सक्षमता आपके पास होनी चाहिए। बुद्धि से ज्यादा कुशलता श्रेष्ठ होती है। खुदपर भरोसा रखो। अपनी कार्यकुशलता और प्रभावशिलता बढ़ाना चाहिए, तो ही आपको सफलता मिलेगी।

कृषी क्षेत्र की अनेक उपलब्धियां हमारे पास हैं। उन उपलब्धियां एवं कुशलता का उपयोग कृषी क्षेत्र की उत्पादकता बढ़ाने के लिए करना चाहिए। खेती की आधुनिक तंत्रे ढुंढना चाहिए। अलग-अलग और कल्पक तंत्रों का उपयोग करना चाहिए। सबसे बड़ी बात याने की अभिनव तरीके से सोच कर तंत्रकुशल, प्रतिभावान लोग हमारे पास हैं। इन मुलभूत ताकदों को प्रगत तंत्रज्ञानसे जोड़ना चाहिए, तो निश्चित रूपसे हम बड़ा साम्राज्य खड़े कर सकते हैं। कंपनी के औद्योगिक प्रगती में प्रत्येक घटकों का योगदान महत्वपूर्ण होता है। प्रत्येक घटकों द्वारा या प्रत्येक व्यक्ति द्वारा पूरा योगदान दिया जाये तो निश्चित रूपसे हमें विश्व की कोई भी

शक्ति प्रगति से रोख नहीं सकती। कंपनी के तीस वर्षों की सफर में यह वर्ष महत्वपूर्ण है। सभी ने सामुहिक विचार शक्ति की जागृति कर अपनी ध्येयपूजा करनी चाहिए। सकारात्मक विचारों से ही कार्यप्रवृत्त होने की प्रेरणा मिलती है। विविध शक्तियां अगर एक हो जाये तो एक महाशक्ती निर्माण होती है। उसी तरह आपकी निर्मल विचार धारा भी प्रबल होनी चाहिए। प्रगत तंत्रज्ञान या आपके कौशल का उपयोग खेती के लिए करें, ताकि खेती अधिकसे अधिक स्मार्ट बने। रजत पर्वसे सुवर्ण जयंती की ओर जानेवाला सफर कठीण है, किन्तु सफल कामयाबी हासिल करने के लिए सभीके योजनाबद्ध परिश्रम, योगदान और समर्पण आवश्यक है, तो ही हम निश्चित रूपसे कामयाबी के शिखर तक पहुँचेंगे।

संपादक: एस.एस.पाटील, पी.ए.दलवी, रवि चौरपगार

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We welcome your suggestions and valuable comments.

Please e-mail us your view on the magazine at info@nirmalseedsindia.com

◆ CMD's message

Nirmal Doot



01

जागतिकीकरण के बदलते परिस्थितियों में डटकर बने रहने के लिए मनुष्यबल का व्यावसायिक (Professional) और प्रबंधकीय (Managerial) कुशलता एवं हुनर में वृद्धि होने हेतु इसपर मैंने हमेशा बल दिया है। इसलिए प्रतिवर्ष प्रशिक्षण व विकास का कार्यक्रम जारी रहता है। इसका उद्देश्य यही है की आप सभी को प्रेरित करना, मनुष्यबल का विकास करना, विविध बदलावों का सामना करने के लिए क्षमताओं को विकसित करना, समस्याओं का हल निकालना और साथ में जो भी कुछ नयी चुनौतियाँ होंगी उनका सामना करने के लिए और प्रतियोगितात्मक समय में आपके व्यवसाय का अस्तित्व बरकरार रखने हेतु जो कुछ निपुणता एवं कुशलता आवश्यक होती है वह विकसित करना और भविष्य के बारे में सोचकर इन कुशलताओं में नयापन लाकर आप यशस्वीता के समृद्धि के उँचाई पर जाये यही हमारी भुमीका है।



‘निर्मलदूत’ इस गृह पत्रिका के माध्यम द्वारा आपसे बातचीत तथा विचारों के आदान-प्रदान करते हुए मुझे बेहद प्रसन्नता एवं खुशी हो रही है। आज 15 अगस्त याने स्वातंत्र्य दिन है। भारतीयों के लिए एक मंगलमय दिन है। आप सभी को भारतीय स्वातंत्र्य दिन की हार्दिक शुभकामनाएँ !

दोस्तो, औद्योगिक क्रांति पश्चात मानवी जीवन में परिवर्तन आये ! यह औद्योगिक विश्व जैसे जैसे बढ़ते गया, वैसे वैसे मानव संबंधों में अधिकतम जटिलता आयी है। व्यावसायिकता विकसित करते समय सामाजिकता को भी देखना जरूरी होता है। किन्तु सामाजिक संबंधों बिना व्यवसाय करना बड़ा कठीण होता है। यह युग सूचना प्रौद्योगिकी का है। सूचना, खबर एवं जानकारी हम सब के लिए जरूरत हो गयी है। जानकारीयों उपलब्ध कराने का काम प्रसार माध्यमों के साथ अन्य स्रोतों द्वारा भी कराया जाता है। इन कॉर्पोरेट क्षेत्रों में परिपूर्ण जानकारीयों प्राप्त करने हेतु एवं आपस में बातचित प्रस्थापित करने के लिए इस आधुनिक समय में संयुक्त वार्तालाप संकल्पना में जैसी वृद्धि हो रही है, वैसे ही मानव संसाधनों की जरूरत बड़े पैमाने पर निर्माण हुयी है। विगत शताब्दी का हम चिंतन करें तो भारतीय उद्योग और व्यवसायों में अनेक प्रकार

के मुलभूत बदलाव हुये हैं। जागतिकीकरणसे व्यवसाय और व्यापारकी दिशा बदल गयी।

प्रौद्योगिकी में आधुनिकता आयी। अधिक स्तरपर रोजगार निर्मिती हुई। पुरी तरह से मानव संसाधनों के ओर देखने का नजारा बदला। इस कारण कॉर्पोरेट क्षेत्र में मानव संसाधन को विशेष महत्व प्राप्त हुआ। हर कोई कंपनी के लिए प्रबंधन का आत्मा मतलब मानव संसाधन होता है। कंपनी के उतार-चढ़ाव एवं यश-अपयश, उद्विष्ट्य, मानव संसाधनों पर ही निर्भर होते हैं। मानव संसाधन प्रबंधन औद्योगिक क्षेत्र के मानवी घटकों से संबंधित होता है। यही मानवी घटक कंपनी को कामयाबी के बुलंदियों पर ले जाता है। इसलिए मनुष्यबल यह एक राष्ट्रीय संपत्ति समझी जाती है।

कंपनी के ध्येय, उद्देश्य संचलित करने के लिए और लक्ष्य की पूर्ति हेतु हमारे पास स्वतंत्र मानव संसाधन विभाग (Human Resource) स्थित है ज्यो सभीको ही प्रेरित (Motivate) करता है। जागतिकीकरण के बदलते परिस्थितियों में डटकर बने रहने के लिए मनुष्यबल का व्यावसायिक (Professional) और प्रबंधकीय (Managerial) कुशलता एवं हुनर में वृद्धि होने हेतु इसपर मैंने हमेशा बल दिया है। इसलिए प्रतिवर्ष प्रशिक्षण व



विकास का कार्यक्रम जारी रहता है। इसका उद्देश्य यही है की आप सभी को प्रेरित करना, मनुष्यबल का विकास करना, विविध बदलावों का सामना करने के लिए क्षमताओं को विकसित करना, समस्याओं का हल निकालना और साथ में जो भी कुछ नयी चुनौतियाँ होगी उनका सामना करने के लिए और प्रतियोगितात्मक समय में आपके व्यवसाय का अस्तित्व बरकरार रखने हेतु जो कुछ निपुणता एवं कुशलता आवश्यक होती है वह विकसित करना और भविष्य के बारे में सोचकर इन कुशलताओं में नयापन लाकर आप यशस्वीता के समृद्धि के उँचाईपर जाये यही हमारी भूमिका है। परंतु जो भी कुशलताये विकसित किये जाती है उनका उपयोग हम हमारे कार्यों में, दिन-प्रतिदिन जीवन में किया जाता है क्या ? यही बड़ा सवाल है। कुशलताएँ एक जैसी नहीं होती, वे व्यवसाय के अनुरूप होती है। खेती का विकास और किसानों की प्रगती यही हमारा उद्देश्य है। इस काम के लिए

हम हमारी कुशलताओं का उपयोग करते हैं क्या ? यही हर किसीने खुदको पूँछना चाहिए। हर कोई व्यवसाय हो या कम्पनी उन सभी की सफलता परिवर्तन पर निर्भर होती है। यही परिवर्तन लानेवाले उन कंपनियों के मानवी घटक होते हैं। क्या, फिर हम हमारे जीवन में बदलाव लाते हैं, क्या खुद बदलते हैं ? हम समय का अनुपालन करते हैं क्या ? क्या हमारी कामे समयपर पुरी होती ? जो गलतियाँ हुयी हैं वह दुबारा ना हो पाये उसकी चिंता, उसकी ओर ध्यान देते हैं क्या ? इन सभी बातों का हर किसीने विचार करना आवश्यक है। अपना धर्म, कर्म एवं क्षेत्र केवल कृषी है, इसलिए हमारा हर कार्य सक्षम होना चाहिए। हम एक उत्तम समन्वयक होना चाहिए। हमें अपने काम से प्रतिबद्ध होना चाहिए। हम अपने कार्य के प्रति निष्ठावान होना चाहिए। अगर आपको आगे बढ़ना है, बड़ा होना है तो अपना कार्यक्षेत्र बढ़ाना होगा। अपने व्यवसाय को बढ़ाना चाहिए। कंपनी के प्रति

प्रतिबद्धता और निष्ठा की भावना को बढ़ाना चाहिए। प्रभावकारी कुशलता को बढ़ाना चाहिए। अपने भूमिका को उचित न्याय देने की क्षमता रखनी चाहिए। कंपनी के लक्ष्य - उद्देश्यों का इमानदारी से अमल करना चाहिए।

आमदनी अथवा उत्पाद वृद्धिका जो तंत्र है वह किसानों तक पहुँचना चाहिए और साथ में हम सभीने सक्षमता एवं कुशलता का पुरी तरह से उपयोग करना चाहिए। उसीका उपयोग खेती की समृद्धी के लिए होना चाहिए। हमारा जो लक्ष्य है वह समयपरही पूरा करना चाहिए। प्रयासों की चरण सिमा तक जाना चाहिए, तो ही हमें सफल कामयाबी हासिल होगी। जब आपकी कंपनी या संस्था बड़ी होती है तब आप भी स्वयं बड़े होते हैं, यह ध्यान रखना चाहिए।

आर. ओ. पाटील

चेयरमेन तथा प्रबंध निदेशक



Mungbean and Urdbean are the important short duration pulse crops which are cultivated across seasons and in wide range of climatic zones of India. It is happy situation for all pulses growing Farmer's and pulse scientists in the Country that ban on export of pulses is lifted and pulses are excluded from the essential commodity act. It is expected that to facilitate fair price to domestic production and motivate farmers to grow more pulses.

Nirmal Seeds played an important role in developing high yielding mungbean and urdbean varieties. These varieties became highly popular among the farmers and occupied major area in central zone of India. The soil and climate in the country is so diverse that it is almost impossible to expect a single variety of any crop to perform better in every corner of the country. However, at the same time it does not mean that it is not possible to breed varieties with wider adaptability.

Previous pulse breeding programme was focused mainly on yield importantly even though we could not achieve the desired breakthrough in increasing production and productivity of pulses at national level as like crops particularly in rice and maize.

To overcome this situation we must retrospect into our breeding objectives and strategies to achieve them.

1) Climate resilient varieties.

Pulses are sensitive to weather fluctuation, Monsoon delay in kharif, long dry spell at flowering and terminal moisture & heat stresses causes severe yield losses. Water logging and uncertain rains are major constraints in kharif season. Terminal heat stress is a severe problem in mungbean in India, particularly in spring/summer. Temperature above 35° C occur during early growth stages which results in reduced growth & has direct effect on

◆ Articles

Nirmal Doot



03

Future Research Strategies in Mungbean & Urdbean

I. S. Halakude

(Research Coordinator)

flower retention and pod formation. At the same time urdbean is very sensitive to water stress. Hence this necessitates in developing photo & thermos insensitive varieties suitable for both dry and wet seasons can help to increase genetic gains.

2) Varieties for new cropping system.

Development of varieties i.e. restructure the plant types suitable for high density planting and suitable for inter cropping. Development of varieties for cultivation as a catch crop between two main crops especially after the harvest of wheat in indogangatic plain, canal command areas of MP and Gujrat. In rice fallow regions of India a rice fallow pulses is a potential one which are grown on residual moisture after rice harvest appropriate management with proper varieties can increase the production and productivity of pulses.

3) Tolerance to biotic stresses.

Mungbean & urdbean cultivation have always been under threat of viral disease like YMV, urdbean leaf crinkle, leaf curl disease and bud necrosis. These diseases are caused by begomoviruses or tospoviruses transmitted through vectors. In the beginning, the YMV disease is more prevalent in northern India during kharif and summer and was rarely noticed in rabi and rice fallow situations. Now the virus has become serious constraint in all growing seasons. Three distinct strains of YMV (MYMV, MYMIV and MYMV vigna) have identified and their prevalence are being mapped in the country. Efforts are being made to develop YMV resistant varieties.

4) Varieties for newer traits.

Non availability of labour for agriculture, the multiple picking in mungbean is now not possible, so it is imperative to develop suitable plant types amenable for mechanical harvesting. For this introgression with additional features like synchronous maturity and thick stem at base with distinct vegetative and reproductive phase. Again use of postemergence herbicides like imazethpyr & quizalofop in soybean encouraged to

identify molecules which can provide protection against weeds in mungbean and urdbean. For higher yielding and to realize the productivity level of these crops, it is necessary to develop the plant types suitability for high density planting. The close spacing will facilitate to more number of plants in per unit area. Pulse varieties with high harvest index with higher biomass production will be desirable and efforts have to be made for value addition.

To provide research impetus to mungbean and urdbean, the research programmes have been oriented to improve genetic yield potential through germplasm enhancement and gene introgression, development of high yield potential varieties with high degree tolerance to biotic stresses, improving crop adaptation to climate change by manipulating crop duration, developing photo-thermo insensitivity, tolerance to high temperature & drought for summer cultivation as a catch crop and value addition and quality improvement in the development of cultivars of mungbean and urdbean.





A Liquid Mycorrhizal Biofertilizer: Step toward effective nutrient and water management

M. S. Paprikar
(Microbiologist)

Crop productivity has direct co-relation with nutrition and irrigation management. Proper utilization of these resources can boost up the yield of different economically important crops. Moreover, it can reduce the cost of production. Leaching of nutrients and water has always been a major concern in agriculture, which has not only deteriorated the soil health but also increased the cost of production. So as to tackle above problems the Bio input division of NSPL has developed a liquid formulation of Mycorrhizal biofertilizer with innovative Patented technology.



**Nirmal
Bio Power Gold
liquid**

The advantages of drip irrigation system viz, increase in crop yield, saving of ground water, optimization of chemical fertilizer doses, reduction in labour cost of application has increased the awareness about the drip irrigation system among the farming community. Day by day area under drip irrigation is increasing drastically due to promotion of drip irrigation system under various Government Schemes. Under such situation if use of liquid formulation of Mycorrhizal biofertilizer will be promoted, then certainly the nutrients and water from untapped area can be tapped resulting in lowering down the expenses on fertilizers and irrigation to fewer extent.

Considering farmers demand of liquid based Mycorrhizae product suitable for drip application, Scientists of Nirmal Seeds initiated the work on liquid Mycorrhizae biofertilizers product development and demonstration. After a series of product testing and trials, NSPL could develop an innovative liquid Mycorrhizae product viz, "Bio Power Gold"

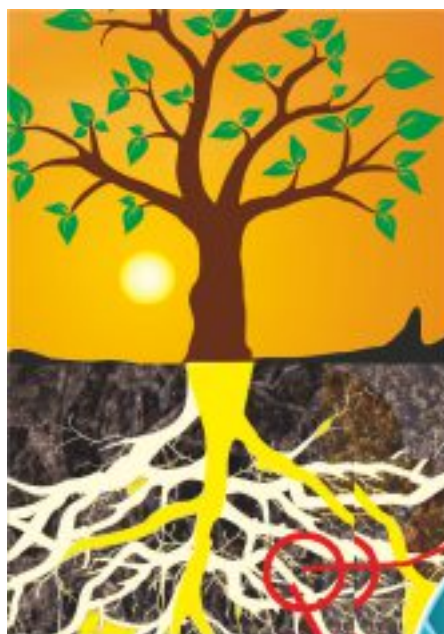
What is Bio Power Gold liquid?

What the New Formulation is?

Bio Power gold liquid is developed by Patented Root Organ Culture technique (ROC) using three species (consortium) of Glomus. ROC is a High-tech in vitro production technology under controlled hygienic conditions.

Propagules count : 100 propagules per ml.

Dose:- Use Bio power Gold liquid through the drip irrigation system/drenching or soil



application with organic manure. Two applications are suggested @ 2.5 litre/ha at
i) Vegetative stage
ii) Flower to the fruiting stage

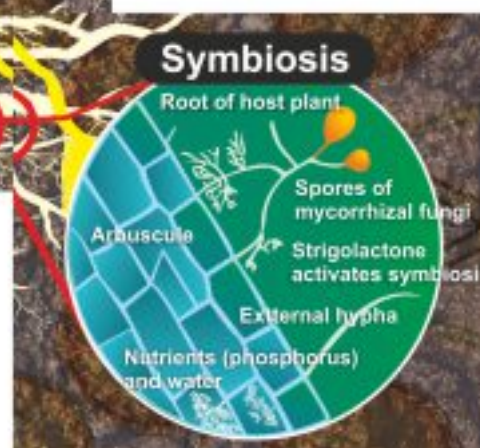
Availability :- Product is available in 500 ml and 1 litre HDPE Bottle packing. Standard packing is of 10 litre.

Recommendations :-

Bio Power Gold (A Liquid Mycorrhizal Biofertilizer) can be used on crops like Sugarcane, Cotton, Banana, Grapes, Apple, Citrus, Onion, Potato, Chili,

Pulses, Oilseeds and Vegetables (except cole crops). It cannot be used for cruciferous plants.

"Bio Power Gold" is proved to be most suitable for sustainable agriculture and for improving the soil structure and texture mainly because, it reduces labour cost and ensure root zone application of propagules, which results in maximum Mycorrhizae fungus root association. Mycorrhizal hyphae penetrates in soil and increases nutrient and water uptake ultimately results in increase in crop yield.



Features:

1. Helps to absorb and mobilize primarily phosphorous, along with other important macro and micro elements and water.
2. Compatible with other Biofertilizer of different categories (N, P, K and S - fixers and solubilizers).



3. Environment friendly and does not affect ecological balance

Benefits of Bio Power Gold (Liquid Mycorrhizal biofertilizer) to the crop and soil:

1. Suitable for application by drip irrigation. Root zone application of AMF propagules ensures root entry point of the AMF and avoid loss of propagules.
2. Improves plant root growth and development.
3. Increases the uptake and mobilization of phosphate in all crops.
4. Increases and facilitate nutrient and translocation from the soil and root cuticle parenchyma to xylem, phloem, elements like nitrogen, potassium, iron, manganese, magnesium, copper, zinc, boron, sulfur and molybdenum.
5. Effective in overcoming the stress conditions like drought, disease incidence and deficiency of nutrients.
6. Enhances the quality of produce and increases the immune power of the crop.

7. AM supplement root hair in water absorption, hence prevents reduction in crop relative water content of cells and helps to overcome drought.

From ongoing experiments it is very clear that, a liquid Mycorrhizal bio-fertilizer developed by the Consortium of Glomus

species and propagated by ROC technique shall provide significantly high and economically attractive option to reduce the dose of chemical fertilizers. It has become an integral part of the nutrient and water management and indispensable component of sustainable agriculture.



Control



Bio Power Gold liquid treated



Seed Enhancement : Technologies for Assured Plant Stand Establishment

M T Sable (Manager QA)
Swapna Deshmukh (QA Officer)

Seed enhancement technologies have expanded over the last 15 years due to the seed industry's demand for strong and uniform crop stand establishment. Seed is regarded as carrier of new technologies. Therefore, the seed needs to be protected so as to deliver it as an efficient input. When seed is planted during an environmental stress like heat or drought chemical reactions in the seed may not go as smoothly as when the seed is under favorable condition.

Precision seeding reduces seed cost per acre and seed establishment increases production flexibility and harvest pack out. Successful stand establishment under all conditions is the key to assured production.

Various seed treatments have been used in many crops for a variety of purposes, seed enhancement includes priming, steeping, hardening, pre-germination, pelleting, encrusting & film-coating.

The purpose is to describe seed enhancement technologies & Nirmal Seed's commercial application in selected crops to boost early seedling vigor.

A. Seed pelleting:

Seed pelleting is the process of adding inert materials to change seed size and shape for improved plantability (Halmer 1988). These enhancements improve planter performance by making seeds rounder or larger and can be used as a carrier for various seed additives such as nutrients, growth regulators, and crop protection materials. Pellets are made to precise size tolerances and are very useful in combination with precision seeding equipment. Singulation of seed in the field is therefore easier.

There are two components to a seed pellet:

a) Bulking (or coating) material: The bulking material can be either a mixture of several different mineral and/or organic substances or a single component. The coating material changes the size, shape and weight of the seed. Desirable characteristics of a good coating material include uniformity of particle size distribution, availability of material, and lack of phytotoxicity.

b) The second component, the binder :

The binder holds the coating material together. Binder concentration is critical because too much binder will delay germination. Too little binder will cause chipping and cracking of pellets in the planter box, which can cause skips and/ or wide gaps in the plant rows. Many different compounds have been used as binders such as various starches, sugars, gum arabic, clay, cellulose, vinyl polymers and even water.

Seeds of various sizes are commercially pelleted, from relatively large seeds like Capsicum, Chilli and tomato to very small seeds like Begonia sp. Seed pelleting protocols can be designed to increase the seed weight by about 2-fold up to 50-fold or more.

Benefits of Seed pelleting :

- Pelleted seeds can be planted with a mechanical seeder.
- The uniformity of shape and additional weight of the pellet make it possible to plant even tiny seeds directly to the field either with a seeder or by hand.
- Pelleted seeds can be spaced regularly, Precise placement of one seed per plug.
- It is used as a carrier for various seed additives such as nutrients, growth regulators, and crop protection materials.

Nirmal Seeds is using this technique in Capsicum NCCH-7 in which seed weight is increased by about 7-fold. There are approximately 200 naked seed per gram in Capsicum NCCH-7.



B. Film Coating/ Encapsulation:

Film Coating involves deposition of a thin but uniform, coating of tough material onto the surface of the seed. Because of worker safety considerations, seed-coating method over the last several years has gained popularity. Dadlani et al. (1992) reported that the seed coating improved stand establishment in Paddy.

Benefits of Film coating:

- Due to film coating all the dosage originally applied to the seed will be available against the pests in the target environment, and worker exposures to harmful dusts are minimized.
- Film coating increased flowability in the planter caused by better "slippage" between individual seeds, increased visibility of seed in the soil.
- Nice appearance and bright colors make for easy checking of seed placement.
- Coating provides an excellent medium to carry fungicides, pesticides, biological and micro nutrients to improve stand establishment.

Film coating in Nirmal Seeds is widely used in crops like Hy. Watermelon, Hy. Muskmelon, Hy. Okra, OP Okra, Hy. Chilli, Hy. Bajra, Hy. Cotton, OP Mustard, OP Paddy & Hy. Maize to apply insecticides, fungicides and pigments on to the seed.

Hy. Watermelon

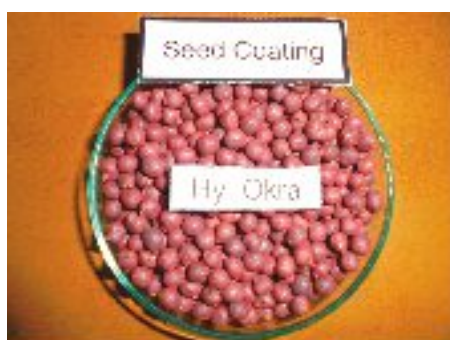


Hy. Muskmelon





Hy. Okra



Hy. Cotton



OP Okra



OP Mustard



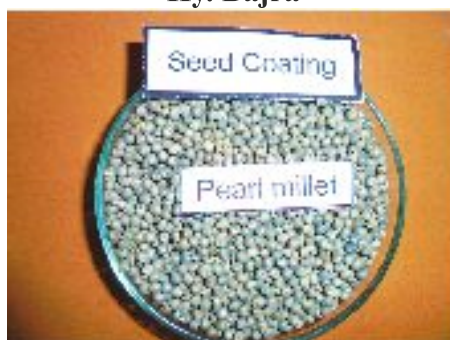
Hy. Chilli



OP Paddy



Hy. Bajra



Hy. Maize



C. Seed Priming:

Seed priming is a seed treatment that regulates the germination process by managing the temperature and seed moisture content. The seed is taken through a biochemical process within that activates the initial stages of germination. The priming process regulates the seed's temperature and moisture content, bringing the seed closer to the point of germination and then carefully dried to stop germination for planting. Basically, the priming process advances the seed to the same stage of maturity so that the seed will emerge uniformly in the field.

When the primed seeds are planted, you are shortening the germination time and improving the uniformity of the crop upon emergence. Since priming activates the germination process it reduces the shelf life of prime vs unprimed seed. The shelf life of primed seed tends to not exceed six months to maybe a year depending on the quality of the raw seed prior to the priming treatment.

Benefits of Seed Priming:

Priming enables seed to germinate and emerge even under adverse agro-climatic conditions such as cold and wet or extreme heat. Uniform emergence helps optimize harvesting efficiency which can increase yield potential. If all the plants emerge at the same time, they will likely mature at the same time for harvest. Priming also helps to improve vigor for fast and healthy plant development.

Germination time can be 50% faster with primed seed. When seeds germinate quickly, they may avoid potential problems including soil crusting, weeds, and soil borne diseases. On the down side, primed seed doesn't have the same storage life as unprimed seeds.



Seed Processing at Nirmal Seeds...

Y. B. Paratkar
Manager (Processing)

*“Don't compare yourself to others, you are you.
No one could come close to being you even if they tried.”*

As rightly said in above phrase, Yes we are we and no body can come close to us being even if they tried. Seed being a basic input of agriculture productivity, utmost care is required during seed processing. Processing adds value to the seed so as to germinate it at higher percentage with high vigour. We always aimed to process the seeds with due care by using innovative seed processing and seed treatment methods. So as to satisfy our customers with respect to quality; the Management of Nirmal Seeds took some strategic decisions so as to make seed processing units ultra modern. Now we are equipped with semi-automated and automated high tech machines which enabled us to give best quality seeds.



What the seed processing is ?

“Seed processing is a vital part of the total technology involved in making available high quality seed. It assures the end users, seeds of high quality with zero adulteration.”

Steps involved in seed processing

- Raw seed receipts.
- Matching of seed lot and variety with TC.
- Entry in seed flow system.
- Moisture checking.
- Weighing of Gunny Bags.
- Lot No. on Gunny Bags.
- Sampling for various QC tests.
- Fumigation
- Stacking.

Our Goal.....

“Always bear in mind that our own resolution to succeed is more important than any one thing”.

- In time supply
- 95-99 % Delivery to plan schedule.
- Quality in all respects.
- Zero Physical quality incidence.
- Zero defects.
- Optimum utilization of the resources.



Our strength.....

Our highly experienced staff is our real strength. Each and every staff is highly devoted with the quality work with result orientated output. Fully motivated by the management with self initiative and self discipline.





Hybrid okra seed production techniques

B. P. Jadhav (Sr. Scientist)
S. Y. Patil (Plant Breeder)

iii) Emasculation :

- It is the removal of male part from the flower of female seed parent"
- It is done in the evening one day prior to Anthesis.
- Emasculation can be done by forcep or Thumb nail.



Flower bud



Flower



Emasculated flower



Pollination

Okra (*Abelmoschus esculentus* L.) is an important vegetable crop of the tropic and sub-tropic. It is grown during summer, rabi and rainy seasons. Okra is cultivated for its immature edible fruits known as pods. The average productivity of okra in India is 11.63 (t/ha) (NHB-2017) and area 5,28,000 ha. with production of 61,46,000 MT. (Horticulture Statistic at glance 2017). The low productivity in okra attributed poor seed replacement due to the limited availability of quality seed and high incidence of yellow vein mosaic and enation leaf curl virus. The hybrid seed marketed by private sector companies is in sizable amount and cover the bigger area across the Country, but still the larger area is under cultivation of improved seeds only. It is therefore, to boost the productivity; this area need to be brought under quality F1 seeds cultivation.

Essential points for quality okra seed production

- i) Soil - light to medium heavy well drained
Season - Kharif (June/July) Summer (Jan/Feb.)
Fertilizer dose - 100 : 50 : 50 NPK/ha.
Isolation distance - Foundation - 400 m. TL /Certified-200 m.

ii) Method of seed production

Plant male and female seed parents separately by keeping 200 m isolation distance.

Female : Male seed ratio - 3:1

Seed rate :

2.4 kg female + 800 g. male/ acre

200 g female + 75 g male/ plot of R

- Pollination is done by picking flower of male seed parent
- It is done during 8-11 AM
- Mark the pollinated flower

iv) Hybridization :

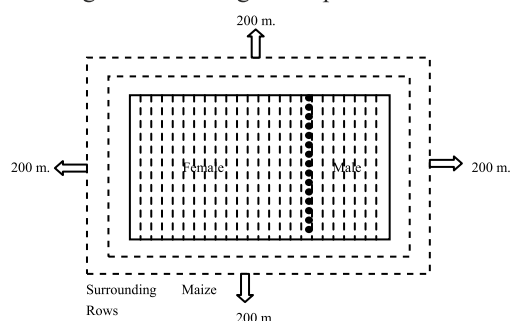
Anthesis - Opening of flower is called anthesis.

Crop	Anthesis	Dehiscence of pollen	Pollen viability	Stigma Receptivity
Okra	8-10 a.m	15-20 min after anthesis	1 hr. before & after anthesis	At flower opening

v) Inspections of seed production plot :

Minimum three inspections are required for rouging.

- Time of Inspection –a) Before flowering
b) Flowering & fruit setting
c) Before Harvesting





vi) Reason of low pollen production in okra - In Oct-Dec



- Due to incidence of pollen feeder insect
- Reduce the pollen viability when the temprature goes below 10° C
- When temprature goes below 10° C pollen production becomes low
- Continous cloudy weather 8-10 days also effect on low pollen production

Solution

- Control the incidence of pollen feeder by spraying the insecticide like Dichlorovas
- Spraying of Boran 20 % @ 3 gm/lit + Berrylon @ 2ml/lit at 6 days interval
- Spraying of Planofix @ 1 ml/lit + Sucrose solution for increasing the setting %

vii) Reasons for Dropping of buds & flowers - emasculated

- Due to close spacing
- Excess vegetative growth due to application of excess nitrogen
- Hardning of soil due to frequently visit of labours for crossing
- Temperature above 40° C causes flower drop
- Due to continuos cloudy weather i.e. too little light intensity also causes flower drop

Remedy :

- Use appropriate spacing for okra i.e. 60x45 cm
- Spraying of Livosin @ 4ml/pump for stop the excess growth
- Avoid application of excess nitrogenous fertilizers
- Use 100 ppm NAA to reduce the flower drop
- Frequent earthing up is essential to avoid abiotic stress to the plants

viii) Effect of fruit load on seed yield & quality in okra

Sr. No.	Treatment	Seed yield (g/plant)	Total seed yield (q/ha)	100-seed weight (gm)	Seed germination %
1	First 6 fruits	18.72	6.84	7.31	96.8
2	First 8 fruits	24.08	8.64	6.94	91
3	First 10 fruits	29.7	10.81	6.69	84.3
4	First 12 fruits	31.92	10.74	6.5	80
5	Control (No. Fruit removal)	36.08	11.7	6.48	68

For better germination & good seed vigour in Okra the number of fruits/plant should be 10-12

ix) Care should be taken regarding self fruits & uprooting of male parent after pollination



x) Harvesting & seed extraction

- Pick full ripe/ mature fruits before shattering
- Dry in shade & extract the seed
- Clean the seed and dry till moisture % reaches to 8-12%

xi) GMS seed production - upcoming miracle

- Very less cost required for pollination due to less labour requirement
- Very less chances of mixing
- No chances of self fruits
- More seed yield as compared to conventional method





Desi cotton hybrid NACH-433 notified by Govt. of India for Central zone.

Dr. S. A. Patil
(Plant Breeder)

Since last twenty years, Nirmal Seeds has developed deshi cotton hybrid NACH-6, NACH-12 and NACH-18 which were notified by Govt. of India and mostly popular amongst cotton growers for their yield potential and superior fibre quality. Looking to the future prospectives of short coarse fibre; Nirmal Seeds has developed one more outstanding desi cotton hybrid NACH-433 having different economically important traits.

The desi cotton (*G. arboreum*) being highly tolerant to abiotic and biotic stresses gets well adapted to the climatic aberrations and also well suited in resource limited environments and therefore are still preferred in the low rainfall areas because of suitability under rainfed conditions with low cost management. In addition it has ability to tolerate major pest and diseases. Beside the Kapas of *A. cotton* has special demand in surgical and denim industry.

The surgical cotton is in much demand for hospitals, nursing homes, dispensaries, for sanitary napkins, pads and at beauty parlors etc. The surgical cotton industry registered a steady growth rate in the past and the demand for absorbent cotton for sanitary and other uses is picking up pace with the spread of education and upward economic growth of towns and villages. The demand for surgical and absorbent cotton is growing at the rate of 10 percent per annum across the world. The current demand in India is estimated at about 2 million bales (of 170 kg each) per year. Besides the Indian market, there is enormous export potential for surgical cotton to countries such as USA, European countries, and Japan. Presently, the absorbent cotton prepared either by chemical or enzymatic process is time consuming, involves cost for several operations and also causes pollution. Researchers have recently developed eco friendly process to make eco-friendly absorbent cotton from short staple cotton

using commercial pectinase Gayal et al. (2012). Sufficient attention has not been given to evaluate and develop the cultivars/hybrids which genetically possess surgical properties and so far only few varieties such as Phule Dhanwantari have been released for surgical use.

After putting hard endeavour from last twenty years, Nirmal Seeds has developed deshi cotton hybrid NACH-6, NACH-12 and NACH-18 which were notified by Govt. of India and mostly popular amongst cotton growers for their yield potential and superior fibre quality. Looking to the future prospectives of short coarse fibre; Nirmal Seeds has developed one more outstanding desi cotton hybrid NACH-433 having different economically important traits which are furnished below.

The hybrid NACH-433 was tested in All India Coordinated Cotton Improvement Project since last three consecutive years (2013-14 to 2015-2016) and it performed well and ranked first in respect to seed cotton yield over the years (3 years) and locations (20 locations) in Central zone (1786 kg/ha.) in comparison to zonal and local checks respectively. Therefore, the hybrid NACH-433 was notified and released as a absorbent cotton due to its short staple and coarse fibre (more than 7 Micronaire) by Central Variety Release Committee during AICCIP annual group meet held at TNAU, Coimbatore (Tamil Nadu) on 8th - 10th ,

April 2017 for Central zone States of India including Maharashtra, Gujarat and Madhya Pradesh. This hybrid has ability to resist against sucking pest and tolerate to drought conditions.

Internally our product development department has conducted many MLTs across India in different agro climatic zones. The results of which revealed that this hybrid has wider adaptability under average management conditions. Certainly, this hybrid shall be boon for the farmers having scanty resources.

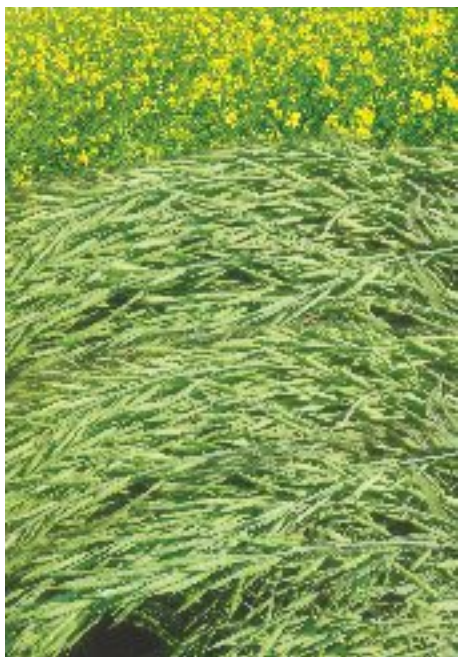
Brief features of Hybrid Deshi Cotton NACH-433 (NACH-433)

Characteristics

Growth Habit.....Open, erect, semi spreading
Duration.....150-160 days
Boll Size & Shape.....Big, Ovate
Avg. Boll Weight (gm).....4.0-4.5
Staple Length (mm).....22-23
Micronaire.....Above 7
Fibre Strength (g/tex).....22-23
Ginning %.....40-42 %

Special features:

- * Sucking resistant
- * Excellent boll bursting and boll retention
- * Tolerant to drought
- * Suitable for 2 to 3 picking
- * Recommended three toppings at 75 to 80, 95 to 100 & 110 to 115 (at 4.5 feet) days after sowing



Nutritionally improved double low Indian mustard variety : NML-100

Dr. V. S. Patil (*Plant Breeder*)
I. S. Halakude (*Res.Co-ordinator*)

In February-2011, Nirmal Seeds Pvt. Ltd. started an ambitious project to develop nutritionally improved mustard (*B. juncea*) varieties having low erucic acid (<2%) and low glucosinolate (<30 micro mole per defatted seed meal) content using marker assisted selection in collaboration with DBT (Department of Biotechnology) and TERI (The Energy and Resources Institute) New Delhi.

The efforts are taken for selection of recipient *Brassica juncea* line for incorporation of double low traits (glucosinolate and erucic acid). After rigorous selection, the line NML-100 was found to be more suitable for incorporation of double low traits due to its characteristics like earliness, high yielding, tolerance to biotic and abiotic stresses and wide acceptance by farmers of the northern states.

Rapeseed mustard (*Brassica* species) is the major rabi oilseed crop of India. Mustard seed is the second most important oil seed crop in India after soybean accounting for nearly 20-22% of the total oilseeds produced in the country. India is the fourth producer of mustard seed contributing to around 11% of world's total production. (Mustard crop survey report 2014-15.) Rapeseed-mustard (*Brassica* spp.) constitutes an important source of edible oil and meal. However, traditional rapeseed-mustard varieties accumulate high amount of erucic acid and glucosinolate in their seeds. These quantitatively inherited anti-nutritional factors drastically reduces the quality of rapeseed-mustard seed oil and meal for consumption purposes. Development of rapeseed-mustard varieties with low erucic acid and glucosinolate content, therefore, has been an important breeding objective worldwide.

Breeding programmes for developing canola quality (<2% erucic acid in oil and <30 μ moles of glucosinolate/g of oil-free seed meal) rapeseed began in Canada as early as 1956. In India, however, the major efforts were made in the 1970's with the launch of Indo-Swedish and Indo-Canadian collaborative projects (1979-94) to improve rapeseed-mustard oil and meal

quality and consequently varieties low in erucic acid and/or glucosinolate were developed. However, the existence of a significant yield gap between potential yield and the yield obtained in frontline demonstrations indicates the need for further refinement in technology packages for these varieties. In addition, it is also important to educate the masses about the health benefits of canola quality oil. This paper reviews the status and perspective of breeding and cultivation of canola quality of our mustard variety NML-100.

What is Canola?

'Canola' which is a registered trade mark of Canadian Oil Association denotes the seeds having less than 2 per cent erucic acid in it's oil and less than 30 micro moles of glucosinolate per gram of it's deoiled meal. Canola is only a quality standard and not a classification based on biological attributes. The 'canola' quality oil has gained acceptance worldwide as a healthy edible oil cooking medium. It is the major edible oil in many countries like Australia, Japan and Canada.

Health benefits of canola oil

- CVD (Cardio vascular disease) CHD and stroke is world leading killer (16.7 million global death in 2003), 29.3% of

global deaths.

- India account for 60% of global burden 118 million in 2000, 214 million by 2025 projected.
- Rapid urbanization, physical inactivity, increased incidence of diabetes, obesity and unhealthy diet are the possible causes of CVD.
- Due to absence of harmful fatty acid (erucic acid) in Canola oil helps to reduce the chances of CVD and other benefits of Canola oil as follows.

Canola oil high in good fats

Fats are made up of smaller units called fatty acids. Canola oil is rich in two fatty acids that are essential in our diet because our body can't make them:

- Alpha-linolenic acid (ALA) is an essential omega-3 fatty acid. It protects against heart attacks and strokes by helping to lower bad cholesterol.
- Linoleic acid (LA) is an essential omega-6 fatty acid. It's important for the brain and for the growth and development of infants. Both of these fatty acids are poly saturated.

Canola oil low in bad fats

Compared to all other vegetable oils in the market, canola oil has the lowest levels of the fats that are "bad" for human health:



- Saturated fats raise the bad cholesterol in our body and have been linked to coronary heart disease. Canola oil has the lowest saturated fat level of all vegetable oils.
- Trans fats raise bad cholesterol and lower good cholesterol while all processed oils contain very small levels of trans fatty acids, canola oil is defined as zero trans fat.

Canola oil good source of vitamin E

Vitamin E is an antioxidant that protects our body's fats and proteins from free radical damage. It may also help reduce the risk of heart disease and cancer.

Nirmal's Progress Towards Quality Mustard

Mustard oil is preferred in most of the Northern states due to its characteristic pungency. Oil contains lowest amount of saturated fats (SFA), two essential poly unsaturated fats (PUFAs), Linoleic and Linolenic among all edible oils and also contains nutritionally desired oleic acid which gives stability to oil. Though the nutritional advantages of rapeseed-mustard oil available in India out do many other edible oils, the presence of erucic acid and glucosinolates are considered to be undesirable. Indian varieties under cultivation have high erucic acid (about 50%) and high glucosinolates (≥ 100 moles/g defatted seed meal). Erucic acid is feared to cause health problems and high glucosinolates in the oil cake are not desired for animal feed. Hence efforts to develop canola quality and also low erucic acid containing mustard varieties acquire importance in the crop improvement programme of Rapeseed- Mustard in India. Therefore, a double low variety is expected to have wider acceptance and increased utility both as edible oil and cattle feed.

Introgression programme of double low traits by using marker assisted backcross breeding method

In February-2011, Nirmal Seeds Pvt. Ltd. started an ambitious project to develop nutritionally improved mustard (B.juncea) varieties having low erucic acid (<2%) and low glucosinolate (<30 micro mole per defatted seed meal) content using marker assisted selection in collaboration

with DBT (Department of Biotechnology) and TERI (The Energy and Resources Institute) New Delhi.

The efforts are taken for selection of recipient Brassica juncea line for incorporation of double low traits (glucosinolate and erucic acid). After rigorous selection, the line NML-100 was found to be more suitable for incorporation of double low traits due to its characteristics like earliness, high yielding, tolerance to biotic and abiotic stresses and wide acceptance by farmers of the northern states. The parental line Teri-4 (Brassica napus) received from TERI; New Delhi having double low traits (low glucosinolate and erucic acid) was used in backcrossing programme as a donor. The genotypic and phenotypic selection approach was used to achieve this aim in a relatively shorter time frame (3-4 years using marker assisted selection approach as compared to 6-7 years in case of only phenotype based selection). Markers linked to double low traits were developed which can be use permanently to convert other high yielding Brassica juncea lines in short duration using marker assisted breeding approach. The glucosinolate trait is governed by four recessive loci whereas erucic acid trait is governed by two recessive loci. Selfing of final backcross generation and or microspore culture approach was used to fix these traits and bring these two traits in homozygous condition at BC3 generation of crossing programme, significantly reducing time for varietal development. Presently the work is completed and also validation of the gene for double low is done. During ensuing rabi season large scale multiplication of this variety shall be done.

Organoleptic taste differences in Nirmal Mustard double low oil, canola oil, Mustard oil & Soybean oil.

Mustard oil has a distinctive pungent taste, characteristic of all plants in the mustard family, it is used often for cooking in North India, Eastern India, Nepal, Bangladesh & Pakistan. In Bengal, Orissa, Assam, Meghalaya, Manipur & Nepal, it is traditionally preferred for cooking. The characteristic pungent flavor oil is due to

allyl isothiocyanate. In case of canola oil (Double low) due absence or removal of allyl isothiocyanate this oil is similar taste with other oil e.g. Soybean oil.

The R & D division has conducted the organoleptic taste of Nirmal's double low mustard oil with other oils like, market Mustard oil, canola oil, soybean oil by preparing Poha (flattened rice), chilli thecha and Bhaji with all type of oil. In this study Nirmal's double low mustard found similar taste with canola and soybean oil without greatly altering the taste.

Social impact expected in the future

The product developed through present research will lead to produce mustard oil with low erucic acid ultimately reducing health hazards arising from consumption of normal oil available in market having high erucic acid content. Export of this double low mustard oil in the countries like EU, USA and Canada, could be initiated where normal mustard oil is banned for consumption principally due to its high erucic acid content. Farmers are expected to get more price for this newly developed double low mustard variety. More over, double low mustard oil can be popularized in central and southern India, as the undesired traits are eliminated. In case of taste and health this is great solution for replacement the other oilseed crop like sesame, groundnut and sunflower for oil purpose in village areas and oil those contain higher fats which are responsible for the cardio vascular disease.

Achievement

BIRAC has conferred an award on Nirmal Seeds for successful completion this research project in collaboration with TERI.





A versatile sorghum hybrid NJH-2013

A. B. Birajdar
(Plant Breeder)

Sorghum has huge potential and also been identified as one among the climate resilient crops that can adopt quickly under changing climatic conditions. Climate change will modify the length of growing period and increases the predicted temperatures across the sorghum growing regions. So, keeping a view in mind, Nirmal's R & D team has developed a versatile photo and thermo insensitive sorghum hybrid NJH-2013 which is suitable for all seasons with wider adaptability and acceptable Bhakari quality.

Sorghum is the fifth most important Cereal Staple Crop in the Sub-tropical and some arid regions of Africa and Asia. It is the second cheapest source of energy and micronutrient after Pearl Millet. The vast majority of the population in Africa and Central India is depending on it for their dietary and micro-nutrient requirements.

In sorghum, the cultivation area is showing a decreasing trend due to diversion of kharif sorghum area to maize, soybean, ground nut and pulses. In general the average area, production and productivity levels are higher in kharif season as compared to rabi season. The average productivity in rabi was low due to crop is grown on residual moisture, non availability of high yielding varieties and hybrids. The grain quality is much superior in rabi season as compared to kharif season.

In contrast, the sorghum produced in rainy (kharif) season is from mostly hybrids but less for human consumption. Above 50% of the kharif produce goes into alternative uses such as poultry feed, alcohol and animal feed while rabi sorghum (local and improved land races) is of superior grain quality and hence preferred for human consumption.

Sorghum is main staple food for poor and marginal farmer with low input. The crop has huge potential and also been identified as one among the climate resilient crops that can adopt quickly under changing climatic conditions. Climate change will modify the length of growing period and increases the predicted temperatures across the sorghum growing regions. So, keeping a view in mind, Nirmal's R & D team has developed a versatile photo and thermo insensitive sorghum hybrid NJH-2013 which is suitable for all seasons with wider adaptability and acceptable Bhakari quality.

Comparative yield data of sorghum hybrid NJH-2013 along with check

Entry	Season	Days to Maturity	Plant height (cm)	Panicle length (cm)	1000 grain wt (gm)	Fodder yield q/ha.	Yield q/ha.
NJH-2013	K-2017	102	219.0	33.3	31.7	116	52.2
	R-2017	130	188.0	29.6	29.8	125.0	55.2
	S-2017	115	172.0	30.2	32.2	123.0	53.0
Mean		116	193.0	31.0	31.2	121.3	53.5
Check	K-2017	108	222.0	31.0	30.5	114.8	51.0
	R-2017	135	147.0	32.0	36.0	123.0	54.0
	S-2017	121	146.0	31.0	32.8	109.1	45.4
Mean		121	172.0	31.3	33.1	115.6	50.1



Photographs of NJH-2013 Earhead & Bhakari quality



कापसावरील गुलाबी बोंडअळीचे एकात्मिक किड व्यवस्थापन

डॉ. अश्विनकुमार डामरे
(किटकशास्त्रज्ञ)

कापूस हे भारतातील महत्त्वाचे नगदी पिक आहे. कापूस पिकाचे उत्पादन ७७ देशामध्ये घेतले जाते आणि जवळपास १२३ देशामध्ये कापूस पिकाशी संबंधित उद्योग व्यवसाय सुरू आहेत. भारतामध्ये कापूस पिकाच्या लागवडीखाली ११८.३१ लाख हेक्टर क्षेत्र आहे. भारतातील कापूस उत्पादन ३५२ लाख कापूसगाठी आहे आणि उत्पदकता ५०८ कि.रुई/हे. आहे. महाराष्ट्रात ३८.२७ लाख हेक्टर क्षेत्र कापूस लागवडीखाली असून कापसाची उत्पदकता ३४२ कि. रुई/हे. आहे. कपाशीखालील क्षेत्र आणि उत्पादन यामध्ये भारताचा जगामध्ये प्रथम क्रमांक लागतो. कापूस पिकाचा परकिय चलन आणि रोजगार उपलब्ध करून देण्यात महत्त्वाचा वाटा आहे.

कापूस पिकावर सध्या गुलाबी बोंडअळीचा मोठ्या प्रमाणावर प्रादुर्भाव दिसून येत आहे. बागायती तसेच कोरडवाहू कापूस पिकावरती या किडीचा ५० ते ६० टक्के पर्यंत प्रादुर्भाव होउन कापसाचे उत्पादन आणि गुणवत्ता यामध्ये मोठी घट आली आहे. त्यामुळे या किडीचे वेळीच नियंत्रण करणे गरजेचे आहे. यामध्ये एकात्मिक किड व्यवस्थापन पद्धतीचा वापर करून ही किड आर्थिक नुकसान पातळीच्या खाली ठेवणे आवश्यक आहे. किड व्यवस्थापनाच्या विविध पद्धतीचा संयुक्त व सुसंगत वापर करताना जैविक किडनाशके, परोपजीवी मित्र किटक, आंतर, मिश्र आणि सापळा पिके, कामगंध सापळे, वनस्पतीजन्य किडनाशके आणि गरजेनुसार रासायनिक किडनाशकाचा वापर करणे गरजेचे आहे.

किडीची ओळख

गुलाबी बोंडअळीचा पतंग हा छोटा ३ ते ६ मिमी लांबीचा असतो. पतंग हा गर्द बदामी रंगाचा असून पंखावर बारीक काळे ठिपके असतात. या किडीची अळी सुरुवातीस फिकट हिरवी पांढरट रंगाची असते. नंतर तिसऱ्या अवस्थेत अळीस गुलाबी रंग प्राप्त होते. या अळीस शेंदरी अळी असेही म्हणतात. पूर्ण वाढ झालेल्या अळीची लांबी १८-१९ मिमी असते.

किडीचा जीवनक्रम

किडीचा मादी पतंग पांढरट रंगाची १०० ते १५० अंटी पानाच्या खाली तसेच कळ्या आणि बोंडावर एक एक करून ३ ते ५ दिवसात घालते. अंटी घालण्याचा कालावधी ६ दिवसाचा असून अंड्यातून किडीची पांढरट रंगाची अळी बाहेर पडते. अळी अवस्थेचा कालावधी ९ ते २१ दिवसाचा असतो. पूर्ण वाढ झालेली अळी नंतर स्वतः भोवती कोष तयार करते आणि

पानावर, फुलावर तसेच जमिनीत कोषावस्थेत जाते. कोषावस्था ६ ते २० दिवसांची असते. या किडीची अळी आणि कोष या अवस्थामध्ये सुप्तावस्था दिसून येते. अळीची सुप्तावस्था ही जवळपास २ वर्षांपर्यंत राहते. किडीचा पतंग ७ ते १० दिवस जगतो. ही किड आपला जीवनक्रम ६ ते ८ आठवड्यामध्ये पूर्ण करते आणि जवळपास किडीच्या ९ पिढ्या प्रतिवर्षी तयार होतात.



अंडी



अळी



कोष



पतंग

प्रादुर्भावाची लक्षणे :

किडीची लहान पांढरट अळी सुरुवातीस कळ्या, फुले, बारीक बोंड यांना छिद्र करून आत शिरते आणि त्यावर खाते. अळी बोंडामध्ये शिरल्यानंतर तिच्या विष्टेने बोंडावरील छिद्र बंद करते. बोंडामधील गुलाबी अळ्या रुई मध्ये छिद्र करून सरकी खातात. त्यामुळे बोंडाची वाढ खुंटते आणि कवडी कापूस तयार होतो.

अधिक प्रादुर्भाव झालेली फुले, कळ्या गळून पडतात आणि बोंडे पक्व न होताच उमलून गळतात. या किडीच्या प्रादुर्भावामुळे उमललेल्या पाकळ्या एकमेकांत पिळवटून गुलाबाच्या आकाराच्या दिसतात. त्याला 'रोझेट फ्लॉवर' असे म्हणतात. या किडीच्या प्रादुर्भावामुळे कापसाची गुणवत्ता आणि तेलाचे प्रमाण कमी होउन कापसाचे उत्पादन मोठ्या प्रमाणात घटते. अळीने बोंडातील सरकीवर खाल्ल्याने कापसासही गुलाबी शेंदरी रंग प्राप्त होतो त्यास कॉटन स्टेनर असे म्हणतात. या किडीचा प्रादुर्भाव ऑक्टोबर - नोव्हेंबर मध्ये कापूस पिकावर अधिक दिसून येतो.



रोझेट फ्लॉवर



अळीमुळे प्रादुर्भावग्रस्त फुल



प्रादुर्भावग्रस्त बोंड



अळीने खाल्लेले बोंड



प्रादुर्भावग्रस्त बोंड

एकात्मिक किड व्यवस्थापन :

- उन्हाळ्यामध्ये जमिनीची खोल नांगरट करावी त्यामुळे किडीच्या जमिनीतील अळी व कोष या सुप्तावस्था उन आणि परभक्षी मित्र किटकांमुळे नष्ट होतील.
- पिकाची फेरपालट करून एकाच क्षेत्रात वारंवार कापूस पिक घेणे टाळावे.
- कापूस पिकाच्या लवकर पक्व होणाऱ्या जातीची निवड करून सामुदायीकपणे १०-१५ दिवसात गावामध्ये वेळेवर हंगामात लागवड करावी. त्यामुळे

- कपाशीची वेळेवर वेचणी होवून पिक अधिककाळ शेतात न राहून गुलाबी अळी किडीचा प्रादुर्भाव कमी होते.
- शिफारशीप्रमाणे लागवडीचे अंतर, खते आणि पाणी यांचा वापर करावा.
- लागवडीचे अंतर : १२० × ९० सेमी, खते : १० टन कुजलेले शेणखत आणि नत्र, स्फुरद, पालाश प्रत्येकी १२५:६५:६५ किलो प्रति हेक्टरी जमिनीतून द्यावे.
- कपाशीची पाते, फुले व बोंडे लागणीच्या या महत्वाच्या अवस्थांमध्ये पाण्याच्या पाळ्या चुकवू नयेत.
- सुक्ष्म अन्नद्रव्येही गरजेनुसार द्रवरूप खतांसोबत शिफारशीप्रमाणे द्यावीत.
- तणांचा बंदोबस्त : कापूस लागवडीनंतर शेत खुरपणी आणि कोळपणी करून तणमुक्त ठेवावे. तसेच गरजेनुसार उगवणीपूर्व तणनाशकांचा उदा. डाययुरॉन किंवा पेन्डीमिथॅलिन किंवा फ्युक्लोरॅलिन प्रत्येकी १ किलो कि.घ./ हे. वापर करावा.



कामगंध सापळे

- बीटी कपाशी मध्ये नॉन बीटी कपाशीच्या आश्रित ओळींची ९५:५ या प्रमाणात लागवड करावी.
- शेतामध्ये किडींचे सर्वेक्षण व निरीक्षण करावे. यामध्ये पिकावरील किडीचा प्रादुर्भाव, कामगंध सापळ्यामधील किडीचे पतंग यांचे निरीक्षण करून किडीची आर्थिक नुकसान पातळी ठरवावी.
- पिकावर किडीचा १० टक्के प्रादुर्भाव तसेच किडीचे ८ पतंग / कामगंध सापळ्यात दिसून आल्यास किड नियंत्रणाची उपाय योजना करावी.
- गॉसीप्ल्युर कामगंध सापळे ५ प्रति हेक्टरी किडीच्या निरीक्षणासाठी तर २० प्रति हेक्टरी किडीच्या सामूहिक पतंग आकर्षित (Mass Trapping) व मिलन अडथळ्यासाठी (Mating disruption) वापरावे. म्हणजे किडींची संख्या व प्रादुर्भाव कमी होण्यास मदत होईल.
- पिकाच्या प्रादुर्भावग्रस्त कळ्या, 'रोझेट फुले', बोंडे गोळा करून नष्ट करावीत.
- कापसाव्यतिरिक्त ही किड भेंडी, ताग, अंबाडी या यजमान पिकावर दिसून येत असल्यामुळे या पिकांची कापूस पिकासोबत मुख्य पिक म्हणून लागवड टाळावी.
- कपाशीचे पिक ८०-९० दिवसाचे झाल्यावर वाढणारे शेंडे खुडावेत म्हणजे झाडाची कायीक वाढ कमी होवून फलधारणा चांगली होते आणि अळीचा प्रादुर्भाव कमी होतो.
- सापळा पिकांचा वापर करून मित्र किटकाचे संवर्धन करावे. यामध्ये झेंडू, ज्वारी, मका, तूर, भेंडी, कोथींबीर यांचा सापळा पिक म्हणून वापर करावा.
- पक्षांना कपाशीवरील किडींच्या अळ्या वेचता याव्यात यासाठी शेतात १५-२० लाकडी मचाण/पक्षी थांबे उभे करावेत.
- परोपजीवी मित्र किटकांचे शेतात प्रसारण करावे. यामध्ये ट्रायकोग्रामाटॉयडीआ बॅक्टीरिया या मित्र किटकाची १.५० लाख अंडी शेतात प्रसारीत करावीत तसेच चिलोनस, ब्रेकॉन, अपॅन्टीलस या मित्रकिटकांचे संवर्धन करावे.
- ट्रायकोकार्ड शेतात लावण्यापूर्वी किंवा सोडल्यानंतर ८ ते १० दिवस हानिकारक किटकनाशकाची फवारणी / धुरळणी टाळावी.
- कापूस पिकाची वेळेवर पूर्ण वेचणी करून झाल्यानंतर जनावरांना शेतात चरण्यासाठी सोडून अळीच्या सुप्तावस्थांचा बंदोबस्त करावा.
- कापूस हंगाम संपल्यावर कापसाच्या पन्हाट्या बांधावर रचून ठेवू नयेत. सामूहिक स्वच्छता



मोहिम राबवून किडग्रस्त पन्हाटी, बोंडे व पालापाचोळा गोळा करुन नष्ट करावा.

- कापूस वेचणीनंतर शक्य तितक्या लवकर सरकीचे गाळप करावे किंवा तज्ञांच्या देखरेखीखाली सरकी बियांना ॲल्युमिनीअम फॉस्फाईड ५०० ग्रॅम/१० क्यु.फिट ची धुरी २४ तासांसाठी द्यावी म्हणजे गुलाबी बोंडअळीच्या सुप्तावस्थांचा बंदोबस्त करता येईल.
- कापूस जिनिंग मिलमधील यंत्राची वेळेवर स्वच्छता करुन गुलाबी अळीच्या सुप्तावस्थांचा बंदोबस्त करावा तसेच कापूस जिनिंग मिल व कापूस विक्री केंद्राच्या परिसरात गॉसीप्लूर कामगंध सापळे लावून गुलाबी अळीच्या सुप्तावस्थेमधून बाहेर पडणाऱ्या पतंगाचे नियंत्रण करावे.

बोंडअळीचे रासायनिक किड व्यवस्थापन

महिना	किटकनाशक	मात्रा प्रती १० लीटर पाणी
ऑगस्ट	लागवडीच्या ६० दिवसानंतर निंबोळी अर्क ५ %	निंबोळी अर्क ५० मिली
सप्टेंबर	क्विनोलफॉस २० AF किंवा थायोडिकार्ब ७५ WP	२० मिली किंवा २० ग्रॅम
ऑक्टोबर	क्लोरोपायरीफॉस २० EC किंवा थायोडीकार्ब ७५ WP	२५ मिली किंवा २० ग्रॅम
नोव्हेंबर	फेनवलरेट २० EC किंवा सायपरमेथ्रिन १० EC किंवा बीटा सायफ्ल्युथ्रीन २.५ EC	१० मिली किंवा १० मिली किंवा १० मिली

संदर्भ - सी.आय.सी.आर.

◆ Twinkling Stars



Harshal M. Alone
B.Tech (Marine Eng.)
1st Sem. Exam- 74.10 %



Harshada Mahesh Patil
93 % in 12th (Science) Exam.



Kaveri Namdeo Rajput
Silver Medal in
Karate championships



Mitali Santosh Patil
4th Std. Exam. -89.68%



Tanisha Jagdish Ghodke
3rd Std. (Grade-A1)



Bhavesh Vinod Patil
Indian Talent Search Exam
(Rank -10th in Dist.)



Krutika M. Deshmukh
Indian Talent Search Exam
(Rank -1st in Center)



Harshada Jagdish Ghodke
Sr. KG. Std. (Grade-A1)

हरितगृहामधील व शेडनेटहाऊस मधील भाजीपाला लागवड

Nirmal Doot



18

बि. पी. जाधव (वरीष्ठ शास्त्रज्ञ)

एम. बी. पाटील (वनस्पती पैदासकार)

एस. वाय. पाटील (वनस्पती पैदासकार)



हरितगृहाचे अनेक प्रकार आहेत, जसे की पॉलीहाऊस, शेडनेटहाऊस, ग्लासहाऊस, पॉली कार्बोनेटहाऊस, हरितगृहाची शेती जास्तीत जास्त फायदेशीर होण्यासाठी त्यामध्ये भाजीपाला व फुलपिके लावली जातात. परंतु ही हरितगृहामधील शेती आर्थिकदृष्ट्या फायदेशीर होण्यासाठी ती शास्त्रियदृष्ट्या काटेकोरपणे करणे आवश्यक असते. म्हणजेच त्यातील बारकावे माहित असणे व विशेष म्हणजे पीक लागवडीत संशोधनाच्या शिफारसी काटेकोरपणे प्रत्यक्षात आणणे गरजेचे आहे.

हरितगृह म्हणजे संरक्षित शेतीसाठी उभारलेली बंदिस्त रचना होय. जीआय पाईप, एमएस पाईप/अँगल तसेच बांबू/बल्ली यांपासून डिझाईननुसार सांगाडा तयार करून त्याला युव्ही फिल्म लावल्यास पॉलीहाऊस तयार होते व शेडनेट लावल्यास शेडनेटगृह तयार होते या शेडनेटस् विशिष्ट यु.व्ही. संस्कारीत अशा १०० टक्के पॉलीईथिलीन धाग्यांपासून तयार केलेल्या असतात. या शेडनेटच्या सहाय्याने दिवसा पिकांसाठी प्रकाशाची तीव्रता व प्रभावी उष्णता कमी करता येत असल्याने बऱ्याचअंशी वातावरणावर नियंत्रण करता येते. मात्र पॉलीहाऊस मधील शेती शेडनेटहाऊस मधील शेतीपेक्षा फायदेशीर असते.

हरितगृह व शेडनेट चे फायदे

१. गुणवत्तापूर्ण व जास्तीतजास्त उत्पादन
२. उघडया शेतीच्या तुलनेत २ ते ५ पट उत्पादन मिळू शकते / थोड्या जागेत खूप उत्पादन
३. बिगर हंगामात किफायतशीर उत्पादन मिळेल अशा पिकांची लागवड शक्य
४. अती पाऊस/थंडी/उष्णता/किड/पक्षी यापासून पिकांचे संरक्षण
५. पिकांना मानवेल असे योग्य ते हवामान तयार करणे शक्य होते
६. पिकाची पाण्याची गरज कमी करता येते
७. लागवडीस अयोग्य / नापीक जमिनीचा वापर करून संरक्षित जागेत चांगली माती टाकता येते.
८. एका वर्षात ३ ते ४ पिके घेता येतात.
९. विशेषतः उन्हाळ्यात पिकांचे उत्पादन, उत्पादकता व गुणवत्ता यांच्या मातेत लक्षणीय सुधारणा होते. चांगल्या गुणवत्तेमुळे चांगला बाजारभाव मिळतो.

शेडनेट व पॉलीहाऊस साठी जागेची निवड

१. जमीन ही पाण्याचा निचरा होणारी असावी. जमिनीतील पाण्याची पातळी पिकाच्या मुळांच्या खाली राहिल, यासाठी निचरा होणे आवश्यक.
२. पाणथळ व खोलगट जागा निवडू नये.
३. शेतात उंचसखल जमीन असल्यास किंवा जास्त उतार असल्यास जमिनीचे सपाटीकरण करणे आवश्यक.
४. पाण्याचा सामू ५.५ ते ६.५ दरम्यान व क्षारतेचे प्रमाण कमी असलेल्या जमिनी योग्य.
५. पाणी व विद्युत पुरवठ्याची सुविधा असावी.
६. इमारती व मोठी झाडे यांची सावली पडणार नाही अशी जागा निवडावी.
७. निवडलेल्या जागेत भरपूर सुर्यप्रकाश असावा.

पॉलीहाऊसमध्ये पिकांसाठी वातावरणाच्या घटकांची माहिती

पॉलीहाऊसमधील पिकांसाठी लागणाऱ्या वातावरणीय घटकांची माहिती पुढीलप्रमाणे आहे.

अ.क्र.	पिकाचे नाव	तापमान (अंश सेंटीग्रेड)		आर्द्रता (टक्के)	सुर्यप्रकाश (लक्स)
		दिवसाचे	रात्रीचे		
१	ढोबळी मिरची	२५-३०	१८-२०	५०-६०	५००००-६००००
२	टोमॅटो	१६-३५	१६-२२	५०-६०	५००००-६००००

मातीचे निर्जंतुकीकरण करून घ्यावे निर्जंतुकीकरणाच्या पद्धतीमध्ये

१००० चौ.मी. भागासाठी ७.५ ते १० लीटर फॉर्मलीन आम्ल घ्यावे

ते १० पट पाण्यात टाकावे

मातीवर स्प्रे किंवा ड्रेंचिंग करावे

नंतर प्लास्टीकने ७ दिवस हवाबंद झाकावे

त्यानंतर १०० ली./ चौ.मी. पाणी वापरून जमीन निचऱ्यासाठी प्लॅश करावी

वाफऱ्यासाठी २ आठवडे थांबून मग रोपे लावावीत



याशिवाय, मिथील ब्रोमाईड : २५-३० ग्रॅ/चौ.मी. किंवा बासामीड (डॅझमेट) : ३०-४० ग्रॅ/चौ.मी. सुध्दा निर्जंतुकीकरणासाठी वापरतात.

वाफे बनविताना घ्यावयाची काळजी

पिकांच्या योग्य वाढीसाठी वाफे व्यवस्थित तयार करणे अतिशय आवश्यक आहे. विशिष्ट माध्यम घेऊन ते निर्जंतूक केल्यानंतर पिकाच्या अंतरानुसार वाफे तयार करावे लागतात. हे वाफे जास्त काळ टिकण्यासाठी वाफ्यांचा तळ हा वाफ्यांच्या वरील भागापेक्षा मोठा असतो. तसेच वाफ्याची उंची ही पिकांच्या मुळांच्या लांबीनुसार ठरत असते. वाफा बांधतांना तो मापांनुसार काटेकोरपणे असणे महत्वाचे आहे.

पीक लावण्याआधीची खताची मात्रा

साधारणतः १० गुंठयाला २ ब्रास शेणखत, १०० ते १५० किलो निमकेक, १०० किलो सिंगल सुपर फॉस्फेट, ३ किलो मॅग्नेशियम सल्फेट व ३५ किलो सुक्ष्म अन्नद्रव्ये लागतात. याशिवाय कार्बोफ्युरॉन अर्धा किलो हे कितकनाशक टाकावे. वाफे बनवून झाल्यानंतर निर्मल बायोपॉवर गोल्ड १० किलो वापरावे.

टिबक सिंचन पद्धतीचा वापर

- टिबक सिंचनासाठी इनलाईन पद्धत उत्तम, पिकांना सकाळी पाणी देणे चांगले.
- एका ओळीस एक उपनळी लावावी.
- इनलाईनच्या छिद्रातून तासाला २ लीटरपेक्षा कमी पाणी असावे.
- या पद्धतीस २ किग्रॅ/चौ. सें.मी. दाब लागतो.
- संचात जास्तीचे पाणी बाहेर काढण्यासाठी बाय पासची सोय असावी.
- बॅक फ्लश यंत्रणा आवश्यक : त्यामुळे सॅड फिल्टर साफ करता येतो.
- टिबकमुळे पाणी वापर क्षमता व पिकाची उत्पादकता वाढते.

पॉलीहाऊस व शेडनेटमधील पिकांची लागवड :

पॉलीहाऊसमध्ये भाजीपाला पिकांमध्ये ढोबळी मिरची, टोमॅटो, ब्रोकोली, खरबुज, लाल कोबी, लेटयूस, भेंडी, काकडी इत्यादींची लागवड यशस्वीपणे करता येते. भाजीपाला पिकाशिवाय शोभिवंत लहान झाडे, काही फुलझाडे, फळभाज्या, औषधी व सुगंधी वनस्पती, मसाला पिके व नर्सरी रोपे (भाजीपाला व फळझाडे) यांची यशस्वीपणे लागवड करता येते. शेडनेटगृहामध्ये

ढोबळी मिरची, खरबुज, लाल कोबी, ब्रोकोली इ. उच्च मुल्यांच्या भाजीपाला पिकांची लागवड करता येते. ही पिके शक्यतो बिगर हंगामात येतील असे पहावे.

शेडनेट व पॉलीहाऊसमधील ढोबळी मिरचीची लागवड :

संरक्षित शेतीतील ढोबळी मिरचीच्या हिरव्याफळांसाठी निर्मल-७०५ व निर्मल शबनम हे वाण ५ गुठ्यांमध्ये १२५० झाडे लावता येतात. पिकाची पाण्याची गरज ही हवामान व पिकाच्या वाढीच्या अवस्थेनुसार बदलत असून ती १ ते २ पासून ५ ते ६ लीटर प्रति चौ.मी. इतकी असते. ढोबळी मिरचीच्या फळांचे उत्पादन ८ ते १० किलो प्रति चौ.मी. इतके असते. झाडावर ६ ते ८ पाने असतांना किंवा १५ ते २० सें.मी. रोपाची उंची असतांना शेंडे खुडावेत. झाडावर एकुण चार फांद्या ठेवाव्यात. ढोबळी मिरचीच्या झाडाचे वय ६ आठवडे झाल्यावर त्यांना प्लास्टिकच्या सुतळीने आधार द्यावा लागतो.

शेडनेटगृहामधील ढोबळी मिरची लागवडीसंबंधी शिफारशी

गादी वाफ्याची रुंदी	: ९० सें.मी.
गादी वाफ्याची तळाची रुंदी	: १०० सें.मी.
गादी वाफ्याची उंची	: ३० सें.मी.
दोन गादीवाफ्यामधील अंतर	: ०.५० सें.मी.
लागवडीचे अंतर	: ६० × ४५ सें.मी.
सुक्ष्म जलसिंचन पद्धत	: इनलाईन पद्धत, १६ मि.मी.
दोन तोटीतील अंतर	: ४० सें.मी.
पाण्याचा दाब	: १ किग्रॅ / चौ.मी.
एका गादीवाफ्यावर उपनळ्यांची संख्या	: २



ढोबळी मिरचीसाठी विद्राव्य खताचे व्यवस्थापन

पुढीलप्रमाणे ढोबळी मिरचीसाठी विद्राव्य खते द्यावीत : मात्रा कि.ग्रॅ./१००० चौ.मी.

विद्राव्य खतांची ग्रेड	पिक लागवडी नंतरचे दिवस	विद्राव्य खतांची मात्रा प्रति ५० लिटर पाणी
१९:१९:१९	४०	१ किलो
१९:१९:१९	४५	१ किलो
१९:१९:१९	५०	१.२५ किलो
१९:१९:१९	५५	२ किलो
००:५२:३४	६५	१.५ किलो
००:५२:३४	७५	२ किलो
००:००:५० व बोरॉन	८०	२ किलो व १ किलो
००:५२:३४	८५	२ किलो
१९:१९:१९	९०	१ किलो
००:००:५०	९५	२ किलो
००:००:५०	१००	२ किलो
००:००:५०	१०५	२ किलो
००:००:५०	११०	२ किलो



शेडनेट व पॉलीहाऊसमध्ये टोमॅटोच्या

लागवडीसंबंधी शिफारशी

गादीवाफ्याची रुंदी	: ०.९० मी.
गादीवाफ्याची तळाची रुंदी	: १.०० मी.
गादीवाफ्याची उंची	: ०.४५ मी.
दोन गादीवाफ्यामधील अंतर	: ०.५० मी.
लागवडीचे अंतर	: ६० × ४५ से.मी.
सुक्ष्म जलसिंचन पद्धत	: इनलाईन पद्धत, १६ मि.मी.
दोन तोटीतील अंतर	: ४० से.मी.
तोटीचा प्रवाह	: २.४० ली./तास
पाण्याचा दाब	: १ किग्रॅ/चौ.मी.
एका गादीवाफ्यावर उपनळ्यांची संख्या	: २



टोमॅटोसाठी विद्राव्य खताचे व्यवस्थापन

पुढीलप्रमाणे टोमॅटोसाठी दिवसाआड विद्राव्य खते द्यावीत : मात्रा कि.ग्रॅ./१००० चौ.मी.

विद्राव्य खतांची ग्रेड	पिक लागवडी नंतरचे दिवस	विद्राव्य खतांची मात्रा प्रती ५० लिटर पाणी
१९:१९:१९	३५	१.२५ किलो
१९:१९:१९	४०	१.५ किलो
१९:१९:१९	४५	१.५ किलो
१९:१९:१९	५०	२ किलो
००:५२:३४	५५	२ किलो
००:५२:३४	६०	२ किलो
००:५२:३४	६५	२ किलो
००:००:५० व बोरॉन	७०	१.५ किलो व १.५ किलो
००:५२:३४	८०	२ किलो
१९:१९:१९	८५	१.५ किलो
००:००:५०	९०	२ किलो
००:००:५० व बोरॉन	१००	१.५ किलो व १.५ किलो
००:००:५०	१०५	२ किलो
००:००:५०	११०	३ किलो
००:००:५०	११५	३ किलो

सर्व पिकांच्या भरघोस उत्पादनासाठी

नव्या युगाचं नवं तंत्रज्ञान

निर्मल बायोपॉवर गोल्ड

नविन तंत्रज्ञानासोबत

(मायकोराईजल जैविक खत)



निर्मल सिडस् प्रा.लि.

(ISO 9001:2015 प्रमाणित कंपनी)



Importance of Seed Vigour Testing

Mrs. Pratima A. Patil
(QA Department)

Seed Vigour testing does not only measure the percentage of viable seed in a sample, it also reflects the ability of those seeds to produce normal seedlings under less than optimum or adverse growing conditions similar to those which may occur in the field. Seeds may be classified as viable in a germination test which provides optimum temperature, moisture and light conditions to the growing seedlings; however, they may not be capable of continuing growth and completing their life cycle under a wide range of field conditions. Generally, seeds start to lose vigour before they lose their ability to germinate; therefore vigour testing is an important practice in seed production programs.

Testing for vigour becomes more important for carryover seeds, especially if seeds were stored under unknown conditions or under unfavorable storage conditions. Seed vigour testing is also used as indicator of the storage potential of a seed lot and in ranking various seed lots with different qualities.

The biological basis of the seed vigour concept

It has been established that the conditions of seed development, maturation, storage and aging influence seed vigour. Seeds developed under moisture stress, nutrient deficiency, extreme temperatures, etc. often result in light, shriveled seed or collectively called poor-vigour seed. Preharvest environment of high humidity and warm temperatures can also cause loss in seed viability and vigour. Seed mechanical damage, whether induced by harvesting or conditioning equipment, as well as improper storage conditions are among the factors that adversely affect seed vigour. In addition, genetic factors such as hard-seededness, resistance to diseases, and seed chemical composition influence the expression of seed vigour.

Methods of measuring seed vigour

The general strategy of determining seed vigour is to measure some aspects of seed deterioration or weaknesses, which is inversely proportional to seed vigour.

Cold test, accelerated aging test, electric conductivity test, seedling vigour classification, and seedling growth rate are among the tests that are used to measure seed vigour. In addition, the tetrazolium (TZ test) can be used as a vigor test by classifying the pattern of stained seeds into high, medium and low quality. Below is a brief description for some of the most common seed vigour tests that are used for various crops including corn, soybean, field beans, peas, grasses, vegetable seeds, and other crops.

Cold Test (CT)

This test is most useful to estimate seed performance from emergence ability to survival and sustenance of normal growth and development of seedling in low soil temperature conditions.

The cold test, the seeds are placed on towel paper and incubated at 5-10°C/41-51°F for 7 days period. At the end of the cold period, the test is transferred to a favorable temperature for germination (e.g., 25°C/77°F in case of sweet corn). The percentage of normal seedlings is considered as an indication of seed vigour. Vigorous seeds germinate better under cold environments.



High vigour and Low vigour seedling.

3. Evaluate the effects of adverse storage conditions, mechanical damage, drying injuries or other causes on seed germination in cold wet soils.

Accelerated Aging Test (AAT)

The principle of this test is to stress seeds with high temperatures of (40-45°C/130-139°F) and near 100% relative humidity (RH) for varying lengths of time, depending on the kind of seeds, after which a germination test is made. High vigour seeds are expected to tolerate high temperatures and humidity and retain their capability to produce normal seedlings in the germination test.

When can the AAT test be used?

1. Can be used to determine the seed vigour of many crops.
2. Useful in predicting the potential storability of a seed lot.

Electric Conductivity Test

This test measures the integrity of cell membranes, which is correlated with seed vigour. It is well established that this test is useful for garden beans and peas. It has been also reported that the conductivity test results are significantly correlated with field emergence for corn, and soybean. As seeds lose vigour, nutrients exude from their membranes, and so low quality seeds leak electrolytes such as amino acids, organic acids while high quality seeds contain their nutrients within well structured membranes. Therefore, seeds with higher conductivity measurement are indication of low quality seeds as vice versa.



Seedling Vigour Classification Test (SVCT)

This vigor test is an expansion of the standard germination test (SGT). The normal seedlings obtained from the SGT results are further classified into 'strong' and 'weak' categories. This test has been used for corn, garden beans, soybean, cotton, peanuts and other crops.

When can the cold test be used?

1. Select cultivars with the best ability to perform under cold wet soils for early spring planting.

2. Provide basis for adjusting planting rates for individual seed lots.

The principle of the test

Seedlings have four significant morphological sites for evaluating vigour:

1. Root system.
2. Hypocotyl (the embryonic axis between cotyledons and root).
3. Cotyledons (storage tissue of reserve food for seedling development).
4. Epicotyl (the embryonic axis above the cotyledons).

In this test, seedlings are classified as 'strong' if the above four areas are well developed and free from defects, which is indication of satisfactory performance over a wide range of field conditions. On the other hand, normal seedlings with some deficiencies such as missing part of the root, one cotyledon missing, hypocotyl with breaks, lesions, necrosis, twisting, or curling are classified as 'weak'.

Techniques of Genetic Purity Assessment of Hybrid Seed.

Swapna Deshmukh
(QA Officer)

Genetic purity of seeds refers to the trueness to type. If the seed possesses all the genetic qualities that breeder has placed in the variety, it is said to be genetically pure. The success of hybrid seed production is dependent on the genetic purity of parental lines. Both out crossing and inadvertent mixing of seed can compromise seed quality, therefore genetic purity assay are critical tools for seed producers and plant breeders. If there is any deterioration in the genetic makeup of the variety during seed multiplication and distribution cycle, there would definitely be proportionate decrease in its performance e.g. yield, disease resistance etc.

Principal genetic purity or genuineness of cultivar is tested by means of Genetic marker. Genetic marker are any genetically determined trait (morphological, biochemical, molecular) that can distinguish among genotypes (Leist, 2005).

1. Morphological (Grow Out Test) Marker based Technique.

It is a conventional method of Genetic purity assessment. Nirmal Seeds Pvt. Ltd. is using this technique to assay the Genetic purity of all produced seed lots. In grow out test (GOT), plants are grown up to maturity and several morphological and floral characteristics are assessed to distinguish

the hybrid, means it is based on morphological markers. It represents very small portion of genome and stage specific, high environmental influent. It is a time consuming and required large-scale field facilities.

Different Stages of Grow Out Test



Land Preparation & Sowing



Germinated GOT plot



Interculture



Vegetative Stage



Testing



Final Evaluation Stage

Now days the latest techniques have been developed in molecular biology to conduct Genetic Purity Assay. It is mostly based on a single genetic difference between the parents of a particular hybrid, it can be done using both protein and DNA analysis.

2. Biochemical (Protein and Isozyme) Marker based Technique.

Electrophoretic analysis of proteins and isozyme offers an efficient and cost effective method to differentiate between varieties within a species and genetic purity assay in seed lots. The analysis of the seed protein and isozyme by electrophoresis (SDS-PAGE and A-Page) technique is the simple, rapid, accurate and most economic. Although SDS PAGE is a more traditional method used for varietal testing, it is not suitable for all species. So now there is an advance technique i.e. IsoElectric Focusing or Ultra Thin Layer IsoElectric Focusing (IEF/UTLIEF) gel electrophoresis is available to the separation of proteins, peptides and enzymes. This procedure is quick, simple, relatively lower in cost, and generates highly resolved banding pattern. Vertical IEF gel electrophoresis in combinations with different Isozymes e.g. ADH, APS, GDH, EST, IDH, LAP, MDH etc. and different stain e.g. CBB, fast blue RRsalt, fast blue BBsalt etc. can be used for variety differentiation or genetic purity assay in different crop species.

Isoelectric Focusing (IEF).

In isoelectric focusing gel electrophoresis, proteins are separated on polyacrylamide gel by the differences in their electric charges. Under the electric field, these proteins migrate through the pH gradient in gel and settle where the pH of the gel is equal to their isoelectric point (pI), which is the pH at which net charge of the protein become zero. Different proteins that have different pI values will settle at different positions on the gel and form a protein band pattern. Different cultivars contain different seed proteins and have different protein band patterns under IEF. Therefore, varieties can be differentiated from each other by comparing their protein band patterns (*Dunn, 1993*)

The first two main factors to be determined in IEF. First proteins must be extracted in the appropriate solvent that is able to dissolve the marker proteins of individual plant varieties that distinguish one variety from the others. Second the appropriate gel pH gradient varies with plant species that possess different protein types. Zhao T. M. (Zhao et al. 2003) reported that a gel pH gradient of 5-8 gave the best results in the separation of hybrid-rice seed proteins, while Wang (Wang et al. 2000) used gel with a pH gradient of 4-8 to separate seed proteins of tomato for variety identification.

Photo 2. Banding patterns of Biochemical (protein and isozyme) marker.

3. Molecular (DNA) Marker based Technique

Molecular marker-assisted identification is expected to be potentially useful in hybrid seed genetic purity testing for many traits that are not easily assessed by visual inspection. It has many advantages over other categories of markers such as morphological, cytological or biochemical markers. e.g. DNA marker can cover the whole genome and, therefore, is much larger in quantity. There is more polymorphism in DNA markers, which are able to reveal the variation and allelism. Many DNA markers are co-dominant and can differentiate between the homozygous and heterozygous genotypes. Furthermore, DNA markers are 'neutral' and they have no effect on phenotype, no epistatic effect, and are not influenced by environmental conditions and developmental stages. Therefore, DNA marker is simple, quick, insensitive to environment and experimentally reproducible. Some molecular marker systems, such as RFLP (Restriction Fragment Length Polymorphism), AFLP (Amplification Fragment Length Polymorphism), RAPD (Random Amplified Polymorphic DNA), SSR (Simple Sequence Repeats), SNP (Single Nucleotide Polymorphism) have proven to be good optional tools for testing purposes. At present SSR & SNP has become an ideal molecular marker in identification of plant variety or genetic purity assay.

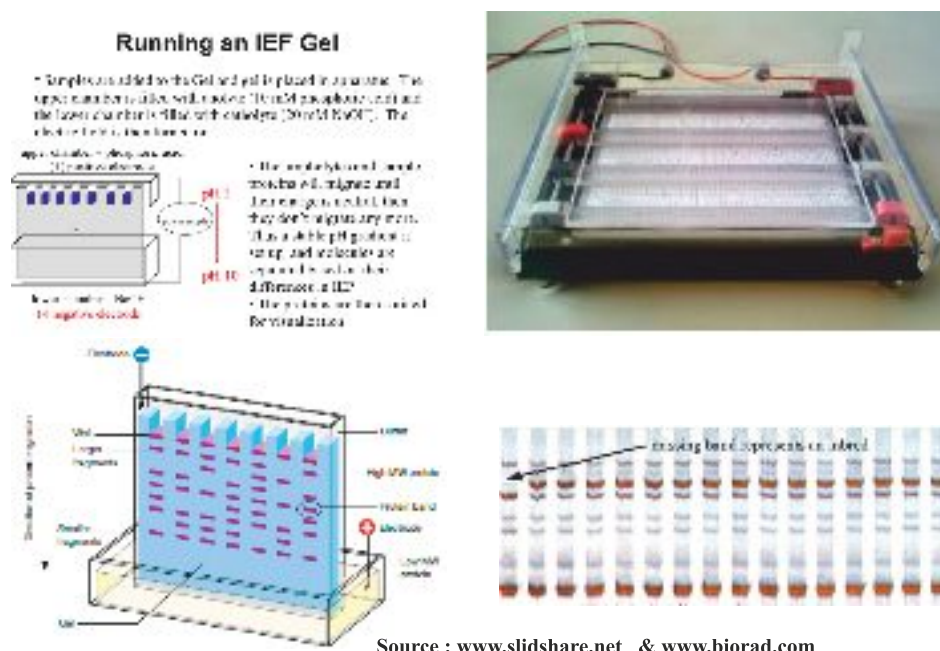


Photo 3. Banding pattern of Molecular (DNA) marker.

Source : www.slidshare.net & www.biorad.com



Why eco-friendly bio inputs are not getting popularized at desired rate ????

Valmik Patil
(Research Officer)

In modern agriculture, due to heavy usage of chemical fertilizers and harmful pesticides on the crops, sustainability of the agriculture system collapsed, cost of cultivation soared at a high rate, income of farmers stagnated and food security and safety became a daunting challenge. Indiscriminate and imbalanced use of chemical fertilizers, especially urea, along with chemical pesticides and unavailability of organic manures has led to considerable deterioration in soil health which affected soil fauna and resulted in poor soil fertility, reduced crop production and farmer income. In recent years, overuse of chemical fertilizers and pesticides leads poor cropping system, soil acidification, contamination of ground water and atmosphere. Therefore, establishment of environmental friendly mechanism and effective strategy for crop yield having vital importance to reach the goal of friendly environment. Microbial products are biologically active products of micro-organism (bio fertilizer and bio pesticides) containing one or more beneficial bacteria or fungal strains.

Importance of bio-inputs in agriculture:

- 1) They are cost effective, eco friendly and renewable source of plant nutrients.
- 2) They can save the uses and cost of chemical fertilizers and pesticides
- 3) Provide protection against drought , different pest and pathogens .
- 4) They stimulate the plant growth and activate soil biologically.
- 5) They can be incorporated in integrated nutrient management (INM) and integrated pest management (IPM).
- 6) The INM & IPM will help to reduce the cost of production and improve the quality of produce.

India is emerging as the single largest country with highest arable cultivated land under organic management. Currently, India is a key player in the global arena, exporting over 300 products in 20 different categories to over 20 countries. Additionally, India is the largest exporter of organic cotton and houses the largest number of organic producers in the world. Alongside the developments pertaining to the global markets, the domestic markets are growing at a rate higher than the global average and are expected to keep growing at a 25% CAGR through 2020.

Government initiative and Indian organic market scenario :

In India Government is promoting eco-friendly bio-products through various schemes like National Mission for Sustainable Agriculture (NMSA)/ Paramparagat Krishi Vikas Yojana (PKVY), Rashtriya Krishi Vikas Yojana (RKVY) and National Food Security Mission (NFSM) etc. To facilitate organic farming, 11 state governments (Kerala, Karnataka, Andhra Pradesh, Sikkim, Mizoram, Nagaland, Himachal Pradesh, Madhya Pradesh, Gujarat, Rajasthan and Odisha) have come out with their own State Organic Farming Policies, and Sikkim became the first state to be declared as Organic State. Many other states such as Chhattisgarh and Uttarakhand are also promoting an organic marketplace wherein producers and consumer can directly interface. With all these initiatives, it is expected that the cost of cultivation will come down and productivity will improve significantly. This will result in lowering the prices of organic products for mass consumers to switch over to organic products and create further demand. In spite of government initiative there are certain major constrains in the quality production of Bio-inputs like:

1. Use of improper, less efficient strains for production.
2. Lack of technically qualified staff in production units.
3. Unavailability of good quality carrier material or use of different carrier materials by different producers without knowing the quality of the materials.
4. Production of poor quality inoculants without understanding the basic microbiological techniques
5. Short shelf life of inoculants and temperature sensitive strains
6. Non-availability of suitable facilities for production
7. Non-availability of quality specifications for raw materials and quick quality control methods.

The above constrains are the major hurdles in not popularizing the bio organic inputs. Secondly, the cut-throat competition and L1 rate concept adopted by various procuring agencies forced manufacturer to compromise in quality to certain extent. This has resulted in getting unexpected results to the farmers. Guidelines have been formulated for such products in FCO & Insecticide Act 1968. These guidelines if strenghthenly followed then certainly this will help to boost the usage of these products among farming communities.





Nirmal's Trichocard

One of the best control measures on **cotton pink bollworm**

K. R. Patole (Plant Pathologist)
Dr. A. S. Damre (Entomologist)

Cotton is a key fibre crop having direct bearing on socio-economic structure of farmers but cotton suffers heavily from a spectrum of insect pests which affect the crop from seedling to boll opening. The losses due to cotton pink bollworm tune to 50-60% resulting in substantial decrease in lint yield. A bio-intensive IPM module with much reliance on conservation and promotion of naturally occurring bioagents, biopesticides and botanicals as tools for sustainable production of cotton. *Trichogramma* spp. belongs to the category of egg parasitoid. *Trichogrammatoidea bactrae* (Hymenoptera: Trichogrammatidae) the most widely used bio-control agent in the world and is effective against pink bollworm of cotton. It attacks the pest at the egg stage itself and hence damage done by larvae is avoided. It offers a lower cost but more effective plant protection option in comparison to insecticides. Considering the heavy incidence of cotton pink bollworm in Maharashtra, the Nirmal seeds has started the trichocard production activity.

Nirmal's Trichocard



Life cycle of Trichogramma



How to use Trichocard:

- In cotton- The Trichocard are released in the field at 45 days after sowing @ 5 cards / ha (one lakh eggs).
- Total three release are necessary. The cards are to be used before the emergence of the adult parasite.
- Cut or tear each Trichocard into small pieces and distribute them all over the field.
- The pieces may be stapled under side of Cotton leaf at 15x15 m distance.
- Care should be taken to release the parasites either in morning or evening i.e., during cool hours, in windward direction and there should not be any pesticide spray.



Trichocard stapled on the inner-side of the leaf

Life cycle of Trichogramma:

- Female parasitoid can distinguish already parasitised eggs, thereby avoiding superparasitism or multiple-parasitism under natural conditions. Fecundity varies from 20 to 200 eggs per female according to the species, the host, and the longevity of the adult.
- Eggs in the early stages of development are more suitable for parasite development. Older eggs, especially those in which the head capsule of the larva is visible, are not usually parasitized and if they are parasite, survival is much lower. Venom injected by the female at the time of oviposition is believed to cause this predigestion of the egg's contents.
- During the 3rd instar (3 to 4 days after the host egg was parasitized) dark melanin granules are deposited on the inner surface of the egg chorion, causing the host egg to turn black. This is an invaluable diagnostic character for distinguishing them from unparasitized eggs. Larvae then transform to the inactive pupal stage.
- The adult wasps emerge from the pupae and escape the host egg by chewing a circular hole in the egg shell. The black layer inside the chorion and the exit hole are evidence of parasitism by Trichogramma. The egg, larval and pupal stages of Trichogramma at 28 ± 20C are completed in about 1 day, 3 to 4 days, and 4 to 5 days respectively.
- Thus, the life cycle is completed in 8 to 10 days, but it may be prolonged at lower temperatures or hampered at very high temperatures. The adults are short lived (6-8 days). Mating and oviposition take place immediately after emergence. The sex ratio is generally 1:1.

Advantages of using Trichocards:

- Low cost, more effective.
- field application (releases) is very simple as compared to other methods.
- Added to all these, environmental pollution is avoided.

Precautions:

- Trichocards should be packed in such a way that the parasitized surface is on the inner side.
- Emergence date should be specified on cards for the guidance of the users.
- Trichocards should be stapled on the inner-side of the leaf to avoid direct sunlight.
- Farmers should avoid the use of pesticides in the field where Trichogramma are released. If need arises selective/safer pesticides can be used and it is to be ensured that pesticides are used 15 days before or after release of Trichogramma.



विक्रमी उत्पादन - एकरी ४६.४१ क्विंटल

सह्याद्री ४ या भात वाणाला दिली निर्मल बायोपॉवर गोल्डची जोड

प्रामुख्याने शेतीचा विचार केला तर भात हे या कोल्हापूर जिल्ह्याचे प्रमुख पिक आहे. चंदगड, शाहूवाडी, राधानगरी, भुदरगड, पन्हाळा व करवीर इत्यादी तालुक्यात भात हे पिक मोठ्या प्रमाणावर घेतले जाते. म्हणून भाताचा जिल्हा म्हणून कोल्हापूर ची ओळख आहे. भात पिकाला केंद्रबिंदू मानूनच दरवर्षी कृषी विभागातर्फे भात बियाणे पिक स्पर्धेचे आयोजन केले जाते. या स्पर्धेमध्ये सदर शेतकऱ्याने निर्मल बायोपॉवर गोल्ड या जैविक खताचा भात पिकासाठी वापर केल्याने या शेतकऱ्याला विक्रमी उत्पादन म्हणजेच एकरी ४६.४१ क्विंटल असे उत्पादन मिळाले.

महाराष्ट्राच्या दक्षिणेकडील शेवटचा जिल्हा म्हणजे कोल्हापूर ! महाराष्ट्रातील एक पर्यटन स्थळ म्हणून कोल्हापूरची ओळख आहे. कोल्हापूरमध्ये पाण्याचा मुबलक साठा असल्यामुळे बारा महिने विविध पिके घेतली जातात. सहकारी साखर कारखान्यांमुळे ऊस हे महत्वाचे पीक आहे. जिल्ह्याच्या पश्चिमेकडील भागात मुख्यतः भात पिकतो. खरीप पिकांमध्ये भात पिका व्यतिरिक्त ऊस, भुईमूग, सोयाबीन व ज्वारी, नाचणी अशी पिके घेतली जातात. तर रब्बीमध्ये मुख्यतः ज्वारी, गहू ही पिके घेतली जातात. प्रामुख्याने शेतीचा विचार केला तर भात हे या जिल्ह्याचे प्रमुख पिक आहे. चंदगड, शाहूवाडी, राधानगरी, भुदरगड, पन्हाळा व करवीर इत्यादी तालुक्यात भात हे पिक मोठ्या प्रमाणावर घेतले जाते. म्हणून भाताचा जिल्हा म्हणून कोल्हापूरची ओळख आहे. भात पिकाला केंद्रबिंदू मानूनच दरवर्षी कृषी विभागातर्फे भात बियाणे पिक स्पर्धेचे आयोजन केले जाते. मागील वर्षी (२०१७) सुध्दा कोल्हापूर जिल्ह्यात भात बियाणे पिक स्पर्धा आयोजित करण्यात आली होती. या स्पर्धेत जिल्ह्यातील सर्व तालुक्यामधून असंख्य शेतकरी सहभागी झाले होते. या स्पर्धेसाठी जि.प. कृषी विभागाकडून ज्या ज्या भागात भात वाणांची लागवड केली जाते अशा भात पिकाची वाण निहाय निवड केली जाते.

निर्मल सिडसच्या एनपीएच-५, एनपीएच-१५० आणि सह्याद्री -४ या वाणांची या स्पर्धेसाठी निवड करण्यात आली. त्यापैकी सह्याद्री ४ या वाणाची लागवड करवीर तालुक्यातील म्हालसवडे या गावातील प्रगतीशील शेतकरी श्री. भगवान केरबा पाटील या शेतकऱ्याने आपल्या एक एकर क्षेत्रात लागवड केली. लागवडीपासून तर काढणीपर्यंत एकंदरीत पिकाच्या एकूण कालावधी मध्ये निर्मल सिडसचे झोनल मॅनेजर श्री. सुनिल गंधम, श्री. राहुल राजपुत (डेप्युटी रिजनल मॅनेजर) व बाळासाहेब पाटील (टेरिटरी ऑफीसर) यांचे सदर शेतकऱ्याला मार्गदर्शन लाभले. रासायनिक खते व औषधांसोबतच सदर शेतकऱ्याने

निर्मल बायोपॉवर गोल्ड या मायकोरायजल जैविक खताचा पुरेपूर वापर केला. निर्मल बायोपॉवर गोल्ड हेक्टरी २५ किलो च्या वापरामुळे तंतुमुळांच्या संख्येत वाढ होवून अन्नद्रव्यांचे सक्षमपणे शोषण झाले. जमिनीतील स्फुरद, पाणी आणि इतर महत्वाच्या सुक्ष्म व अतिसुक्ष्म घटकांचे जास्तीत जास्त शोषण होवून पिकाला झालेल्या अन्नद्रव्यांच्या उपलब्धतेमुळे ओंबीची लांबी, दाण्यांची संख्या, झाडाची वाढ या गोष्टींवर त्याचा प्रभाव पडून भात पिकाचे विक्रमी उत्पादन म्हणजेच एकरी ४६.४१ क्विंटल उत्पादन शेतकऱ्याला मिळाले. या विक्रमी उत्पादनामुळे सदर शेतकऱ्याने या पिक स्पर्धेत प्रथम क्रमांक

पटकवला. प्रथम क्रमांक आल्यामुळे शेतकरी श्री. भगवान केरबा पाटील यांचा दि. ०१ जुलै २०१८ रोजी जिल्ह्याचे पालकमंत्री मा. श्री. चंद्रकांतदादा पाटील यांच्या हस्ते सत्कार करण्यात आला. शेतकरी आपल्या या यशाचे श्रेय आपल्या भावनेतून व्यक्त करताना निर्मल सिडसच्या अधिकाऱ्यांना देतात. ज्यांनी वेळोवेळी मार्गदर्शन केलं आणि निर्मल बायोपॉवर गोल्ड हे सोन्यासारखं उत्पादन मला उपलब्ध करून दिलं. त्यामुळेच मी विक्रमी उत्पादनाचा आणि सन्मानाचा मानकरी ठरलो. यातून इतर शेतकऱ्यांनीही प्रेरणा घ्यायला हवी असे शेतकऱ्याने सांगितले.





Launching of Tailor-made Mobile-App for Production Department:-

Production development took initiative to launch a tailor-made production mobile app along with a Digital production diary for its all three (TL, BS, FS) branches.

This has introduced the smart working concepts among the team members and enabled the day to day working very easy. Now the entire operations of the Department are paperless. Every team member is successfully utilizing this Mobile App. Training programmes were conducted under the guidance of Hon. Director (Production) for operation of this Mobile App.



Lot List(Bagwal)				
Lot	Crop	Variety	Grower	Genotype
TB1741	Corn	N-11750	Alvada Palmar J	1.1
TB1742	Corn	N-18278	Shawon Palmar	1.3
TB1743	Corn	N-11750	Rajesh Palmar	2.1

◆ Product performances



Product performance of Nirmal Castor NTCH-44 in AP



Product performance of Hy. Maize NMH- 51 in UP



Use of Nirmal Bio Power Gold & Berrylon on Cotton



Farmer Name : Dinesh kumar Village : Tarara, Hasanpur, Amroha

Product performance of Sponge gourd NSGH- 88 in MS



Farmer Name : Shree Babhale
Village : Parola Dist. Jalgaon. (MS)

Product performance of Ridge gourd NRGH-370 in AP





**Product performance of
Maize NMH-27+ in UP**



Excellent performance in
summer trial at Buland shahar (UP)

**Use of Nirmal Bio Power Gold
on Sugarcane**



Village : Godi Pokhoni, Dist : Raibarely (UP)

**Product performance of
Tomato NTH-3622, Bitter gourd NBGH-951 &
Cucumber-NCH-388 at Dist : Mandi (Himachal Pradesh)**



**Product performance of
Muskmelon NMMH-24 in UP**





Product performance of Okra - NOH-1684 (Kajari) in Thane (MS)



Farmer Name : Dnyaneshwar Waman Pawar Village : Khutal, Dist : Thane

Performance of Bottlegourd - NBBH-48 (Vikram) in UP



Farmer Name : Pritam Singh
Village : Rudrapur, Tal : Hanspur,
Dist : Amroha

Product performance of Muskmelon - NMMH-203 in MS



Farmer Name : Bajirao Patil Village : Sonevadi,
Tal : Shindkheda Dist : Dhule

Product performance of Muskmelon - NMMH-24 in UP



Product performance of Hy. Bajra NPH-5423 in Gujarat



Village : Naman, Gujrat

Product performance of Paddy - NR-89 in West Bengal





Use of Nirmal Bio Power Gold on Onion in Nashik district



Use of Nirmal Bio Power Gold on Sugarcane in Nashik district





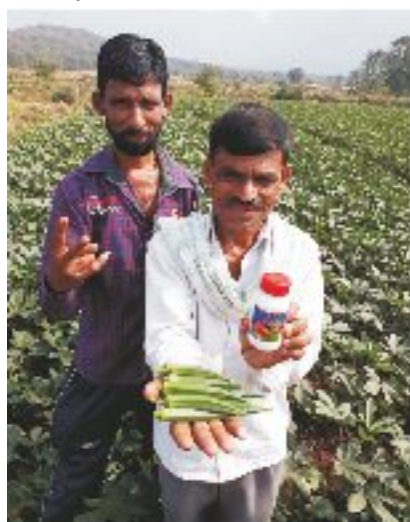
Use of Nirmal Bio Power Gold on Capsicum in Osmanabad District



Healthy growth & excellent result



Use of Berrylon on Okra in Nashik District



Product performance of Tinda NRL-3 (Gabaru) in Nashik



◆ Product Promotion Activities

Nirmal Doot



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Marketing department conducts various product promotion activities for communicating product's special features & advantages to the farmer.







Hon. Shri Kishor Raje Nimbalkar, Collector Jalgaon district
visited Jamun Plantation at Hon. CMD's farm



Visit of Hon. Sanjay Swant Shivsena Sampark Pramukh to Nirmal Seeds, Pachora



Visit of Mr. Kuldeep Kumar (Manager Vijaya Bank) &
Mr. Kishor Varma (Manager Vijaya Bank) to Nirmal Seeds, Pachora





Hon. Dr. J.C.Rajput (Director R & D) delivering lecture on Integrated Nutrient Management of Mango at Vengurla during International Mango Conformance



Hon. Director Dr. S.S.Patil along with Scientist & Progressive farmer's at Nirmal Bio Power Gold applied Banana plantation



Hon Director Production Shri D. R. Deshmukh with Sr. Manager Production, Sr. Scientist & RM Production inspecting the Bittergourd hybrid seed plots.





Recently, Production department has conducted trainings mobile app operation



◆ Award :



Receipt of “ Outstanding Partnership Award- Asian” for Pearl Millet biofortification research for human nutrition in India



Hon. CMD sir addressing the Nirmal Team during training programme



AGM (Finance & Administration) S.S.Patil addressing the Account & Administration team of MP, UP, CG, KK, AP, HR, RJ & MS during training programme



AGM (Finance & Administration) S.S.Patil during presentation of results of Financial Year 2017-18 on 31st March 2018



AGM (Marketing) G.M.Patil addressing the Marketing Team of MP, CG & Vidarbha (MS) during R & D Visit





Annual budget meet of Marketing held at Novotel Mumbai during 22nd to 24th April 2018



Training at Lucknow
covering North & North eastern state's team



Training at Bangalore
covering Western, Central & Southern state's team



Training at Hydrabad



Launching of Nirmal Bio Power Gold
Marketing Department took initiative to launch
newly developed unique Mycorrhigal bio fertilizer
Bio Power Gold in different regions of country





अनावश्यक खर्चाला फाटा देत शेतकऱ्यांना बियाणे

आष्टी, ता. ३० (चातमीदा) : निवडून आलेल्या अनावश्यक खर्चाचा फाटा देऊन शेतकऱ्यांना बियाणे व खाद्ये वस्तू कल्पना असून येथील जमीनदारीत एवढीच, याने बाजारातून घेऊन व सडकून सोपवून देऊन देऊन लोकांच्या बियाणेचा खर्च वाचवून घेऊन.

लवकरे की, लवकरे डोने, फेरे, बंडवाल अदीवादी मोठे खर्च केला जातो, नवसेवाकडे घेऊन दिलेले शेतकऱ्यांच्या वस्तूतून घेऊन घेतले जाते. या वस्तूतून घेऊन घेतले जाते.

या वस्तूतून घेऊन घेतले जाते, लवकरे की, लवकरे डोने, फेरे, बंडवाल अदीवादी मोठे खर्च केला जातो, नवसेवाकडे घेऊन दिलेले शेतकऱ्यांच्या वस्तूतून घेऊन घेतले जाते.



आष्टी : शेतकऱ्यांना बियाणे व खाद्ये वस्तू कल्पना घेऊन घेतले जाते.

लवकरे की, लवकरे डोने, फेरे, बंडवाल अदीवादी मोठे खर्च केला जातो, नवसेवाकडे घेऊन दिलेले शेतकऱ्यांच्या वस्तूतून घेऊन घेतले जाते.

पुणे येथे शेतकरी विभाग व टेक्निकल सेलच्या उद्घाटनात भाग घेतले. शा. (३०) शिवहरमण अदीवादी यांच्याकडे फायदा देऊन लोकांच्या बियाणेचा खर्च वाचवून घेऊन घेतले जाते. या वस्तूतून घेऊन घेतले जाते.

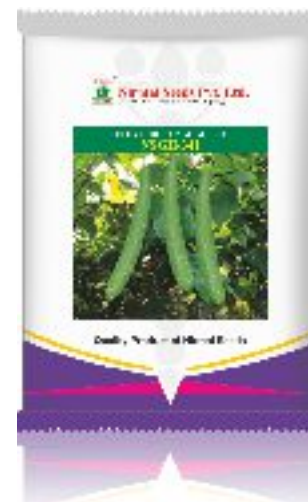
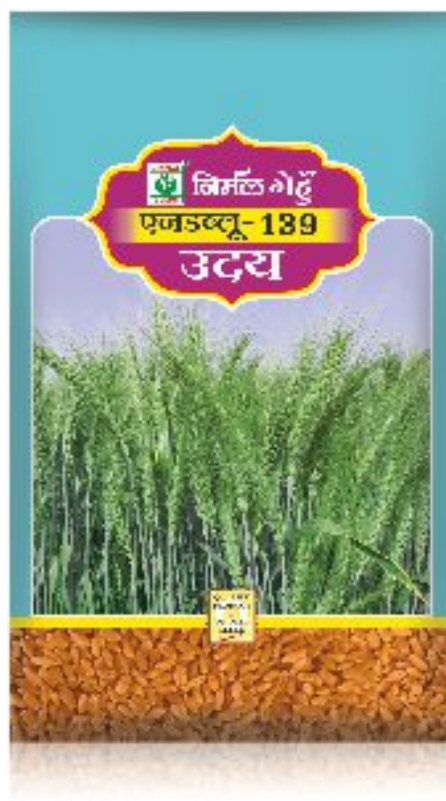
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◆ New Packing /New Product Launches

Nirmal Doot



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◆ New Joinings



Mr. Rajesh Kumar Ranjan
Zonal Manager Mktg
(Bihar & Jharkhad)



Mr. Rameshwar G. Khokale
Zonal Manager
Mktg (Gujrat)



Dr. Ashvinkumar S. Damre
Entomologist
R & D



Mr. Vilas P. Khile
Regional Manager
Production (Chikhli)



Mr. Ravindra S. Langde
Dy. Regional Manager
Mktg (Nagpur)



Mr. Swami P. Patil
PA to CMD

◆ Wedding Bells



Chi. Pankaj
S/o. Late Ashok P. Tayade
With
Chi. Sau. Kan. Falguni
D/o. Late Nilkanth D. Bharude
On 23rd June 2018

Chi. Sau. Kan. Jyostana
D/o. Shri Pitambar Firake
With
Chi. Vishal
S/o. Shri Bhaurao Patil
On 8th April 2018

Chi. Bhushan
S/o. Shri Rajesh Rajput
With
Chi. Sau. Kan. Harshada
D/o. Shri Ranjeetsingh Girashe
On 28th April 2018

Chi. Sachin
S/o. Shri Bhalerao Patil
With
Chi. Sau. Kan. Vaishali
D/o. Shri Bhausaheb Patil
On 1st May 2018

Chi. Ganesh
S/o. Shri Hardash Chhagan Rathod
With
Chi. Sau. Kan. Priyanka
D/o. Shri Bhaiyasaheb Chavan
On 18th February 2018

निर्मल बायोपॉवर गोल्ड

अभी तरल में भी उपलब्ध...





On the occasion of Republic Day 26th January 2018, Hon. CMD hoisted the flag.

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