Виходячи з цього професор О.М. Можейко запропонував для їх хімічної меліорації вносити вапно і фосфоритне борошно половинними нормами 1 раз на 3–4 роки. Ці дослідження, а також вивчення глеєутворювального процесу в грунтах при вирощуваню рису на півдні України послужили теоретичною основою для подальших практичних розробок у цьому напрямку. Так, задовго до винекнення й обгрунтування інтенсивної технології вирощювання озимої пшениці О.М. Можейко запропонував дробнее внесення азотних добрив на осушених дерново-підзолистих оглеєних грунтах Передкарпаття. За результатами десятирічних досліджень у цьому регіоні булла захищенна одна докторська дисертація І.І. Назаренка і п’ять кандидатських.

Продовженням наукових досліджень О.М. Можейка і І.І. Назаренка в галузі грунтознавства стали роботи їх учня і послідовника А.М. Свиридова. Він проводив свої дослідження щодо окультурення опідзолених черноземів Придністровья протягом 1975–1980 рр. Вивчивши природу опідзолених черноземів Придністровья А.М. Свиридов розробив і запропонував комплекс прийомів їх окультурення і підвищення родючості. Своїми дослідженнями він установив, що ведучою ланкою в цому комплексі, яка забезпечує найбільше підвищення врожаю вирощуваних культур, є застосування кальцієвмісних сполук сумісно з якісними органічними добривами. Ним розроблена і технологія підготовки таких добрив шляхом компостування безпідстилкового, напіврідкого гною з низинним торфом і кальцієвмісними речовинами, при якому в компості підвищується співвідношення вуглецю з азотом і зростає вміст активного кальцію, який запобігає втратам органічних речовин та елементів живлення. При цьому підвищується і якість гумусу в ґрунті, оскільки в ньому збільшується кількість гумінових кислот і активної фракції гумусу.

Професор О.М. Можейко заснував наукову школу меліоративного ґрунтознавства та землеробства. Ним підготовлено 3 доктори наук та 24 кандидати наук, які працювали і працюють на кафедрі землеробства та продовжують розвиток наукових основ цієї школи, а кафедрі присвоєно почесне звання імені професора О.М. Можейка.

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QUALITY SEED PRODUCTION IN HYBRID RICE

The Aim of Hybrid Rice in India

i) Development of hybrids with 25-30% higher yield than the best cultivar with stability to attract farmers.

ii) Standarzation of hybrid seed production technique.

iii) Development of best location specific package of practices for the respective hybrids released from different regions of state

iv) Strengthening basic research

v) Securing for the future-Food Security and Attain self sufficiency in rice production.

Hybrid Rice Seeds Production

Hybrid seed production is at present based on CMS System and involves two steps

1. Multiplication of CMS Line (A x B)

2. Production of hybrid seeds i.e. F1 Seeds (A x R). Seeds Production technology for getting maximum hybrid seed yield (F1 Seeds) is as below

Selection of land

Field should be well fertile, uniformly leveled with good irrigation and drainage system

Season

Rabi (December-January Sowing)

Kharif (May –June sowing).

Rabi season is more suitable for seed production than kharif.

Favorable climate condition during flowering for higher seed set

i) Daily mean temperature 24-30˚C

ii) Relative humidity-70-80%

iii) The difference between day and night temperatures should not exceed 8-10˚C.

iv) Sufficient sunshine and moderate wind velocity-2-3m/Second

v) Free from continuous rain above 10 days during peak flowering.

Seed set and yield will be affected if temperature is below 10˚Cand above 35˚C at the time of flowering)

ISOLATION

i**) Space isolation**-100m for hybrid F1 (A x R) and 200m for (A x B)

ii) Time isolation- 25 days

iii) Barrier isolation-Plastic sheets above 2m in height or bordering crop like maize ,sugarcane, sesbania to a distance over 30 m.

NURSERY MANAGEMENT

*Female and male (A x R) seedlings have to be raised in separate seed beds.

*Application of DAP 50g/sq. m as basal in the nursery will give ensure robust seeding with 2-3 tillers at the time of planting.

*20-25 days old seedling have to be planted

*Seed rate female-15kg/ha and male 6kg/ha sufficient

*Other nursery operations are as usual

STAGGERING SOWING OF PARENTS FOR SYNCHRONIZATION

It is most important to synchronize the heading date of the male and female parents, especially for the hybrid combination having parents with quite difference growth duration. In addition, in order to extend the pollen supply time, male parent is usually seeded thrice at interval of 4-5days.

These three methods can be used to determine the difference in seeding date for synchronization between male and female parents.

i) Growth Duration Difference (GDF) method
ii) Leaf number difference (LND) method
iii) Effective Accumulated Temperature (EAT) method

Among these three methods GDD method is mostly followed since it is simple and easy to adopt. In GDD method by checking the previous data on the difference in duration from seeding to heading between male and female parents, the proper seeding date of both parents in current season can be determined. This method is suitable in season or regions where the temperature fluctuation is small

MAIN FIELD MANAGEMENT

(a) Row Ratio, Row Direction and Planting Pattern

In hybrid seed production the seed parent and pollen parent are planted in a certain ratio at certain spacing the row ratio and spacings of pollen parent and seed parent have distinct effect on the hybrid seed yields. A and R lines can be planted in several row ratio of 8:2 or 10:2 etc

(b) Factors influencing row ratio

*Plant height of the pollinator
*Growth and vigor of pollinator
*Size of panicles and amount of residual pollen
*Duration and angle of florets opening in CMS lines
*Stigma exertion in CMS lines

(c) Layout for transplanting

Transplanting should be done when A and R line attained age of 21-25 days, which ensure timely heading and flowering of parental lines. Transplanting of older seedling delays flowering and transplanting of younger seedlings advances flowering.

To facilitate outcrossing, the row of male and female in seed production plot should be perpendicular to the prevailing wind direction expected at flowering time of the parents

Practically a row ratio of 2:8 (A x R) is currently widely adopted for hybrid rice seed production in India.

(d) Transplanting of R Line

Three stagger R line seedling may be transplanted in two separate rows at 15cm spacing,(1M:2M:3M:1M:2M:3M) or mixed well together and plant @2-3 seedlings/hill with 15cm spacing within the rows. Leave a 145 cm or 110 cm wide block between paired rows of R line seedling for transplanting 8 row blocks of A line seedlings.

(e) Transplanting of the A line

Transplant with one seedlings per hills with the inter and intra row spacing of 15x15cm in 145 cm wide block or 10x15 cm wide block according to fertility of field. Leave a 20cm spacing between the A line rows and the nearest R line rows.

PREDICTION OF HEADING DATE

The method, which is widely used and found to be effective, is by examining the development of young panicles. Based on the morphological features, the young panicles are classified into 8 development stages. The synchronization in flowering

can be predicted by using such criteria. In practice, about 30 days before heading, the male and female parents in the seed production field are sampled and their young panicles within the main clumps and tillers are carefully observed with a magnifying lens every three days. Usually female and male parent will take 27 and 32 days respectively from panicle initiation to heading in 8 stages.

Method of observing panicle initiation

• Select the main tiller (the longest one) and cut at the base where stem and root join.

• Make a longitudinal slit from the base up to the top of the tiller

• Open the slit just above the nodal portion

• Observe the developing panicle with the help of a magnifying lens.

Adjustment of flowering date

If the difference is predicted in flowering date between parental lines is more than three days, then the adjustment is essential for synchronized flowering

a) when the difference is 4-5 days

The earlier developing parent should be applied with quick releasing nitrogen fertilizer (2% urea spray at 500 lit/ha) and the later developing parent should be sprayed with 2% solution of DAP.

b) When the Difference is 8-10days

Pollen parent (R line) is more sensitive to water than CMS Lines, if R line is found to be earlier, draining out of water from the field will delay the panicle development. Advance delay flowering parents by spraying 2% D.A.P (diamonium Phosphate) or 1 % S.S.P (single super phosphate).on other hand if R line is found to be late , higher standing water would facilitate rapid panicle development. Spray 2% urea to the other parental line (early flowering parent) to delay flowering. Thus both parents will be adjusted to come at a point where the flower synchronization will take place.

c) When the difference is 11-15 days

When the difference is more than 10 days, adjustment for synchronization of flowering of the parents is difficult. Delay the flowering of early parent by removing the main tillers. In addition of this, spray 2% urea or apply nitrogenous fertilizer to the soil@ 30-40kg./ha, on other hand, hasten the flowering of the late parent 2% solution of D.A.P to the late parent.

Enhancement of out-crossing

The out- crossing in hybrid seed production plots could be increased by facilitate pollen dispersal. This could be achieved by flag leaf clipping, gibberelic acid application and roping or shaking the pollen parent with bamboo stick.

a) **Flag leaf cutting:-**The flag leaves in female parent are main obstacles to cross-pollination. Thus, flag leaves should be cut at boot stage. Flag leaf cutting helps in uniform pollen movement and wide dispersal of pollen grain over CMS line. Leaf cutting, however, slightly affects the grain weight.

b) Application of Gibberellic Acid (GA3). Gibberellic acid (GA3) plays important role in rice hybrid seed production. It can adjust physiological and biochemical metabolism of rice plant, especially stimulate the elongation of young cells. About 25-30 % spiklets of a panicle are inside the flag leaf sheath in most of

the indica CMS lines than that of the Japonica CMS lines.GA3 has a definite role in exertion of panicle.

*Spray three times at15- 20% flowering during early morning or evening hours at rate of 100gm/ha follow for three days consecutively (30g/50g/20g).GA3 is not soluble in water(1gm in 25-30ml of alcohol)

Advantages of Gibberelic GA_3 application

- Enhances panicle and stigma exertion
- Adjust plant height of seed and pollen parents
- Speed up the growth of later tillers and increases the effective tillers
- Sets uniform panicle ear.
- Flag leaf angle is increased
- Increases 1000 grain weight
- Reduces unfilled grains
- Remarkably enhances seed setting and seed yield

Supplementary pollination

Natural outcrossing was recorded less than 10% by Ramlingam et al. (1994). However, this depends upon the wind direction and its velocity. Shaking the male parent(R) line panicles by rope pulling at panicle level or rod driving during anthesis can make their anthers dehisce and spread the pollen widely and evenly thus the outcrossing rate could be increased. It is more effective especially on calm or breezy days. Generally, supplementary pollination is carried out at 30 minutes interval for 5 times daily both morning and evening during peak anthesis (10-12 am and 2-4 p.m.) until no pollen remains on the R line. It is not needed when the wind is greater than moderate breeze.

Foliar spray

Spray of 2% DAP increases yield and qualities of seed. Short duration: 1st Spray on 60 DAS 2nd “80” Medium duration: 1st Spray on 80 DAS 2nd “100”

Rouging

Remove the undesirable plants either in A or R line rows that differ from plants that are true to type. The pollen shedders and off types are removed. The undesirable plants come from many sources. They may be volunteer plants from the previous cropping. The most important stages for rouging are at maximum tillering, at flowering and just before harvesting.

Harvesting, threshing & drying

Turning of 90% green a seed to straw yellow colour is the stage of physiological maturity Moisture content will be 17-20%.

Male parent should be harvested first.

Care should be taken to avoid admixture of male line with female line while harvesting.

The female parent should be threshed at 16-17% moisture content

Separately in a well cleaned threshing floor.

The threshed seed should be winnowed and dried to reduce the seed

Moisture content to 12%

The seed should not be dried under direct sun between 12 to 3.00 p.m. during hot sunny days.

Storage

For short term storage use gunny bag or cloth bag. For long term storage use polythene bag of > 700 gauge and dry the seeds to 8% moisture content. When compared with varieties, the hybrids and parental lines A & B lines are poor in storability. The order of the storage potential is R > F1 > B > A.

Seed Yield:-2,000kg-3,500kg/ha.

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PRODUCTIVITY OF SWEET CHERRY IN SOUTHERN UKRAINE UNDER STRESS CONDITIONS

Introduction. Sweet cherry is one of the most important stone fruit crops in Ukraine, with production level of 60-85 thousand t annually, with most of the industrial production concentrated in the Steppe zone [1]. The question of optimal cherry rootstock for intensive orchards is still very open, and the tendency of climate change observed throughout the world makes it more pressing nowadays. According to the meteorological data, in recent years, mean daily air temperature and sum of active temperatures in Melitopol increased compared to mean long-term values, while hydrothermal coefficient and air humidity decreased, more spring frosts in April-May are observed, and precipitation distribution shifted to heavy rains followed by prolonged periods of draught [2]. Thus, cherry rootstocks should be adaptive to a wide range of possible abiotic stress factors. The aim of our research was to assess the main production indices of sweet cherry trees grafted on different clonal rootstocks.

Materials and methods. The research was carried out in sweet cherry orchard planted in 2015 in Melitopol, Zaporizhzhia region, on ‘Melitopolska chorna’ and ‘Krupnoplidna’ cultivars. Trees were planted with a scheme of 5 x 3 m and trained as spindle bush canopies. The soil of the experimental site is southern light loamy chernozem. The field experiment had four replications with 8 trees in each replication. Due to Russian aggression against Ukraine, experimental orchard was not irrigated and fertilized, which further added to the stress of the plants. To analyse the results, 2-way ANOVA was conducted using Minitab 19 software with Tukey’s range test with an accuracy of 0.05 to determine the significant differences between the means.

Results and conclusions. Weather conditions of the winter of 2021-2022 were generally favourable for sweet cherry. The minimum air temperature was recorded at the level of minus 14.2 °C on 24.12.2021, and the damage to generative buds in winter amounted to 6-9%. Frosts after the restoration of plant vegetation, which were observed in March (up to minus 4.6 °C on 28.03.2022) and April (up to minus 2.5 °C on 05.04.2022) damaged 15-20% of flower pistils, which is not critical for this crop