**Advanced production technology of millet**

**Introduction**

* Millet is a crop that is cultivated by farmers in areas with adverse conditions and limited rainfall and with very low fertility, where other crops do not produce well.
* Millet crop which is the main source of energy, protein vitamins, and minerals for the poor.
* Millet is mainly grown in dry and semi-arid areas, it is considered the main source of grains and fodder for these areas. Drought is a tolerant and short term (mainly 2-3 months) crop that can be grown in almost all types of lands. Millet is an important crop in the region and production.Where 500-600 min.m. Rainfall occurs every year which is suitable for the dry western and northern regions of the country
* According to the study of Newtonian Journal, if children up to 3 years of age in India consume 100 grams of millet flour, then they can fulfill their daily iron requirement and children up to 2 years of age should consume less quantity in it.
* Millet flour is an accessible means to overcome anemia, especially for Indian women. Not only in India but in the world, women and children are deficient in iron and mineral salts - Dr. According to Eric Boi, Head of the Department, Newtonian HarvestPlus, millet is a better source of iron and zinc than wheat and rice
* Millet cultivation is about 2 lakhs in Madhya Pradesh. It is grown in land which is mainly grown in Bhind, Morena, Sheopur and Gwalior districts in the northern part of Madhya Pradesh. Millet is grown on about 45000 hectares of land in Bhind district.
* Good quality nutrients are found in millet grains from jowar. Dano contains 12.4 percent moisture, 11.6 percent protein, 5 percent fat, 76 percent carbohydrates and 2.7 percent minerals.
* Millet grains can be used by cooking them like rice or making chapatti. It is also used for green fodder and dry fodder for chicken feed animals.

**Climate**

* Millet crop is a fast growing hot climate crop that is 40-75 cm. Suitable for areas with annual rainfall. It has amazing power to tolerate drought.
* Moist environment is favorable during crop growth and also rain at flowering stage is harmful for it because due to melting of pollination due to rain, less grains are formed in the animals. Generally millet is grown in those areas where it is not possible to grow jowar due to high temperature and low rainfall.
* 20-280 centigrate temperature is suitable for good growth of the water

**Land-**

Millet can be grown successfully in many types of lands, black soil, loam, and red soil, but is very tolerant of the problem of water logging.

**Advanced varieties**

**Hybrid**

| **Kr.** | **Variety** | **Notification year** | **Name of the centre** | **Favorable area** | **special properties,** |
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| 1 | K.V.H. 108 (m.H. 1737) | 2014 | Krishna Seed Pvt.Li. Agra | M.Q.,u.Q., Punjab, Delhi, Haryana, Gujarat, Rajasthan, | For late ripening, large plants, downymildew, blast and smut resistant |
| 2 | G.V.H. 905 (M.H. 1055) | 2013 | A.I.C.P.M.I.P.M.R.S. Jamnagar | M.Q.,u.Q., Punjab, Delhi, Haryana, Gujarat, Rajasthan, | Medium term, medium height, downymildew resistant |
| 3 | 86 M 89 (M H 1747) | 2013 | To Pioneer Overseas. Hyderabad | M.Q.,u.Q., Punjab, Delhi, Haryana, Gujarat, Rajasthan, | Late maturing, large plants, downymildew resistant |
| 4 | M.P.M.H 17(m.H.1663) | 2013 | A.I.C.P.M.I.P. Jodhpur | M.Q.,u.Q., Punjab, Delhi, Haryana, Gujarat, Rajasthan, | Medium term and high, downymildew tolerance |
| 5 | Kaveri Super Vos (M.H.1553) | 2012 | To Kaveri Seed.Li. Secunderabad | M.Q.,u.Q., Punjab, Haryana, Gujarat, Rajasthan, | Late maturing, large plants |
| 6 | 86 M. 86 (M. H. 1684). | 2012 | To Pioneer Overseas. Hyderabad | M.Q.,u.Q., Punjab, Haryana, Gujarat, Rajasthan, | Late ripening, medium height |
| 7 | 86 M. 86 (M. H. 1617) | 2011 | A.I.C.P.M.I.P.T.N.A.U.Coimbatore | M.Q. Gujarat, Haryana, Raj. U.Q. Delhi, Punjab | Late ripening, medium height, downymildew resistant |
| 8 | R.H.B. 173(m.H. 1446) | 2011 | A.I.C.P.M.I.P.S.K.R.A.U.Jaipur | M.Q. Gujarat, Haryana, Raj. U.Q. Delhi, Punjab | Medium term, medium to large height, downymildew tolerant |
| 9 | H.H.B. 223(m.H. 1468) | 2010 | A.I.C.P.M. I.P.C.S.H.A.U. Hisar | M.Q. Gujarat, Haryana, Raj. U.Q. Delhi, Punjab | Medium term, downymildew resistant, drought tolerant |
| 10 | M.V.H. 130 | 1986 | Mahiko Jalna | All India | 80-85 days duration, medium high |
| Species (for grains and fodder) | | | | | |
| 1 | J.C.B. 4(m.P. 403) | 2007 | A.I.C.P.M.I.PC.O.A.,Gwalior | M.Q. | Duration 75 days, medium high |
| 2 | C.Zed.P. 9802 | 2003 | Kajri, Jodhpur | Drought-prone areas - Raj., Gujarat, Haryana | 70-72 days, medium height, drought tolerance more bitter, hybrid |
| 3 | Jawahar Millet -3 | 2002 | Jawaharlal Nehru Agricultural University, Jabalpur | M.Q. | Yield 18-20 qui./Hay, duration 75-80 days downymildew resistant |
| 4 | Jawahar Millet -4 | 2002 | Jawaharlal Nehru Agricultural University, Jabalpur | M.Q. | Yield 15-27 qui./Hay, duration 75-80 days downymildew resistant |
| 5 | Native (regional variety) | Especially for green fodder | | | Yield 12-15 qui./Hey, dry bitter 125-150 quintals/ha |

**Field preparation-**

Since millet seeds are fine, the field should be prepared well. After a deep ploughing, the field should be leveled by ploughing 2-3 times, so that water cannot stop in the field, proper arrangement should be made for drainage of water together. 15 days before sowing, 10-15 tonnes per hectare of rotten cow dung manure is added and mixed with it well-groomed soil by ploughing. Per 25 K when termite infestation is likely.Gra./ha Chloropyrifos 1.5 percent powder added to the field.

**Time and method of sowing**

2-3 cm to seed in Ise queues by the second week of July as soon as the rains start. Should be sown at depth. Line to line 45.m. And plant to plant distance 10 -15 cm. Is suitable.

**Crop rotation**

* Millet-barley Millet-wheat
* Millet-machna Millet-peas
* Millet-mustard etc.

**Extrinsic crops -**

Planting two rows of urad/mung between two rows of millet like intercostal crops provides additional yield of urad/mung up to about 3 quintals/hectare.  
By applying 2 lines of cowpea between two rows of millet, it provides additional green fodder of 80-90 quintals/ha within 45 days.

**Planting plants-**

Many reasons can be responsible for millets not being sown on time - like late arrival of monsoon, heavy and continuous rainfall at the appropriate time of sowing or late harvesting of summer crop etc. In these circumstances, planting millet seedlings gives more production than sowing direct seeds. Planting trees has the following benefits -

* By planting trees, the crop ripens quickly and delayed low temperature does not affect the formation of grains.2 Due to good growth, more kalle and wali comes out.
* Can keep the number of plants constant.
* Planted plants grow well because plants about three weeks old can tolerate persistent rainfall conditions well.
* Plants affected by DownyMildew can be removed at the time of planting.After starting, level the field by plowing or plowing two-three times. Sowing before the onset of rain improves the growth of plants.

**Preparing nurseries for plantation-**

2 K for a hectare of land.Gra. Millet 500-600 sqm. Should be sown in area. Seed to 1.2m.X 7.50m (Chaedai X length) 10cm in beds. Distance & 1.5 cm.Should be sown at a depth of. 25-30 K in nursery for good plant growth.Gra. Calcium amanium nitrate is used. Saplings should be uprooted from the nursery after three weeks and planted in the field. Also, the nursery beds should be wet while uprooting the plants so that the roots of the plants are not affected while uprooting them. After uprooting the plant, it breaks the area above the growth point so that minimum transpiration can take place. Also, planting should be done on the day it is raining. If it is not raining then the field should be irrigated so that the plants can be planted easily. 50 cm to a plant in a hole. Distance of and plant to plant distance of 10 cm.Keep distance. Tax should be paid from the third week of July to the second week of August.

**Fertilizer-**

40 K before sowing.Gra. Natrajn, 40 K.Gra. Spurr and 20 K.Gra. Potash should be given per hectare. Remaining 40 K on about 30 days after sowing.Gra. Natrajan should be given per hectare. Base volume of fertilizers always 4-5 cm under seed. Sow at depth.

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| --- | --- |
| Integrated nutrient management in hybrid millet |  |
| Atrazine 1 kg for coordinated weed control in millet.Active ingredients/ha. Weeding with one hand on + 20-25 days within 3 days of bony |  |
| Native millet (regional variety) mainly for fodder, yield-12-15 quin/ha.Kadvi 250-300 quin/ha, dry Kadvi 125-150 quintals/ha |  |

**Coordinated Weed Control-**

In the fields where more plants have grown, take them out on rainy days and plant them at those places where the number of plants is less. This work should be done about 15 days after the seed has been set. Nidai should be done once on 20 - 25 days after bony. 2,4 D 500 grams volume 400-500 lee on day 25-30 of bony for control of chaddy leaf weeds. Make a solution in water and sprinkle it. Atrazine 1 kg active ingredient per hectae immediately after sowing for control of narrow and broad leaf weeds. Spraying should be done by mixing it with 400-500 liters of water.

**Irrigation-**

Millet is a rain-fed crop, hence it requires little water irrigation. When there is no rain, the crop should be irrigated. Generally, irrigation of the crop is required at the time of its growth. If there is less moisture at the time of release, then irrigation is required at this time because there is a great need for moisture at that level. Millet crop cannot tolerate water logging for long, hence proper arrangements should be made for drainage of water.

**Integrated pest and disease management-**

By sowing on time, the number of insects reduces, using Prakas Prapanch to monitor insects, collecting and destroying white grub beetles mechanically.

| **Pests and diseases** | **Control measures** |
| --- | --- |
| Stem borer, blister beetle, earhead, caterer pillar | * In the initial stage, insect affected plants should be uprooted and destroyed * NSKE (Nemashat)/sprinkling of 5% at least 2 times to reduce the number of ketos. Neemkhali for Nimotod control/200 K.Gra. Use per hectare. * Carbofuron3 G for control of high outbreaks of the stenotaph fly (Shootfly). / 8-10 K.Gra. Per hectare or monocotophos 30 S.L.Ki 750 M.L. Spray by mixing the volume in 600 liters of water. |
| Mriduromil Asit (green one or downymildew) | * Restraining Species - J.V.-3, J.V. Adopt 4 species, * Epran 35 S, the anti-inflammatory drug for seeds.D. Treat Karboni with 6 grams per kilogram of seeds. * To uproot affected plants after seeing them * Spray 0.2 percent Mancozab on 30 days crop period Yathirum0.2 percent spray for downymildew control 3 times 50 percent flower formation. |
| Bitter disease | * J.B.H.-2, J. B.H.-3 and I.C.M.B. - 221 Species have less disease impact. |
| Kandwa of millet - disease of millet Harit Wali disease (Downeemildew) - Argat disease of millet | |

**Harvesting and storage**

Harvest the crop when it is fully ripe. Keep the crop heap standing in the field and after threshing, ooze the seeds. Store the grains by drying them thoroughly in the sun.

**Yield-**

* 30 -35 quintal grains from species when cultivated in scientifically irrigated condition
* In planting hybrid species and managing them scientifically, yield is up to 40-45 quitals.
* Rainfed farming provides grains up to 12-15 quintals and dry bitter gourd up to 70 quintals.

**Average income - expenditure per hectare assessed -**

Income-average granule 40 quintals/1250 per quintal =50000/- + Kadvi-5000/- per hectare  
Total income =55000 /-  
Total cost =30000/-  
Net income =25000/-