Tobacco Research 46(2): 79-82, 2020

SHORT COMMUNICATION

# EFFECT OF DIFFERENT ORGANIC MANURES ON THE PRODUCTION OF CHEWING TOBACCO POLY TRAY SEEDLINGS AND ITS RESULTANT EFFECT ON THE GROWTH, YIELD AND ECONOMICS

**M. KUMARESAN, P. MANIVEL AND D. DAMODAR REDDY**

ICAR- Central Tobacco Research Institute, Research station, Vedasandur - 624 710

(Recieved on 20th July, 2020 and accepted on 15th November, 2020)

In Tamil Nadu chewing tobacco is one of the commercial crop grown in an area of 10000 to 15000 ha. The seedlings of chewing tobacco are generally grown on raised beds. In this method the transplanting shock is more and the farmers have to fill the gaps one or two times in the main field resulting in increased cost of cultivation. The seedling quality, particularly good root development and a balanced shoot to root ratio is very essential for higher tobacco production. Hence, there is a need to develop an efficient and effective alternative improved nursery technique for chewing tobacco using different organic manures. The polytray method of raising seedlings without soil has many advantages like cost effective, free from soil borne diseases, seedlings have uniform growth, no transplanting shock etc., use of several plant based animal based fertilizer in the production of vegetable transplants has already been demonstrated (Koller *et al.*,2004). Transplants stocky ,with healthy foliage ,producing new roots quickly and having good carbohydrate reserves are appropriate for planting and additionally they should not have any nutrient deficiency or pest and disease problems (Kubato *et al.*,2013).In an another study polytray seedlings performance was better and reduced the gap filling (Subbaiah *et al.*,2018). Considering these points, the present study was taken up to find out the suitability of organic manures on poly tray seedling production and its resultant effect on growth and yield of chewing tobacco.

The study was conducted during *rabi* season of 2017 -18 at the experimental farm of ICAR-CTRI, Research Station, Vedasandur (latitude 10° 32'N longitude 77° 57'). The soil of the experimental site was alfisols with alkaline pH (8.1), low in organic carbon (0.40 % ), low in available N (210 kg/ha) , P (6.5 kg/ha) and medium in available K (275 kg/ha). The treatments comprised Farm Yard Manure (FYM) 50% + Cocopeat 50% (T1); FYM 25% + Cocopeat 75% (T2); Sheep manure 50% + Cocopeat 50% (T3); Sheep manure 25% + Cocopeat 75% (T4); Vermicompost 50% + Cocopeat 50% (T5); Vermicompost 25% + Cocopeat 75% (T6); FYM 100% (T7); Sheep manure 100% (T8); Vermicompost 100% (T9); cocopeat 100% (T10); Traditional nursery seedlings (T11). The experiment was conducted in a randomized block design in three replications. Chewing tobacco hybrid VDH 3 was used for planting. The hybrid VDH 3 is a Sun cum smoke cured tobacco with medium inter nodal length and leaf width moderately puckered surface having prominent mid ribs and venation. The conventional or traditional method of seedlings were raised first and then twenty five days old seedlings were resetted in polytrays with the potting medium as per the treatments under shade net. The tray medium was fortified with single super phosphate @ 300 g, Ammonium sulphate@250 g, $K_2So_4$@150 g, $MgSo_4$ @ 200 g per 100 kg of medium, Blitox @ 2 gm/litre was sprayed on the medium to avoid soil borne diseases. The observation of seedlings *viz.*, root, shoot and root volume were recorded at 60 days old tray seedlings *i.e.* before transplanting. The seedlings of 60 days are transplanted in the main field. The recommended dose of fertilizer for chewing tobacco is 125:50:50 N: $P_2O_5$: $K_2O$ kg/ha respectively. Phosphorus 44 kg P was spot applied in the form of super phosphate mixed with 2.5 t/

**Key words:** Poly tray seedlings, Organic manures, Chewing tobacco

ha FYM. Nitrogen was applied at 40 and 60 days after transplanting (DAT). The first top dressing of N (50%) was applied in the form of urea and the second top dressing of N (50%) was applied in the form of Ammonium sulphate. Potassium in the form of MOP was applied at 40 DAT. Weeding was done manually at 20 DAT. Earthing up operation was done by spade at 40 DAT. The crop was topped at 60 to 65 days and the suckericide "Power 10" was applied to the top three axils to control the suckers. The crop was harvested by stalk cut method at 120 DAT. The first grade leaf yield (FGLY) and total cured leaf yield (TCLY) were recorded after sun curing and standard fermentation process. The package of practices and chewability scores for chewing tobacco was followed as per the recommendation of ICAR CTRI Research Station, Vedasandur (Kumaresan et al.,2019). Economics was calculated as per the cost of inputs and the price of cured leaf realized. Total rainfall received was 257.84 mm during the crop growth period.

Different organic manures significantly influenced the seedling production. The sheep manure 25% + cocopeat 75 % increased the shoot fresh weight (Table 1) as compared to the traditional nursery seedlings. The root weight of the seedlings was significantly superior with different organic manures in combination with cocopeat irrespective of the levels as compared to the organic manures or cocopeat applied individually. The dry weight of shoot was higher (2.0 g/plant) with sheep manure 25% + cocopeat 75%. The treatment sheep manure 25% + cocopeat 75% was comparable with the other combination of organic manures irrespective of the levels and cocopeat with respect to dry weight of seedling shoot. Similar trend was noticed with the root dry weight of the seedlings. The effectiveness of vermicompost in seedling production was reported by Tuzel *et al.*(2015) and Atiyeh *et al.*(2000). The fresh weight and dry weight of shoot as well as root was lower with the organic manures applied individually as compared to the organic manures applied in combination with cocopeat. The organic manures in combination with cocopeat acted as a good growing medium, increased the water holding capacity, had enough macrospores to allow excess water to drain away and prevented water logging, thereby increased number of seedlings. Similar findings were reported by Hartmann *et al.*( 2009 ). The growth of seedling with organic manures and cocopeat applied individually was comparable with the traditional nursery seedlings.

The resultant effect of the seedlings revealed that FYM, Sheep manure and vermicompost in combination with cocopeat irrespective of the levels increased the leaf length and width at topping as well as at harvest stage followed by traditional nursery seedlings and seedlings produced by individual application of organic manures. The seedlings produced through organic

**Table 1: Effect of different organic manures on the production of tray seedlings**

| S.No. | Treatments | Fresh weight (g) | | Dry weight (g) | | Root volume (cc) |
|---|---|---|---|---|---|---|
| | | Shoot | Root | Shoot | Root | |
| 1. | FYM50%+Cocopeat50% | 11.10 | 6.00 | 1.81 | 0.84 | 4.33 |
| 2. | FYM25%+Cocopeat75% | 12.00 | 7.60 | 1.86 | 0.88 | 6.00 |
| 3. | Sheep manure 50 % + Cocopeat50% | 13.00 | 7.70 | 1.92 | 0.96 | 6.00 |
| 4. | Sheep manure 25 % + Cocopeat75% | 15.70 | 7.90 | 2.00 | 1.08 | 4.00 |
| 5. | Vermicompost 50 %+Cocopeat50% | 11.50 | 6.50 | 1.80 | 0.82 | 3.5 |
| 6. | Vermicompost 25 %+Cocopeat75% | 12.50 | 6.90 | 1.84 | 0.92 | 4.0 |
| 7. | FYM 100% | 5.50 | 2.60 | 1.10 | 0.32 | 3.0 |
| 8. | Sheep manure100 % | 7.30 | 2.90 | 1.14 | 0.33 | 3.0 |
| 9. | Vermicompost 100 % | 10.90 | 4.30 | 1.60 | 0.50 | 3.0 |
| 10. | Cocopeat 100% | 12.40 | 5.40 | 1.90 | 0.42 | 5.0 |
| 11. | Traditional nursery | 6.50 | 3.20 | 0.86 | 0.22 | 2.5 |
| | SEm± | 0.64 | 0.69 | 0.17 | 0.08 | 0.66 |
| | CD (P=0.05) | 1.92 | 2.05 | 0.51 | 0.24 | 1.95 |

manures application alone recorded a lower growth attributes. The FGLY significantly increased (3350 kg/ha) when the seedlings were grown with sheep manure 50% + cocopeat 50% as compared to the organic manures and cocopeat applied individually. The increase in yield over traditional nursery seedling was 12.6 % with sheep manure 50%+ cocopeat 50%. The seedlings raised with sheep manure 50% + cocopeat 50% was comparable with the other organic manures irrespective of the levels in combination with cocopeat with respect to FGLY. The TCLY significantly increased by 10% with the seedlings raised under sheep manure 50% + cocopeat 50% as compared to the traditional nursery seedlingsThe well established root system of the seedling due to organic manures increased the seedling vigour thereby the resultant effect on the growth and total cured leaf yield. The TCLY with the seedlings raised under sheep manure 50% + cocopeat 50% was comparable with cocopeat in combination with different organic manures irrespective of the levels. Better field establishment and crop uniformity in tray seedlings resulted in higher cured leaf yield in FCV tobacco (Mahadevasamy *et al.*,2007). In KLS conditions, Shenoi *et al.* (2003) recorded an yield increase with cured leaf yield and TGE in tray nursery seedlings in the variety Rathna. The organic manures when applied individually as a tray medium for raising tray seedlings increased the moisture content of the tray medium resulting in higher seedling mortality rate and seedlings were transplanted in trays during second time and there was a reduced growth at 60 days ie. before transplanting in main field. The gross return was higher (Rs. 2,71,800/ha) when the seedlings were raised in the tray with sheep manure 50% + cocopeat 50% followed by FYM 50% + cocopeat 50% (Rs. 2,61,700/ha). The gross return with respect to organic manures viz., FYM, sheep manure, vermicompost applied individually to the trays were comparable. Net return was significantly higher (Rs.1,32,800/ha) with the seedlings raised with sheep manure 50% + cocopeat 50% as compared to the traditional nursery seedlings (Table 3). The net return with different organic manures irrespective of levels in combination with cocopeat was comparable. Net returns with the different organic manures when applied individually are comparable. Benefit cost ratio was significantly higher (1.96) with the sheep manure 50% + cocopeat 50% as compared to the traditional nursery seedlings. The organic manures and cocopeat applied individually and traditional nursery seedlings recorded a comparable B:C ratio.

It is concluded that raising poly tray seedlings with FYM, Sheep manure, Vermicompost with 25:75 or 50:50 combinations with cocopeat

**Table 2: Resultant effect of seedling production through different organic manures on the growth and yield of chewing tobacco**

| | | At topping | | At Harvest | | FGLY | TCLY |
|---|---|---|---|---|---|---|---|
| | | Leaf length (cm) | Leaf width (cm) | Leaf length (cm) | Leaf width (cm) | (kg/ha) | (kg/ha) |
| 1. | FYM50%+Cocopeat50% | 65.2 | 35.7 | 76.0 | 45.5 | 3386 | 4027 |
| 2. | FYM25%+Cocopeat75% | 65.7 | 35.7 | 77.5 | 45.7 | 3172 | 3990 |
| 3. | Sheep manure50 % + Cocopeat50% | 64.8 | 34.0 | 76.5 | 43.8 | 3258 | 4182 |
| 4. | Sheep manure 25 % + Cocopeat75% | 63.3 | 34.8 | 75.2 | 41.3 | 3350 | 3864 |
| 5. | Vermicompost 50 % + Cocopeat50% | 65.2 | 35.8 | 74.7 | 43.5 | 3301 | 3744 |
| 6. | Vermicompost 25 % + Cocopeat75% | 63.7 | 34.8 | 73.8 | 42.0 | 3180 | 3723 |
| 7. | FYM 100% | 60.5 | 34.7 | 72.0 | 42.0 | 2903 | 3545 |
| 8. | Sheep manure100 % | 65.7 | 35.7 | 73.9 | 45.0 | 2926 | 3744 |
| 9. | Vermicompost 100 % | 64.8 | 34.3 | 73.7 | 43.2 | 2922 | 3853 |
| 10 | Cocopeat 100% | 61.5 | 33.5 | 72.8 | 44.7 | 2934 | 3283 |
| 11 | Traditional nursery | 61.8 | 32.5 | 71.0 | 41.8 | 2975 | 3236 |
| | SEm± | 1.72 | 1.02 | 1.23 | 0.70 | 116.0 | 63.0 |
| | CD (P=0.05) | 2.44 | NS | 3.65 | 2.01 | 370.0 | 194.2 |

increased the seedling growth, growth attributes, FGLY,TCLY and net returns.

**REFERENCES**

Atiyeh, R.M., C.A Edwards, S .Subler and J.D. Metzger 2001. Pig manure, vermicompost as a component of a horticultural bedding plant medium: effects on physicochemical properties and plant growth. Bioresour. Technol. *78*, 11–20 http://dx.doi.org/10.1016/S0960-8524(00)00172-3. PubMed.

Hartman H.T., D. E. Kesters , F. T. Davies and R. L. Geneve.2009. Plant Propagation: Principles and Practices, Prentice Hall, New York, NY, USA, 8th edition.

Koller, M., T. Alfoldt, M. Siegrist and F. Werbel. 2004. A comparison of plant and animal based fertiliser for the production of organic vegetable transplants. **Acta Hort**. 631:209–215.

Kubato, C., A. Balliu, and S. Nicola. 2013. Quality of Planting Materials. Good Agricultural Practices for Greenhouse Vegetable Crops: Principles for Mediterranean climate Areas. FAO Plant Production and Protection Paper 217, 355–378.

Kumaresan M., D. Damodar Reddy and C.Chandrasekara Rao.2019.ICAR CTRI Research station at a Glance. Bulletin No.1,Published by Director, ICAR CTRI, Rajahamundry.

Mahadevasamy, M., M. M. Shennoi, S.S. Sreenivas and S. Ramakrishnan. 2007. Studies on production of tray nursery seedlings on FCV tobacco under KLS Situation. **Tob. Res**. 33 (1&2): 17-20.

Shennoi, M.M., M. Mahadevasamy and S.S. Sreenivasan. 2003. Tray nursery for healthy seedling production in FCV Tobacco- An ecofriendly approaches. Proc. Symposium on Recent development in the diagnosis and major of plant diseases conducted in. Dec. 18-20, at UAS, Dharward.

Subbaiah, K.V., G. S. Raja, A. D. Reddy, T.V. Nirmala, V. Deepthi, E. Karunasree, R.V.S.K. Reddy. 2018. Raising of vegetables seedlings under polytrays. Bioquest: 2 (1): 10.

Tuzel, Y., G.B. Oztekin and E.Tan. 2014. August. Use of different growing media and nutrition in organic seedling production. In XXIX International Horticultural Congress on Horticulture: Sustaining Lives, Livelihoods and Landscapes (IHC2014): 1107 (pp. 165-175).

**Table 3: Economics of polytray seedlings and its resultant effect on chewing tobacco**

| S.No. | Treatments | Cost of cultivation (Rs $10^3$/ ha) | Gross return (Rs $10^3$/ ha) | Net return (Rs $10^3$/ ha) | B:C ratio |
|---|---|---|---|---|---|
| 1. | FYM50%+Cocopeat50% | 139.0 | 261.7 | 122.7 | 1.88 |
| 2. | FYM25%+Cocopeat75% | 139.0 | 259.3 | 120.3 | 1.86 |
| 3. | Sheep manure50 %+Cocopeat50% | 139.0 | 271.8 | 132.8 | 1.95 |
| 4. | Sheep manure25 %+Cocopeat75% | 139.0 | 251.1 | 112.1 | 1.80 |
| 5. | Vermicompost 50 %+Cocopeat50% | 139.0 | 243.3 | 104.3 | 1.75 |
| 6. | Vermicompost 25 %+Cocopeat75% | 139.0 | 241.9 | 102.9 | 1.74 |
| 7. | FYM 100% | 139.0 | 230.4 | 91.4 | 1.65 |
| 8. | Sheep manure100 % | 139.0 | 243.3 | 104.3 | 1.75 |
| 9. | Vermicompost 100 % | 139.0 | 250.4 | 111.4 | 1.80 |
| 10. | Cocopeat 100% | 139.0 | 213.3 | 74.3 | 1.53 |
| 11. | Traditional nursery | 133.6 | 210.3 | 76.7 | 1.57 |
| | SEm± | - | 9.84 | 42.0 | 0.04 |
| | CD(P=0.05) | - | 29.8 | 126.2 | 0.15 |