



Research paper

Assessment of sugarcane dry material product by ecological approach in Loamy Soil at Aurangabad

Oliver Barth

Johannes Kepler University Linz, Austria

ARTICLE INFO

Keywords:

Correlation coefficient

Dry material

Biomass

Prior fertility

**Corresponding Author:*

Barth215782@yahoo.com

ABSTRACT

Sugarcane is a tropic, yearly grass produce plant belonging to the family Poaceae that comprises sideways shoot in the base for producing multiple stems, generally 3- 4 meters tall and almost 2- 5 centimeters in diameter. The stems develop to cane stalk that when mature constitutes around seventy-five percent of the whole plant. A grown stalk is generally comprised of eleven to sixteen percent of fiber, twelve to sixteen percent of soluble sugars, two to three percent of non-sugars, and sixty-three to seventy-three percent of water. A sugarcane product is related to the weather, soil type, irrigation, fertilizers, insects, disease control, varieties, and the harvest period. The middle of cane stalk yield is sixty to seventy tons each hectare per year. This investigation has been performed in Dange Farm at Jayakwadi Area Paithan Dist. Aurangabad. (M.S.) the analyses indicate the data on the direct fertility of sugarcane grow on loamy soil. The product Saccharum Officin arum Linn var.CO.419 grow in loamy soil in the Aurangabad area utilized for data collection. It has been seen, which the primary fertility gains as the product age up to 184 days, and after it began reducing by the aging of product. The prior fertility indicates an important relation between the leaf size and the other growth factors. With the comparison of the fertility database of cropland by other terrestrial ecosystems such as pastureland ecosystems .it has been calculated that the cropland has more fertility as compared to the pastureland ecosystems. The measure of the prior fertility of green plants, the most significant harvester of nature is the sun. Via energy transition by the sun, the whole biosphere produces various kinds of ecosystems. For the proper attention and knowledge of the ecosystem, ecologists are spending awareness for collecting database on the prior fertility of various kinds of systems such as terrestrial, forest, and aquatic ecosystems in the world. The dry material fertility to the cropland ecosystems. Sugarcane product provided dry weight for 184 days old product when it passed dry weight two to nine days older product that is the production of crop reductions after a certain age of the plant. At the time of the last sampling, it was regarded that the stem dry weight has been about 3 times high than green leaves. Furthermore provides 5 times much than no green leaves. With a comparison of the earlier study results in various crops, it is more acceptable.

Received: 27 July, 2022

Accepted: 18 Sep, 2022

Available online: 10 Oct, 2022



This work is licensed under the Creative Commons Attribution 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

Introduction

Sugarcane is a tropic, yearly crop belonging to the Poaceae. Sugarcane is a cash product, while it is utilized as livestock fodder. Sucrose is removed and filtered in technological mill factories, is utilized as raw matter in human food industries, or is fermented for producing ethanol. The world need for sugar is the prior driver of sugarcane agriculture. The product of ethanol from sugar cane is so energy effective than corn, sugar beets, or palm or vegetable oils. Specifically, cane bagasse is utilized for producing heat and power for the procedure.

The upgraded Coimbatore canes populate 53 percent of the sugarcane area in India. They have improved the yields by at least 50 percent, some upgraded kinds are, Co. 313, Co. 419, Co. 421, Co. 453, Co. 527, Co. 658, Co. 997, and Co. 1148. Of these, Co. 419 products from forty to ninety tons of cane each acre and includes thirteen to sixteen percent sugar.

For collecting ecological dataset, more awareness has been supplied for forest fertility (Misra et al, Pandya et al.1971 and Sharma.1971) and then the grassland fertility (choudhary1967,Rao 1970).when the Cropland fertility has been ignored by the workers. in India, the analyses on prior fertility are produced on wheat, maize, pearl millet, Paddy by Misra and Pande(1971) when Singh (1974) and Khokhar in 1974,Dua and V.K Sharma collected the effective database on paddy production under dry ground agriculture and typical agriculture Dua and V.K Sharma orderly.

Therefore, the economic significance of sugarcane and the big space beneath its cultivation cause to expend additional awareness for collecting fertility data. The crop *Saccharum Officinarum* Linn var.CO.419 rising in loamy soil in the Aurangabad area has been utilized to collect the database.

Case Study

This investigation location is at Dange Farm Jayakwadi Paithan. Dist. Aurangabad (MS) India. (GPS Location is 19°30'43''N 75°23'14''E).

Methodology

In this analysis, the whole database of standing crop biomass given has been gathered from Dange Farm Jayakwadi Paithan. Dist.Aurangabad. The diversity Co.419 (Early Ripening) of sugarcane has been chosen for the detailed empirical investigation. The standing crop biomass of this diversity is specified by a particular harvest method, as the clear felling has not been approved by farmers. The five planets have been chosen from any of the 10 quadrats (10x10m) on every 15th day. It has been called sampling time. After the harvesting, their height has been calculated; the number of green

leaves, no green leaves, and the none of internodes of the stem has been calculated. The length of the stem has been estimated. Thereafter green leaves, No green leaves, and stems have been divided and obtained to the lab. All gathered plant parts have been dried at 650 C for two days and it has been weighed for determining the dry weight of every gathered plant part orderly.

In this study, the litter that is Biomass dropped in crop farms has been gathered from October to December 2018. while the plants are shed down leaves 10 quadrats (2x2m) have been accidentally spread in every sample time and whole the dead Leaves (no Green leaves) and No leaf Plant parts that as Stem etc. have been gathered and obtained to the lab for the specification of dry weight.

The pure prior product of the sugarcane diversity CO 419 has been estimated by the growth in biomass in its growth season. From May to December 2018 of 229 days, adding to the organic material amount produced in the soil by the litter at the same time for comparing the fertility of the cropland ecosystem by formerly calculated grassland communities' net yearly production of the pastureland ecosystems.

Results

According to Table1, there has been a growth in plant biomass from (19.10 to 75.12 ton/ha) and the fertility (5.24 gm/m²/day. to 35.04 gm/m²/day.) Up to the first week of November and then on both of these reduction until the latest sample has been accomplished in the December 2018 last week. (61.46 ton/ha.) and (48.34.gm/m²/day) orderly. The estimated fertility in its grow season of 229 days is (26.15 gm/m²/day). While annually basis this product rate less than (21.29 gm/m²/day). The leaf zone (30.13 m²/ m²) have been on peak in the first week November while the crop has been 184 days older. Database on the dry material range of various plant parts and standing crop biomass of the sugarcane sorts are indicated in Table 1 the dry weight of the stem ,green leaves or no green leaves are estimated on the ton/ ha. Basis and gain a peek in the November first week (184 days old crop) from the related amounts are (47.36, 16.13 and 11.63 ton/ha) orderly. The proportion among no Photosynthetic parts (No green leaves plus Stem) and the Photosynthetic parts (Green leaves) of the plant has been specify and discovered that this ratio has been on peak (0.91) in the November last week and then it reduced (0.80) in the December first week and also rich to the peak (0.81) in the December last week while the last sample has been accomplished.

Table. 1. The dry material product of sugarcane crop in loamy soil

days	Dry weight.						
	Stem	Green leaves	No green leaves	Whole	Fertility	Leaf area	Non photosynthetic or Photosynthetic Ratio
94	8.34	9.78	0.98	19.10	5.24	17.26	0.10
109	14.4	10.29	4.57	29.26	14.32	19.63	0.44
124	16.09	13.19	3.37	32.65	19.37	24.27	0.25
139	15.85	9.61	4.53	29.99	21.29	17.39	0.47
154	31.84	14.91	5.53	52.28	23.44	26.16	0.37
169	27.48	13.32	7.54	48.34	26.36	24.47	0.56
184	47.36	16.13	11.63	75.12	35.04	30.13	0.72
199	45.42	13.00	11.87	70.27	35.85	25.15	0.91
214	36.69	12.24	9.91	58.84	34.39	23.26	0.80
229	40.95	11.32	9.19	61.46	26.15	20.23	0.81

Linear correlation among fertility and different grow elements demonstrate positive and important.

Demonstrated in table. 2 that show the no green leaves which is the most suitable fertility index.

Table. 2. Demonstrating the correlation coefficient among fertility and grow elements in Sugarcane

factors	factors	Correlation coefficient
1	Prior fertility and whole leaf zone	0.699
2	Prior fertility and whole biomass	0.921
3	Prior fertility and stem dry weight	0.906
4	Prior fertility and green leaves dry weight	0.623
5	Prior fertility and no green leaves dry weight	0.946
6	Prior fertility and age of the plant	0.392

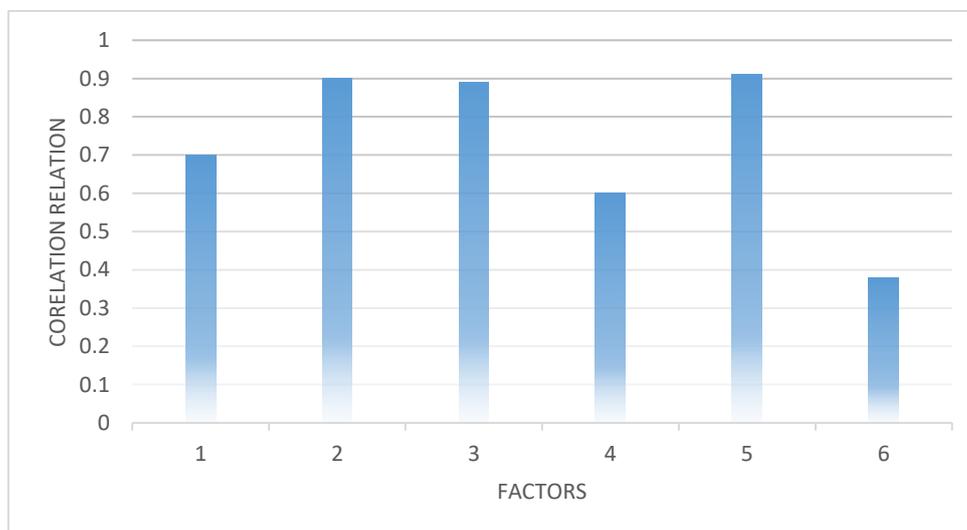


Fig. 1. Demonstrating the correlation coefficient among fertility and grow elements in Sugarcane

Discussion

Many kinds of ecosystems exist in the nature which is contributed the net fertility. The organic production progressed in the different ecosystems life span is the net nature profit. Therefore is a demand for measuring and organic fertility study as an environment function and biological interaction in the basic ecosystem and human system adaption for shifting environment pattern.

Conclusion

The sugarcane product study in Dange farm Jayakwadi Paithan dist Aurangabad for helping us the knowledge relating the dry material fertility for the cropland ecosystems. Sugarcane product present of 75.12 ton/ha. Dry weight of 184 days old product when it present of 61.46 ton/ha, dry weight two to nine days old product which is the product of crop reduces after definite age of the plant. In the last sample time it has been seen that the stem dry

weight 40.95 ton/ha has been about 3 times high in comparison with green leaves 11.32 ton/ha and 5 times high in comparison with no green leaves 9.19 ton/ha with comparison the past investigation presented in Wheat, Maize and Barely it is more better.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- Ambasht, R. S., A. N. Maurya, and U. N. Singh. 1971. "Primary Production and turn over in certain protected grassland of Varanasi". Symp. Trop. Ecol. Emphasizing organic productivity. Abs. pp. 9-10
- Choudhary, V. B. 1967. "Seasonal variation in standing crop and Energetic of *Dichanthium annulatum* grassland at Varanasi". Ph.D.thesis, Banaras Hindu, University, Varanashi.
- Dua, K. L., and Sharma, V. K., 1997. "Ecology of sugarcane crop (*Saccharum Officinarum* Linn.) I. Dry matter production". Botany Department, A. A. V. College, Muzaffarnagar. J. Indian Bot. Soc. 56: 197-201.
- Khokhar, M. F. K. 1974. "Primary production, growth Analysis and Nitrogen status in two varieties of paddy at Ambikapur". Ph.D thesis, B. H. U. Varanasi.
- Mishra, K. C. and H. N. Pandey, 1971. "Primary production of four crops in Varanasi (a monsoon area)". Symp. Trop. Eco. Emphasizing organic productivity. Pp. 115-120.
- Mishra. R., J. S. Singh and K. P. Singh, 1967. "Preliminary observation on the production of dry matter by sal (*Shorea robusta Gaertn. F.*)" trop. Ecol.8: 94-104.
- Pandya, S. C. B. R. Pandit, and S. C. Sharma. 1971. "Biomass and production correlation of teak (*Tectona grandis* Linn.) in natural forest in the river Narmada upper Catchment area in central India and a comparison there of with the plantations". Symp. Trop. Ecol. Emphasizing organic Productivity, Abst.pp.
- Rao, A. 1970. "Role of *Desmodium triflorum* in the Production and Nitrogen Economy of Grassland at Varanasi", Ph. D. Thesis, Banaras Hindu University, Varanasi.
- Sharma, V. K. 1971. "Ecology of *Shorea robusta* Gaertn and *Buchanania lanzan* Spreng. at Varanasi". Ph.D. Thesis, Banaras Hindu University, Varanasi.
- Singh M. P. 1974. "Eco-physiology of six varieties under Dry land farming". Ph.D. Thesis. B. H. U. Varanasi.