

Assessment of Pure Live Seed, Optimum Seeding Rate and Best Buy Value in Maize (*Zea mays* L.)

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ABSTRACT The present study was conducted to assess the planting value, seeding rate and to find out the best buy value (real pay) of two maize varieties namely VIVEK HYBRID 9 and VIVEK HYBRID 11, bought by Rs. 30/- and 25/- per half kilogram from VPKAS, Almora, Regional Research Centre of ICAR. The experiment was conducted at the Seed Testing Laboratory of the Department of Seed Science and Technology, H.N.B. Garhwal University. The research comprised of determinations of seed water content, physical purity test, germination test, pure live seed per cent, seeding rate and determination of best buy value. Results revealed that same cost of both the seed lots of each variety is unreasonable due to variation in PLS per cent. Buying seeds from the seed lot 2 (S2) will give more benefit for both the varieties as their PLS% is high and respective cost prices are low but seeding rate was needed to increase for all seed lots from the recommended seed rate. From the study it may be suggested that such tests should be carried out by the seed testing laboratories as a security for the seed producers.

Key words: Pure live seed, best buy value, seeding rate, seed lot.

Planting quality seed having high planting value is the best way to obtain maximum return. The failure in the production of the crops may be due to low seed quality [1]. Seed quality is perhaps one of the most important factors in buying decision. A bag of seed consists of inert material such as dust, chaff, empty seed, weed and other crop seed and pure live seed (PLS) of the desired species. Since every seed lot has a different analysis, a common formula can be devised which allows customers to pay only for the "pure live seed" in a bag. Pure Live Seed (PLS) often varies among seed lots, even of the same variety. The amount paying particular quantity of seed can be adjusted according to PLS. Thus for a purchaser, adequate evaluation of seed value is very essential to determine the Pure Live Seed price before seed is purchased. Seed with higher purity and germination rates tend to have more vigorous and healthy than

seed with lower PLS values. Pure live seed can be evaluated by the combination of physical purity percentage and germination percentage, but buyers do not compute the pure live seed per cent and their best buy value. This ultimately affects the seedling emergence and economic loss. PLS enables to adjust the amount per gm or kg of a seed lot [2]. Seeding rate can be adjusted according to the calculated PLS. This is a significant difference and if we hadn't made this adjustment, we would be under the target rate [3]. The investigation on seeding rate was thoroughly studied [4]. Elbersen *et al.* [5] reported that seed rate is based on the number of live seeds and germination rate (PLS).

The experiment was conducted to evaluate the planting value of seed lot in order to exploit the exact seed quality, to adjust the optimum seeding rate and to find out the best buy value (real pay) of a particular seed lot.

MATERIALS AND METHODS

Two seed samples (Assign as S1 and S2) of half kilogram of each maize variety namely VIVEK HYBRID 9 and VIVEK HYBRID 11, were bought for Rs. 30/- and 25/- per sample respectively from Vivekananda Parvatiya Krishi Anushandhan Sansthan (VPKAS) Almora, Regional Research Centre of ICAR. The experiments were conducted at the Seed Testing Laboratory of the Department of Seed Science and Technology, H.N.B. Garhwal University. The research comprised determinations of seed water content, physical purity per cent, germination per cent, PLS per cent, seeding rate and determination of best buy value.

Seed water content

Water content was determined at 27°C with the digital seed moisture meter in duplicate samples of intact seeds as recommended by the Rules for Testing Seeds [6]. The results were expressed as percentage of water content.

Germination and physical purity test

Four replicates with 50 seeds in each were planted in sterile sand medium and germinated at 25°C and assessed as per ISTA's recommendation [7]. Seedlings were counted on 4th day (DAS) as a first count and final on 7th day (DAS) of experimentation. In physical purity test observation was recorded up to 2 decimal places by weight in gram as described by Arora & Verma [8].

Pure live seed (PLS)

Pure Live Seed percentage is calculated by multiplying the purity percentage by the germination percentage of the seed lot and then dividing by 100. The resultant value represents the amount of pure seeds in a seed lot that are capable of producing seedlings.

$$\text{Pure Live Seed} = \frac{\text{Germination \%} \times \text{Purity \%}}{100}$$

Seeding rate and best buy value

Seeding rate was calculated by dividing pure live seed value by the recommended seed rate per hectare. The best buy value was determined by

dividing the seed cost by the pure live seed percentage to get the Pure Live Seed cost.

$$\text{Seeding Rate} = \frac{\text{Pure Live Seed}}{\text{Recommended Seed Rate per Particular Area}}$$

$$\text{Pure Live Seed Cost (Best Buy Value)} = \frac{\text{Seed Cost}}{\text{Pure Live Seed Per cent}}$$

RESULTS AND DISCUSSION

The percentage of moisture is expressed on a wet-weight basis because this value most accurately represents how much of water per cent is present in a seed lot. Therefore, the buyer knows how much seeds is purchased and how much water is present along with that seed. The observed moisture content in both varieties was found within the standard per cent (12%) and the seed samples of both varieties were found safe for storage, testing and good enough for selling. The germination per cent of both the samples of VIVEK HYBRID 9 was observed above the minimum standard (90%) but the samples of VIVEK HYBRID 11 was found too low (58%). The purity per cent of SI of VIVEK HYBRID 11 was recorded below (96.86%) the seed standard value (98%).

The highest PLS per cent was recorded in S2 of VIVEK HYBRID 9 and lowest in SI of VIVEK HYBRID 11. As per the Seed Act (1966), the minimum PLS per cent of maize hybrid is 88.2. The observation revealed that PLS per cent of both seed lots of VIVEK HYBRID 9 was above the minimum per cent but seed lots of VIVEK HYBRID 11 were observed below the minimum per cent. Similar observation was discussed earlier by Helm & Spilde [2]. The best buy value was recorded in S2 of VIVEK HYBRID 9 having the highest PLS (93.87) which is at par with S1 (Rs. 64.30/kg.) of the same variety. But in case of VIVEK HYBRID 11, the buy value was observed too high in comparison to the PLS per cent value indicating the cost price of the seed lots of VIVEK HYBRID 11 was too expensive. When best buy value is considered within the seed lots of the same variety, a marginal variation of PLS per cent 0.56 and 0.74 was found between

Table 1. Moisture content, germination, purity, pure live seed (PLS), seeding rate per hectare and best buy value of two maize hybrid seeds

Variety	Moisture (%)		Germination (%)		Purity (%)		Pure live seed (%)		Seedling rate (kg/ha)		Best buy value (Rs./kg)	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
	Vivek hybrid 9	10.30	10.20	94.00	94.00	99.21	99.86	93.31	93.87	19.35	19.17	64.30
Vivek hybrid 11	10.30	10.30	58.00	58.00	96.86	98.14	56.18	56.92	32.00	31.62	89.00	87.84

the seed lots of VIVEK HYBRID 9 and VIVEK HYBRID 11 respectively. So, this variation gives the information of requirement in the adjustment of cost price (best buy value) of each lot. The result obtained of best buy value is consistent with the statement given by Helm & Spilde [2]. "PLS often varies among seed lots, even of the same variety". According to McDonald & Copeland [9] the recommended seeding rate of maize hybrid per hectare is 16-18 kg that is plant populations of 54,000 to 64,000 plants/ha has been found optimum for highest yield. To achieve the target rate from the result of this study, the recommended rate for maize seed (18 kg per hectare) need to adjust to 19.35kg for S1 and to 19.17 for S2 of VIVEK HYBRID 9 that is need to add 1.35 kg and 1.17 kg to the recommended rate for S1 and S2 respectively. For VIVEK HYBRID 11 as per the recommended rate, it needs to add 14 kg for S1 and 13.62 kg for S2 as described by Liskey [3]. This in turn will be able to achieve the optimum plant populations and maximum productivity.

Thus seed we thought cheapest early are not. Calculating PLS can help us save money and do the best jobs possible. Determination of best buy value of a particular seed lot is indispensable before buy. When bought, the cost of both the seed lots of each variety was same but due to variation in PLS per cent the same cost was not reasonable. In the study results revealed that buying seeds from the seed lot 2 (S2) will give more benefit for both varieties VIVEK HYBRID 9 and 11 as their PLS per cent is high and respective cost prices are low but seeding rate was needed to increase for all seed lots from the recommended seed rate. From the study it may be suggested that such tests should be carried out by the seed testing laboratories as a security for the seed producers.

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