https://doi.org/10.29321/MAJ.10.A00484

Correlation and path coefficient analysis in onion (Allium cepa L. var. aggregatum Don.)

G.V. RAJALINGAM AND K. HARIPRIYA

Dept. of Horticulture, Faculty of Agriculture, Annamalai Univ., Annamalainagar - 608 002, Tamil Nadu.

Abstract: A study on the association of metric traits involving twenty aggregatum onion ecotypes (Allium cepa L. var. aggregatum Don.) revealed that the yield components like plant height, leaf length, leaf breadth, number of leaves, weight of plant, number of bulbs, bulb length, bulb diameter and volume of bulb exhibited significant positive association with yield. These components were also positively inter correlated among themselves. The path coefficient analysis indicated that plant height, leaf breadth, weight of plant, bulb length, shape index, days to maturity and harvest index, had direct positive effect on yield. While leaf length, number of leaves, number of bulbs, bulb diameter, volume of bulb and storage life had negative direct effects. Plant height and weight of plant are dependable indices of selection in identifying the yield potential of individual ecotypes. (Key words: Correlation, Aggregatum onion, Path analysis).

Onion is a commercially important vegetable crop grown throughout India in an area of 277 thousand ha. Out of the average production of 2934 thousand metric tonnes per annum, part of it is exported and the rest is domestically utilised. In Tamil Nadu, aggregatum onion (Allium cepa L.var. aggregatum Don.) is grown in an area of 22.30 thousand ha with an average production of 1.85 lakh tonnes per annum. In planning and evaluating a breeding programme for such a crop, the study of correlation co-efficient between co-efficients between yield and its components and their relative contribution to the yield is of great value indicating the association between characters at phenotypic and genotypic level, ultimately helping in selecting for desirable characters. Path coefficient analysis proposed by Wright (1921) facilitates the partioning of correlation coefficients into directs and indirect effects of various characters on yield and other attributes. It also permits to study the specific forces acting to produce a given correlation in correlated variables. Such information on the interrelationship of different traits in aggregatum onion is meagre. However reports pertaining to similar studies in common onion reveal that bulb yield per plant is positively correlated with plant height, leaf length, leaf breadth, number of leaves, bulb diameter, bulb neck thickness and bulb size (Soni et al. 1993) and with weight of plant, number of leaves, number of bulbs, bulb density, and shape index for aggregatum onion (Suthanthira Pandian and Muthukrishnan, 1980 and 1982).

Materials and Methods

The material for the present investigation comprised of twenty ecotypes of onion. These were grown in a randomized block design with three replication at the University Orchard, Faculty of

Agriculture, Annamali University, Annamali Nagar during 1996-97. The crop was raised during March and normal cultural operations were carried out to ensure a healthy stand. Observations were recorded on plant height, leaf length, leaf breadth and number of leaves at the time of harvest, weight of plant, number of leaves at time of harvest, weight of plant, number of bulbs, bulb yield, bulb length, bulb diameter, shape index, volume of bulb, days to maturity, harvest index and storage life. Correlation coefficients of yield and yield components and intercorrelations among the various components were calculated (Panse and Sukhatme, 1961) and path coefficient analysis was done as proposed by De Way and Lu, (1969).

Results and Discussion

The plant height, leaf length, leaf breadth, number of bulbs, bulb length, bulb diameter and volume of bulb exhibited significant positive correlation with yield as well as between themselves. Hence it can be inferred that selection based on any of these traits either alone or in combination, will result in identifying lines with high yield. Within the vield components, plant height exhibited significant positive association with leaf length, leaf breadth, number of leaves, weight of plant, number of bulbs, bulb yield, bulb length, bulb diameter and volume of bulb. The association of number of bulbs with plant height, leaf length, leaf breadth, number of leaves, weight of plant, bulb yield, bulg length, bulb diameter and volume of bulb was positive and significant. There was no association between days to maturity on one hand and bulb yield and number of bulbs on the other hand indicating that they are independently inhertited. Such a situation is favourable to choose ecotypes with higher yield and more number of bulbs coupled with earliness.

Table 1. Genotypic and phenotypic correlation coefficients (r) between yield and its component chara

** 1.0415** 0.9864** 0.9870** 0.9934** 0.6 ** 0.8744** 0.7230** 0.7662 0.9916** 0.5 1.0077** 1.1249** 0.7071** 1.0198** 0.5 0.9736** 0.7047** 0.4232 0.8593** 0.4 1.0000 0.7264** 0.4114 0.8577** 0.45 1.0000 0.6184** 1.0821** 0.35 1.0000 0.5263** 0.35 1.0000 0.5263** 0.35 1.0000 0.5263** 0.35 1.0000 0.5184** 1.0000 0.66 1.0000 0.3977 0.7123** 0.35 1.0000 0.5263** 0.35	1 Bi						+		0		2	0	10	11	10	100000	
Part			9	1.0000	0 9853**	1 041 588	0.0074**	0.00000	,	/	0	~	OT	П	71	13	14
Pair Inaget Compare	Nic Nic		A	1.0000	0.8795**	-	0.9864**	0.9870**	0.9934**	0.6412**	0.9863**	_	-0.4614*	0.9930**	-0.4123	0.2814	-01066
Indicates Part Indicates Part Indicates In	die do			_	20100	_	0.7230**	0.7662	**91660	0.5343**	0.8907**		-0.3261	0.9339**	-0.2600	0.2055	-0.0739
Lar Invest P 1,0000 0,9756** 0,7047** 0,4522 0,8593** 0,4592 0,5893** 0,4592 0,5893** 0,4592 0,5893** 0,4592 0,4492	311		5 1	io!	1.0000		1.1249**	0.7071**	1.0198**	-0.5971**	1 0004**		D. ADAM	1 00000	-		
Land length G	mi		L.	92	1.0000	0.9736**	0.7047**	0.4232	0.8593**	0.4592*	0.8493**		##7F-0-	1.0210**	-0.4076	0.3803	-0.1805
Land breach	1		9				1 101 100				-		-0.2003	0.8/00**	-0.3022	0.2551	-0.0632
Langibreadth G	at		Ъ	110			-	0.6191**	1.0311**	0.6214**	1.0143**	1.0542**	-0.4237	1.0352**	-0.4292	0.3313	01768
at harvest P P 1,0000 0,6184*** 1,0821*** 0,5938*** 0,5415*** 1,0478*** -0,5415** 0,1919*** -0,5415** 0,1919*** 0,5415** 0,5415*** 0,541			0					0.4114	0.8577**	_	0.8480**	0.7781**	-0.1989	0.8631 **	-0.3258	0.2267	-0.9028
No. of leaves G 1,0000 0,3577 0,7123# 0,7361#* 0,7361#* 0,7361#* 0,7391# 0,7210 0,1899	ele	harvest	0 0	101	To the state of	(th)		0.6184**	1.0821**		0.9938**		0.5415**	1 0478**	3635 0	0.3076	0.000
No. of leaves G Licono O.5263** O.5264** O.5364** O.5364** O.566** O.5024** O.666**	0		4		20.00	DR.		0.3977	0.7123**		7.7412**		0.9316	0.7010**	0.000	0.3970	-0.0433
## chartest P Parkett P Pa	90	aves	150		dir	it	NA PL	1 0000		_	10		017	0.1717	-0.2210	0.1899	-0.0124
Weight G Control Contr	10		Ь		Id di	6	14)			H	0.6361**	-00			-0.6776**	0.0392	-0.3190
of plant p 1.0000 0.6688*** 0.9697*** 1.0551*** 0.9295** 0.4117 0.1761 Number G P December De	0.1		9		lo lo	MA.	B III			Low		-1111	113	0.4016	-0.4193	0.0461	-0.1473
Number G G bulbs Days to G G bulb Days to G G C C C C C C C C C C C C C C C C C	edili 130		Ъ		10	11	of the last of the	Tan Yii		1	1,9697** 1		-		-0.4117	0.1761	-01136
1,0000 0,6388** 0,5291** 0,5321** -0,1163 -0	od.		(dim	HZR		押加河		1000	0 **8698"	.8186**	111	_	-0.2719	0.0876	-0.0722
Bulb G Bulb G Bulb G Bulb G Bulb G G G G G G G G G	10				07	100	No.		in the second	-	6588**	5291 ** 10		777	0 22377	0110	
Bulb G G G G G G G G G	_		-									4827* -0			0.1772	0.0505	-0.1513
Bulb G G G G G G G G G	124				100	St. 25	Column d	The last of	107						6//17	-0.000	-0.1240
Bulb G Commenter P Commenter Commenter <th< td=""><td>leng</td><td></td><td></td><td></td><td>AI On</td><td>e ex</td><td></td><td>100</td><td>E I</td><td></td><td></td><td>3430</td><td></td><td></td><td>:</td><td>0.3101</td><td>-0.3425</td></th<>	leng				AI On	e ex		100	E I			3430			:	0.3101	-0.3425
diameter P 1,0000 -0,5934** 1,0277** -0,3425 0.1893 1.000 -0,5267** 0,8840** -0,1785 0.1698 1.000 -0,5267** 0,8840** -0,1785 0.1698 1.000 -0,5267** 0,8840** -0,1785 0.1698 1.0000 -0,5540** 0,2235 1.0000 -0,5540** 0,2235 1.0000 -0,4429* 0,1391 -0,1018 1.0000 -0,4429* 0,1391 -0,1018 1.0000 -0,2429* 0,1391 1.0000 -0,2429* 0,1391 1.0000 -0,2429* 0,1391 1.0000 1	30				0 1	list	EO I	Set Set	I F			7- **8681				0.2481	-0.2299
Shape G 1.0000 -0.5267*** 0.8840*** -0.1785 0.1698 index P 1.0000 -0.5540*** -0.1785 0.1698 volume G 1.0000 -0.5540*** 0.1391 -0.1018 volume G 1.0000 -0.4429* 0.1591 -0.1018 Days to G 1.0000 -0.2016 0.2281 -0.1018 Index P 1.0000 -0.1064 0.1740 Index P 1.0000 0.0727 0.0000 Index P 1.0000 0.0727 0.0000	diam) di	IB THE	face tylu	te d	PHA	0 1	1,					_	0.0219
index P I 0000 -0.5540** 0.2836 -0.2235 Volume G Of bulb P Days to G Maturity Harvest G Storage G Storage G Storage G I 0000 -0.5540** 0.2836 -0.2235 I 0000 -0.2016 0.2281 I 0000 -0.2016 0.2281 I 0000 -0.1064 I 0000 0.0727 I 0000 0.0727	THU.		100				i el		の語か	ion (M)	1		1.100				0.0103
Volume G of bulb P Days to G maturity P Harvest G Storage G I.0000 0.0727 I.0000 0.0727 I.0000 I.0000 I.0000 I.0000 I.0000 I.0000	11				21		ile de	100	BU PER	THE REAL PROPERTY.	in	1.		0.5540** 0		_	1 601 6##
of bulb	UC		-				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	The state of	THE PERSON NAMED IN	mi mi	ogi	E E		0.4429* 0			2388
Days to G maturity P Harvest G index P Storage G index P I.0000 1	710	lo build	5 6		to you	che (X.)	200	SA U II		Qi Qi	mi	100	ol din	15			000
Days to	13		F		oi uh	do	20 100	THE PERSON NAMED IN	OR OR	6	71	CHY CHY	172			_	0.0647
Harvest G 1.0000 -0.1064 Harvest G 1.0000 1.0000 Storage G 1.0000 1.0000 Harvest G 1.0000 1.0000 Harvest G 1.0000 1.0000 Hife		ga ga					io	inn ion	HI IN	10	isi	100					0.0210
Harvest G 1.0000 0.0727	matur	de l				dia no			0 0	VIII Q	012	a la	ieit syll	1		-	.5247**
storage G I.0000		had i al ana	-			(1) (1)	this is	OV.	Hara	DE CONTRACT	(19)	dite	oj o	i			.2362
Storage G 1.0000	index	be the state of th			39		100 100 100 100 100 100 100 100 100 100	SUL SUL		(1) (10) (10)	100	rib		o re	NI THE		1742
Value of the state	2011	10000000000000000000000000000000000000	ch	dis	OQ OQI ORI	in F	b		100	He Cat	10.1			dm	1	71.000	0772
	life			100	EU I	arti	100	80	a d		3.0		dig unr	pio e l	all a	N	0000

Significant at 5% level ** Significant at 1% level