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# Correlation Studies in Relation to Micro-Climate in Summer Groundnut (Arachis Hypogaea L).

KEYWORDS: Photosynthesis, $CO_2$ Conc., LUE, APAR, *Arachis hypogaea* L

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**ABSTRACT** *The dry pod yield was positively and highly significant correlated with all the characters under study during the year 2009 and 2010, except APAR during the year 2009. The LUE was positively and highly significantly correlated with all the growth and yield contributing characters under study during both the years indicating its importance in development of growth and yield attributes and ultimately dry pod yield.*

**Introduction**

Groundnut (*Arachis hypogagea* L.) is a world prospective oilseed crop grown in almost all the tropical and subtropical countries. Yield is a complex character, which is influenced by micro-meteorological and physiological parameters. The equally dependent of these characters will influence kernel yield either directly or indirectly. Correletion coefficient study is used for the relationship of micrometeorological and physiological parameters. Hence in the present investigation, such correlation study was carried out in summer groundnut under different irrigation regimes and sowing dates.

**MATERIALS AND METHODS**

A field experiment was conducted at Mahatma Phule Krishi Vidyapeeth Rahuri, (M.S.) in summer seasons of 2009 and 2010. The experimental plot had medium black soil low in available nitrogen 222 kg $ha^{-1}$, medium in available phosphorus 21.7 kg $ha^{-1}$, and high in available potash 313 kg $ha^{-1}$ with slight alkaline in reaction (pH 8.2). The experiment was conducted in Strip Design with three replications, comprising four irrigation regimes viz; i) 0.6 PE (Micro sprinkler) ii) 0.8 PE (Micro sprinkler) iii) 1.0 PE (Micro sprinkler) iv) 1.0 IW :CPE (Surface irrigation) and three sowing dates viz; i) 7th MW (12-18 February) ii) 9th MW (26 February- 4 March) iii) 11th MW (12-18 March). The Broad Bed Furrows were prepared by using a tractor drawn ridger. Each experimental unit was with gross plot size of 6.00 m x 3.00 m and net plot size of 5.60 m x 1.80 m. The groundnut variety TAG-24 was sown as per treatments during both the years. The spacing of the crop was 30 cm x 7.5 cm row per bed.

**RESULTS AND DISCUSSION**

The dry pod yield was positively and highly significantly correlated with all growth attributing characters and micrometeorological parameters during both the years except APAR during the year 2009. The LUE was positively and highly significantly correlated with plant height, no. of branches $plant^{-1}$, no. of leaves $plant^{-1}$, leaf area, dry matter and no. of pods $plant^{-1}$ during both the years except APAR during the year 2009, indicating its importance in development of growth and yield attributes. Important yield attributes viz; number of pods $plant^{-1}$, shelling percentage and test weight were positively and highly significantly correlated with all the growth attributes, micro metrological and physiological parameters during both the years indicating that these were influenced by micro-metrological and physiological parameters.

The important characters *viz;* leaf area and dry matter $plant^{-1}$ were showed positive and highly significantly correlation with other growth attributes, physiological and micrometeorological parameters as well as dry pod and haulm yield during both the years indicating that their important role in higher biological productivity. Similar results were reported by Sumathi *et al.,* (2007), Mane *et al.,* (2008) and Parameshwarappa *et al.,* (2008).

**Table 1. Correlation studies between growth and yield parameters with micro-meteorological and physiological parameters during 2009 at harvest.**

| | Dry Pod Yield | Plant height | Branches | Leaves | Leaf area | DM | $P_n$ | $CO_2$ | APAR | LUE | GDD | Pods $Plant^{-1}$ | Shelling % | Test Wt. | Haulm yield |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yield | | | | | | | | | | | | | | | |
| Plant height | 0.932** | | | | | | | | | | | | | | |
| Branches | 0.869** | 0.913** | | | | | | | | | | | | | |
| Leaves | 0.928** | 0.878** | 0.863** | | | | | | | | | | | | |
| Leaf area | 0.909** | 0.869** | 0.807** | 0.971** | | | | | | | | | | | |
| DM | 0.811** | 0.786** | 0.685* | 0.845** | 0.931** | | | | | | | | | | |
| $P_n$ | 0.798** | 0.846** | 0.743** | 0.815** | 0.890** | 0.891** | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $CO_2$ | 0.850** | 0.787** | 0.651* | 0.859** | 0.944** | 0.946** | 0.886** | | | | | | | | |
| APAR | 0.479 | NS | NS | NS | 0.614* | 0.715** | 0.686* | 0.663* | | | | | | | |
| LUE | 0.742** | 0.719** | 0.697* | 0.783** | 0.831** | 0.809** | 0.671* | 0.793** | NS | | | | | | |
| GDD | 0.791** | 0.887** | 0.923** | 0.829** | 0.793** | 0.646* | 0.807** | 0.613* | NS | 0.646* | | | | | |
| Pods plant$^{-1}$ | 0.890** | 0.909** | 0.912** | 0.940** | 0.891** | 0.741** | 0.825** | 0.734** | NS | 0.730** | 0.947** | | | | |
| Shelling% | 0.867** | 0.891** | 0.841** | 0.911** | 0.951** | 0.917** | 0.960** | 0.886** | 0.592* | 0.792** | 0.877** | 0.908** | | | |
| Test Wt. | 0.880** | 0.864** | 0.720** | 0.850** | 0.932** | 0.917** | 0.954** | 0.960** | 0.612* | 0.773** | 0.746** | 0.811** | 0.940** | | |
| Haulm yield | 0.992** | 0.929** | 0.846** | 0.923** | 0.927** | 0.868** | 0.844** | 0.892** | NS | 0.758** | 0.773** | 0.873** | 0.899** | 0.917** | |

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

**Table 2. Correlation studies between growth and yield parameters with micro-meteorological and physiological parameters during 2010 at harvest.**

| | Dry Pod Yield | Plant height | Branches | Leaves | Leaf area | DM | $P_n$ | $CO_2$ | APAR | LUE | GDD | Pods Plant$^{-1}$ | Shelling % | Test Wt. | Haulm yield |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yield | | | | | | | | | | | | | | | |
| Plant height | 0.898** | | | | | | | | | | | | | | |
| Branches | 0.745** | 0.819** | | | | | | | | | | | | | |
| Leaves | 0.812** | 0.688* | 0.676* | | | | | | | | | | | | |
| Leaf area | 0.948** | 0.852** | 0.720** | 0.848** | | | | | | | | | | | |
| DM | 0.871** | 0.799** | 0.654* | 0.736** | 0.967** | | | | | | | | | | |
| $P_n$ | 0.835** | 0.803** | 0.735** | 0.735** | 0.926** | 0.964** | | | | | | | | | |
| $CO_2$ | 0.930** | 0.838** | 0.626* | 0.795** | 0.979** | 0.948** | 0.895** | | | | | | | | |
| APAR | 0.859** | 0.792** | 0.648* | 0.728** | 0.963** | 0.999** | 0.964** | 0.948** | | | | | | | |
| LUE | 0.913** | 0.808** | 0.673* | 0.789** | 0.976** | 0.979** | 0.940** | 0.937** | 0.971** | | | | | | |
| GDD | 0.614* | 0.753** | 0.925** | 0.597* | 0.666* | 0.674* | 0.793** | NS | 0.672* | 0.666* | | | | | |
| Pods plant$^{-1}$ | 0.864** | 0.854** | 0.917** | 0.889** | 0.861** | 0.778** | 0.841** | 0.784** | 0.770** | 0.820** | 0.866** | | | | |
| Shelling% | 0.932** | 0.873** | 0.856** | 0.845** | 0.966** | 0.928** | 0.924** | 0.902** | 0.920** | 0.954** | 0.803** | 0.934** | | | |
| Test Wt. | 0.916** | 0.864** | 0.719** | 0.756** | 0.952** | 0.932** | 0.939** | 0.965** | 0.934** | 0.911** | 0.691* | 0.837** | 0.910** | | |
| Haulm yield | 0.983** | 0.860** | 0.674* | 0.789** | 0.969** | 0.918** | 0.856** | 0.954** | 0.907** | 0.955** | 0.574$^{NS}$ | 0.816** | 0.932** | 0.920** | |

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

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