

1. **Name in full and designation (In block letters)** : Dr. A.S. NANDWAL  
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5. **Date of birth** : 30.5.1956
6. **Academic qualifications**

<b>Degree</b>	<b>Marks/OGPA obtained</b>	<b>% age of marks</b>	<b>Institution from which obtained</b>
B.Sc. (Med.)	406/650	62.46%	Kurukshetra University
M.Sc. (Plant Physiology)	3.40/4.00 (Research fellowship)	78.0%	HAU, Hisar
Ph.D. (Plant Physiology)	3.77/4.00 SRF, CSIR, New Delhi (Distinction)	84.5%	CCS HAU, Hisar

7. **Field of specialization** : Plant Physiology – Abiotic stresses, nodulation and nitrogen fixation and mineral nutrition.

### 8. Membership of Professional societies

- Life member of Indian Society for Plant Physiology, IARI, New Delhi
- Member, Journal of Plant Physiology and Biochemistry, IARI, New Delhi
- Member, Journal Annals of Arid Zone, CAZRI, Jodhpur (Rajasthan)
- Life Member, Journal of Potash Research (Gurgaon)
- Member, International Journal of Phytomorphology
- Member, Guar Research Annals
- Member, Journal of Legume Research
- Member, Journal of Cotton Research Development

## 9. Awards/distinction/recognition/foreign visits

### Award

- National Award for Academy for the Advancement in Agricultural Sciences (AAAS, Senior), Year 2003, instituted by Indian Society for Plant Physiology (ISPP), New Delhi
- Received “Bharat Jyoti” award from Dr. R. S. Kadiyan, Hon’ble Speaker Haryana Vidhan Sabha instituted by the IIFS, New Delhi.
- Fellow, Food and Agricultural Organization (FAO, Rome)
- Received SRF of CSIR, New Delhi (1985-88)
- Received award for top rank in Ph.D.

**Distinction:** Top rank in Ph.D. (Plant Physiology) for the year 1989

### Recognition

- Felicitation received from Dr. R. S. Kadiyan, Hon’ble Speaker Haryana Vidhan Sabha in Fourth CCS HAU Alumni Convention organized at CCS HAU, Hisar from 8-9 April 2007.
- Elected Vice-President, ISPP, New Delhi for the year 2007-08.
- Elected Zonal Secretary (Northern) of ISPP, New Delhi for the year 2004-06.
- Consulting Editor, Indian Journal of Plant Physiology
- Executive Member Forum College of Basic Sciences and Humanities of Alumni Association, CCS HAU, Hisar for the year 2003-05.

### Foreign visit:

### Training programme under ICAR-AHRD Fellowship on chickpea in Plant Industry CSIRO, Perth, Western Australia (WA)

On the basis of my significant contribution in the research area of Stress Physiology mainly in Legumes, my name was recommended to Food and Agricultural Organization (FAO) Rome by CCS Haryana Agricultural University, Hisar, for 3 months training programme i.e. from August to October, 2000, to work under the noble guidance of Dr. Neil C. Turner, (Plant Physiologist) Chief Research Scientist, Plant Industry, Centre for Mediterranean Agricultural Research, Commonwealth Scientific and Industrial Research Organization (CSIRO), Perth, WA.

### Relevance of this training in the research area of Plant Physiology in India

Three months training has provided an opportunity to me for close interaction with Australian Plant Physiologists, Breeders, Agronomists, Pulse farmers, Industry group and the students of University of Western Australia. In Australia, chickpea is grown under Mediterranean climate whereas in India it is grown under conserved soil moisture or rain fed, but in both the countries, chickpea suffers from the terminal drought of varying duration and intensity, which adversely affects the seed size and yield. The aim of this study to improve the seed size and yield by spraying <sup>15</sup>N-urea under terminal drought will benefit the pulse industry/farmers in both the countries. Larger seed size is an important quality factor to fetch a higher price than smaller seed especially for *kabuli* chickpea. Since the main emphasis of breeder in both the countries is to identify the drought tolerance cultivar or to how to improve the yield

under terminal drought, this physiological work was undertaken at CSIRO, WA. Various physiological traits, i.e. isotopic analysis of  $^{15}\text{N}$  and total N and C content in different plant parts, their remobilization under terminal drought and volumetrically measurement of soil water content by TDR can be utilized in India also, since already ACIAR-ICAR collaborating project is in progress in both the countries.

Name of project	Funding Agency	Date of commencement/ termination
i) Morpho-physiological studies in important crops of Haryana for improving productivity under different environmental conditions.	State Govt.	1980- continue
ii) Development of lines tolerant to salinity in oats and identification of associated physiological markers	DBT, New Delhi	2007-continue
iii) Mechanism of antioxidant protection and ethylene evolution during drought induced nodule senescence in <i>Cajanus cajan</i> L.	CSIR, New Delhi	1998-2001
iv) Studies on ethylene induced decline in nodulation and $\text{N}_2$ -fixation and its alleviation by ethylene inhibitor(s)	ICAR New Delhi	1995-99
v) Root-shoot signals, stomatal regulation and leaf behaviour in <i>Brassica</i> under quantified moisture level	ICAR New Delhi	1994-97
vi) Role of potassium for increasing efficiency of nitrogen applied to bajra and wheat cropping sequence	PRII* Gurgaon	1993-95
vii) Potassium to alleviate moisture stress in oilseeds and pulse crops in typical rainfed situation of Haryana	PRII Gurgaon	1989-92

## SIGNIFICANT ACHIEVEMENTS

- (i) To overcome the genetical and physiological limits of productivity of traditional chickpea genotypes with spreading growth habit and having relatively low harvest index (HI), the morpho-physiological traits and components of yield productivity were identified in the improved, erect and compact released variety HC-5, (Entry No.APP 0201, INGR 02003, Identity No. IC-296887, NBPGR, New Delhi), which was developed on ideotype concept for extensive agriculture of higher density planting under assured irrigation and or optimal rainfall conditions. This genotype is also suitable for mechanical harvesting. **Morpho-physiological traits e.g. high photosynthetic and  $\text{N}_2$  fixing efficiency and fruiting zone length suitable for mechanical harvesting were included in the released proposal of this variety at State and National level.**

- (ii) Identification of drought resistance and wide range of thermo-tolerance cultivar of pigeonpea (*Cajanus cajan* L.), H77-216, **included in Package Practices (Kharif) 1997, HAU, Hisar:**
- (iii) The pentafoolate mutant of mungbean which has been got registered vide code No.97003 at NBPGR, New Delhi has been identified as relatively tolerant to applied salinity stress (Cl dominated) than the check trifoliolate (K-851) on the basis of various physiological traits studied.
- (iv) Morphophysiological studies of cultivar H-777, an American-cotton were made through the method of composite plant diagram under the noble guidance of Dr. Avtar Singh (World Bank Consultant) and Dr. B.R. Mor and Dr. B.P.S. Lather, Senior Cotton Breeder under the World Bank Aided Integrated Cotton Development Project at Cotton Research Station (HAU) Sirsa (Haryana). This cultivar was well adopted by the farmers and declared as one of the best variety due to its better yield, earliness, less pest infestation, resistant to lodging and suitable for normal and late sowing which were related to the various morphophysiological characters and thus replaced 320F and Bikaneri Narma in the cotton belt of Haryana and surrounding areas.

**Operational Research Trials at Farmers Field:** Under the operational research trials to test the performance of newly released American cotton varieties and of Desi cotton for their yield potential, 16 locations in Sirsa District were selected. For this three varieties of American cotton i.e. H-777, 655C and 320F and two Desi cotton i.e. HD-11 and G-27 were tested at farmers fields. Among the American cotton, H-777 yielded the best followed by H-655C and adopted by the farmers. No significant differences were noticed for desi cotton genotypes. The number of squares/flowers production and their retention to form mature bolls and their behaviour based on plant population, the maximum yield of seed cotton of cv. H-777 was recorded with 80 kg N ha<sup>-1</sup> at the spacing of 75x30cm as compared to 90 x 30 cm and 60 x 30 cm.

- (v) Under field conditions applied K in combination with N and P improved the plant water status of wheat which ultimately contributed towards the increase in 15-20% yield. Whereas, response to either N (basal) or NK (basal) treatment was poor. In addition to this, K in combination with NP the maturity of wheat crop was 10-15 days earlier than control.
- (vi) The increase in ACC content, ACC oxidase and ethylene evolution and decreased ARA may be considered as indirect/direct effect of ethylene produced by roots/nodules on NO<sub>3</sub><sup>-</sup>-N application/drought stress in chickpea. Under drought stress the behaviour of ethylene evolution, H<sub>2</sub>O<sub>2</sub> scavenging enzymes and membrane integrity was different in roots and nodules in pigeonpea / chickpea and their significant roles have been elucidated.

<b>Teaching</b>	UG & PG Courses		
<b>Research papers published :</b>	Original Research Papers	Books/Reviews / Projects report	Popular articles
	72	5	2
<b>Students guided:</b>	Ph.D. 3	M.Sc. 2	

## 10. Extension activity:

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