

## METEOROLOGICAL ASSESSMENT OF *RITUS* AT DEHRADUN- A SURVEY STUDY

Vidhu Saxena<sup>\*1</sup>, Mannat Marwaha<sup>2</sup> and Satya Dayal Manav<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of *Swasthvritta*, Uttaranchal Ayurvedic College, 17- Old Mussoorie Road, Rajpur, Uttarakhand.

<sup>2</sup>Assistant Professor, Department of *Swasthvritta Evum Yoga*, Faculty of Ayurved, Main Campus, Uttarakhand Ayurved University, Harrawala, Dehradun, Uttarakhand.

<sup>3</sup>Professor and Head, Department of *Swasthvritta*, Uttaranchal Ayurvedic College, 17- Old Mussoorie Road, Rajpur, Uttarakhand.

Article Received on  
24 July 2022,

Revised on 14 August 2022,  
Accepted on 04 Sept. 2022

DOI: 10.20959/wjpr202213-25537

### \*Corresponding Author

**Vidhu Saxena**

Assistant Professor,  
Department of *Swasthvritta*,  
Uttaranchal Ayurvedic  
College, 17- Old Mussoorie  
Road, Rajpur, Uttarakhand.

### ABSTRACT

Changes in the environment leads to change in bodily humors. Ritucharya (seasonal regimen for diet and behavior) could only be followed once it is confirmed which *Ritu* is going on. Study of nature and changes in Sun, moon, earth, sky, air, temperature, humidity, air velocity and morphology of plants and animals is compulsory. One should able to assess Ritu prevailing by observance of environmental changes in surroundings. All Characteristics mentioned in *Samhitas* which were taken under survey were found present during survey. Presence of all the environmental changes, changes in flora and fauna further confirms the validity of seasonal changes and characteristics mentioned in *Samhitas*. Assessment criteria followed can be taken as standard for assessment of prevalent of *Ritu* in any place, city, and

state at any time of year. Assessments of months corresponding to *Ritus* (according to presence of all characteristics of particular *Ritu*) in Dehradun and surrounding areas are: *Shishira Ritu* - months of December (last three weeks) and January (first three weeks). *Vasant Ritu* vis-a-vis months of February (last week), March (whole month) and April (first week). *Grishma Ritu* vis-a-vis months of May (last week), June (whole month) and July (first week). *Varsha Ritu* vis-a-vis months of July (last three weeks) and August (first week). *Sharad Ritu* vis-a-vis months of August (last week) and September (first three weeks). *Hemant Ritu* vis-a-vis months of December (four weeks) and January (first week). Two

weeks before and two weeks after the prevalent *Ritu* can be considered as *Ritusandhi*. Meteorological parameters: Increase and decrease in temperature and humidity was observed all due to sun rays, wind and presence of rains. Temperature increases and humidity decreases and vice versa. However, in Dehradun the humidity remains more than normal due to geographical status of the area.

**KEYWORDS:** *Ritu* assessment, Meteorology, seasons, Dehradun.

## INTRODUCTION

One fundamental understanding in *Ayurveda* is about the seasons. There are six seasons in various *Ayurvedic* texts. The *Ritus* are based upon the sun's dominance during *Adana Kala* and the moon's dominance during the *Visarga kala*, the *Vayu* being *Ruksha* in *Adana* (dry season) then *Visarga* (wet season). The atmospheric changes due to change in *Ritus* create a disturbance in the equilibrium of the *Mahabhutas* (five elements) and *Gunas* (qualities). This disturbance first leads to the accumulation of *Doshas* (derangements) because the *Mahabhutas* and *Gunas* vitiates in that specific *Ritu*. This is the first stage of disease.

With the continued change of the *Ritu* it further aggravates the *Dosha* (this is the second stage of disease). Due to nature's mercy, the next *Ritu* naturally balances and bring the *Doshas* back to normalcy. These two stages of disease are occurring due to nature. *Prakriti* then leaves it up to our own ignorance to continue the plight into disease formation after the second stage by lifestyle and diet habits that are not beneficial for balance of that *Ritu*. This is the basic ebb and flow of creation, transformation and destruction that happen all through the year over and over.

Led to the famous *Ayurvedic* theory of '*Loka Purush Samya*'.<sup>[1]</sup> Obviously changes occurring in the *Loka* affect the *Purush* and vice versa. This philosophical concept was transformed into perfect luminaries. Since the very birth, the two entities *Desha* and *Kala* have been described as influencing the human beings at every step. Out of these two entities *Kala* has been given more importance because, a person can transfer himself from one place to another and as such *Desha* becomes under the control of mankind. But *Kala* has been said to be irresistible and uncontrollable. That is why *Acharya Charaka*, while discussing the causative factors of *Janpadodhwansa*, has stressed very emphatically that, out of the four reasons, the time factor or the *Kala* is most powerful and uncontrollable.<sup>[2]</sup>

The *Ritus* on the whole affect human beings. It is not possible to have the knowledge of suitable diet and regimen for different *Ritus* without having the knowledge of *Ritus* themselves. Even though *Ritus* are to be taken as separate entities, but taken together constitute a year and same *Ritus* are repeated every year.

A year is divided in two *Ayanas* or six *Ritu*. *Ritus* and corresponding *Masa* (months) explained in classics are mainly for central India where all the *Ritus* are observed corresponding to particular period. But observance of these *Ritus* may vary according to areas (coastal, hilly etc.), zones (tropical, subtropical, torid, temperate, frigid etc.), *Desha* (*Anupa*, *Jangal*, *Sadharana*), equator, southern pole, northern pole etc.

The guidelines mentioned in *Ayurvedic* classics regarding *Ritucharya* can only be followed when one knows about the details of prevailing *Ritu*. To know when a particular *Ritu* starts, changes in the environment and morphological description of plants mentioned in *Ayurvedic* classics during months of various *Ritus* should be well known to physician and also common man to remain healthy following *Ritucharya*.

For concluding appropriate time period of a specific *Ritu*, *Acharyas* quoted characteristics of *Ritus* based on changes in the environment and morphological description of plants mentioned in *Sushruta Samhita*<sup>[3]</sup>, *Ashtanga Samgrah*<sup>[4]</sup>, *Ashtanga Hridayam*<sup>[5]</sup>, *Harita Samhita*<sup>[6]</sup> etc.

The study was conducted as Post graduate thesis work at Uttarakhand Ayurvedic College, Dehradun, Uttarakhand in the year 2015 -17. The characteristic of particular *Ritus* were observed weekly and plotted/ tabulated in pre-planned proforma charts. Also, meteorological parameters (average temperature, humidity etc.) were observed and their mean was tabulated weekly.

## AIMS AND OBJECTIVES

1. To assess the months corresponding to various *Ritus* in Dehradun and surrounding areas.
2. To evaluate and establish meteorological parameters against each *Ritu* in Dehradun and surrounding areas.

## MATERIAL AND METHODS

Assessment of particular months corresponding to each *Ritu* (in whole year 2016-17) was done at Dehradun and surrounding areas through pre planned survey proforma which includes following characteristics:

### Characteristics selected for assessment of *Ritus* in Dehradun

#### *Shishira Ritu*

1. *Sheetamadhikam* (The cold gets increased)
2. *Megha marutvarshjam* (Clouds, breeze and rain increases)
3. *Sheetamadhikam rokshayam* (Cold is severe causing more dryness)
4. *Vatavrishtyakula disha* (Quarters (space around) are vitiated with breeze and rain)
5. *Shesham hemantvat* (Other features are same as during *Hemanta*)

#### *Vasant Ritu*

1. *Dakshina anilshiteshu* (Cold wind blowing from south)
2. *Disho vasante vimla* (All directions are clear)
3. *Parito jalvahishu* (Increased water levels in natural flowing water sources)
4. *Kokilalikulalapaki kollahalakula* (Sounds of excited birds specially *Kokila*)
5. *Kvanitamtmadhruvt lalsam* (Presence of black bees on flowers in search of honey)
6. *Navpravaltwakpatrapadpa* (Evolution of new leaves, flowers, bark and self plantation)
7. *Tamrakirnoo ravi* (Increased hotness and redness in Sunrays)
8. *Adrishta nashtasureshu* (Patches of clouds in clear sky)
9. *Manikutimkantishu* (Earth gracefully covered with colored flowers and green forest- look like gems on earth)
10. *Vichitrapushp vriksheshu kaaneshu sugandhishu* (Environment full of fragrance)
11. *Goshthi kathabhi chitrabhirmadhyah gamyetsukhi* (People/children are usually cheering/enjoying outdoor environment)

#### *Grishma Ritu*

1. *Atasipushpanibham tikshana anshudarvadeepti* (Sun's rays appear like that of flowers of *Atasi* and are very hot)
2. *Jvalanti bhumishcha* (Fire breaks out in forests)
3. *Pravridhaudhso Nadya* (Rivers appear prominent in their embankments)
4. *Chayaheena mahiruha vishirna jirana parnascha* (Trees have no shade under them because of falling ripened leaves)

5. *Shushkavalkala lataankita* (Leaves, bark and creepers are all dried up)
6. *Manohara kalalapaha shishava sarika shuka* (Children, *Sarika* (mynah bird) and *Shuka* (parrot) found taking pleasantly)
7. *Bhustaptah* (Ground is heated up)
8. *Saritastanvyo* (Rivers are thin)
9. *Disha prajvalanti* (The quarters appear as through burning)
10. *Dhvasta virutrinatala viparnankit padapaha* (Trees, grass, creepers and trees are devoid of their leaves)
11. *Deerghavsara* (Day appears long)

### **Varsha Ritu**

1. *Varunoo Vayu* (Wind blows from west)
2. *Sarvasya udgama* (All vegetation springs up)
3. *Bhinnendraneelabhra vrindmandavilma nabha* (The sky will be bright blue in colour resembling a sapphire freshly cut)
4. *Didhirka navyadhmagna sopanapanktya* (The flights of steps of ponds and lakes become covered with fresh water)
5. *Sarita sagarakara* (Rivers appears like oceans)
6. *Bhuravyakta jalsthal* (The demarcation of land area and water area is not clear)
7. *Mandrastanita jimuta shikhid darduranadita* (Pleasant sounds from the clouds, peacock and frogs are heard constantly)
8. *Indragopa dhanukhandvidyuta chitadeepta* (The earth shines with indragopa (chochineal) insect (insects with bright red coloured fur crawling on ground) rainbow and lightning)
9. *Parita shyamlatatrina silindrakutaja ujwala* (Green grass, mushrooms and *Kutaja* trees with flowers are found all around)
10. *Nadyoambhachanookhatatatadruma* (Rivers are full of water so much so that they uproot the trees on bank)
11. *Vapya protfulla kumudha neelotpalavirajitah* (Tanks are studded with full blooming *Kumudha* (white water lilies- *Nymphaea alba* Linn.) and *Neelotpala* (blue lotuses))
12. *Bhu avayakta sthalachabhra* (Soil as well as pits in earth are often hidden due to grass grown)
13. *Bahusasya upshobhita* (Landscape looks beautiful on account of abundant crops)
14. *Naatigarjanstavanmegha nirudharkagraha nabha* (Sky covered with raining clouds, without excessive peals of thunder obstructing sun view)

**Sharad Ritu**

1. *Vayoma shubhabham* (Sky is clear of clouds)
2. *Kichittapanksaankita mahi* (earth is full of slush, *Kasa*, grass, *Saptahva*, water lily (*Kumuda*), paddy, (*Shali*) samplings)
3. *Vikshipta tikshana kirnoo meghatvigamat ravi* (With absence of clouds, the sunrays are spreading wide and hot)
4. *Babhruvarno ativimla kraunchamalaakulla disha* (Quarters (space around) appears reddish brown, very clear and with *Krauncha* birds (curlews) - flying in formation resembling garlands)
5. *Saaransi vimalani* (The water of ponds etc. is clear)
6. *Babhrushna sharada arka* (The sun rays are brownish and hot)
7. *Shvetabhrevimalam nabha* (Sky has white clouds and is clear)
8. *Saarasyamburuharbhanti hansansaghatita* (Ponds and lakes are full of lotus flowers and herds of swan)
9. *Pankashushkadrumakirna nimna -unnatasameshu bhu* (Ground has dried slush, dry trees and elevation and depressions are exposed)
10. *Baanah saptahvbadhuka kasha asna virajita* (Land is adorned with *Baana*, *Saptahavaha*, *Bandhuka* (*Pentapetes phoenicea*), *Kasa* (*cassia occidentalis*) and *Asana* (*pterocarpus marsupium*)).

**Hemant Ritu**

1. *Dhumadhumra rajomanda tusharavilamandla* (All the quarters (areas all around) appears smoky with covering of thick mist, sun is also covered likewise)
2. *Marutshaityat uttaro romaharshnam* (Cold breeze from north causes horripilations)
3. *Rodhra priyangu punnaga lavalya kusuma ujjvalla* (Trees like *Lodhra* (*symplocus racemosa*), *Priyangu* (*callicarpa macrophylla*), *Punnaga* (*calophyllum inophyllum*), *Lavali* are full with blossom)
4. *Nadya svashpa* (The reservoirs of water are covered with layer of mist/ rivers are covered with mists)
5. *Sushmanaa kupashcha himagame* (The water of wells and ponds are warm)
6. *Dedhryan nishanametahee -prataveva bubhukshitah* (Nights grown longer- person feels hungry in (early) morning itself)
7. *Angaartapa santaptagarbha bhuveshamcharinna* (People spent their time residing in houses kept warm/ underground chambers)

8. *Vayurvata utara* (Cold wind blows from south)
9. *Chinnastushara savitah* (The sun rays are hindered by fog)

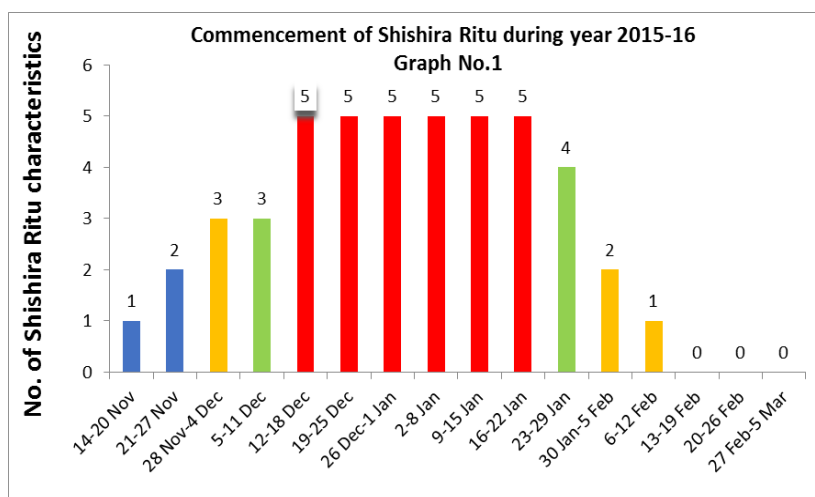
All the above characteristics were found present during *Ritus* when survey was performed. This further confirms the validity of seasonal changes and characteristics mentioned in *Samhitas* in present era. If those changes in nature are still the same then changes in human body accordingly should be the same. Non observance of dietary regimens during those *Ritus* and changes in life style can become the cause of many diseases. Hence a proforma (attached in appendices) was made and survey was started much before the time (dates/weeks) recommended for that particular *Ritu*. Observations were also continued for at least two weeks after the time for that *Ritu* finishes.

## SURVEY FINDINGS

### *Shishira Ritu*

There were five characteristics chosen for assessment of prevalence of *Shishira Ritu*. Observations were done in months of November, December 2016 and January, February 2017 (i.e. *Pausha*, *Magha*, *Falgun* and *Chaitra*) in Rajpur, Dehradun and surrounding areas. All five characteristics of *Shishira Ritu* were found present during 12<sup>th</sup> December 2015 to 22<sup>nd</sup> January 2016 (i.e. duration of six weeks). However, three characteristics were already present from 28<sup>th</sup> November to 11<sup>th</sup> December 2015 (i.e. duration of two weeks) and four characteristics during the week (23<sup>rd</sup> to 29<sup>th</sup> January 2016). Few characteristics remain prevalent up to 12<sup>th</sup> February 2016. (Graph No.-1).

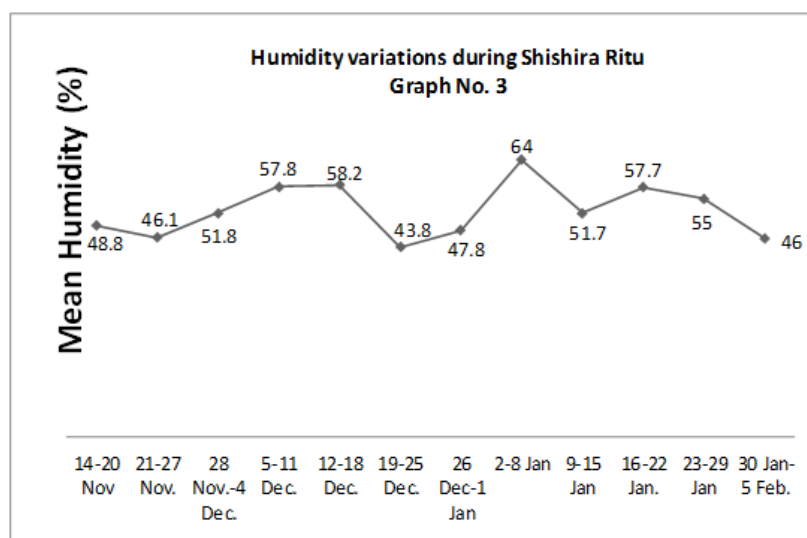
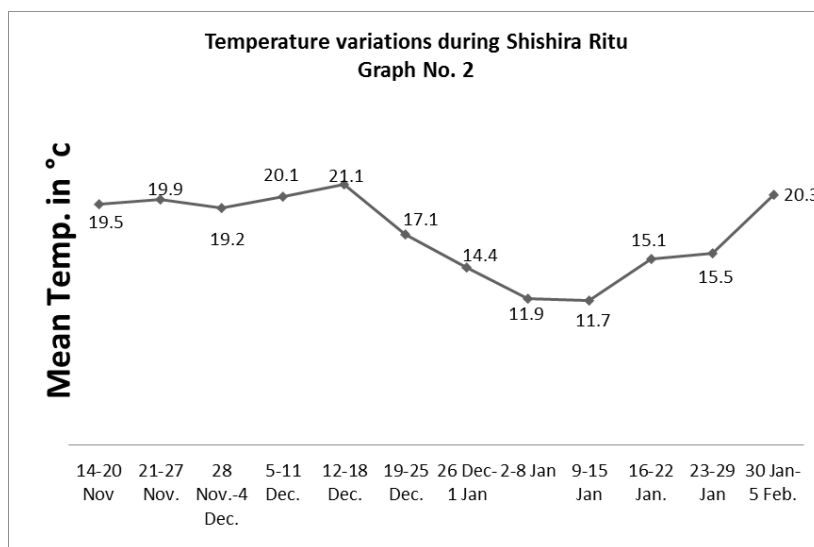
A period of six weeks (i.e. from 12<sup>th</sup> December 2015 to 22<sup>nd</sup> January 2016) was having all five selected characteristics present.





### Meteorological components and their variations

Mean Average Temperature recorded weekly for that period (12<sup>th</sup> December 2015 to 22<sup>nd</sup> January 2016) varies from Maximum 21.1°C and Minimum 11.7°C. (Graph-). Mean Average Humidity (in percentage) recorded weekly was Maximum 64 and Minimum 43.8. (Graph No.-2,3).



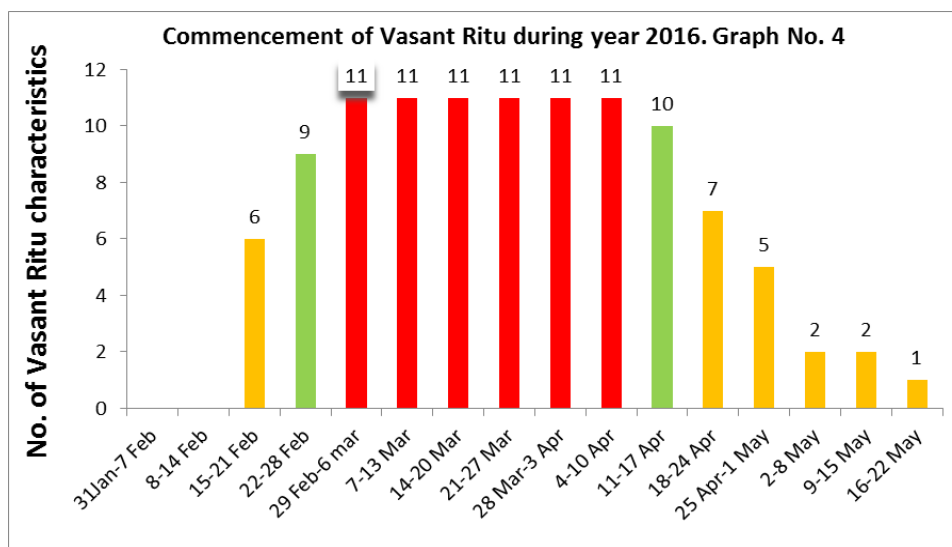
### Vasant Ritu

There were eleven characteristics selected for assessment of prevalence of *Vasant Ritu*. Observations were done in particular months corresponding to *Vasant Ritu* during the months of February, March, April and March 2016 (i.e. *Falguna*, *Chaitra*, *Vaishakha* and *Jayeshtha*). All eleven characteristics were found present during 29<sup>th</sup> February to 10<sup>th</sup> April 2016 (i.e. duration of six weeks). However, six and nine characteristics were found present during 15<sup>th</sup> to 21<sup>st</sup> February and 22<sup>nd</sup> to 28<sup>th</sup> February 2016 (i.e. total duration of two weeks). From 11<sup>th</sup>



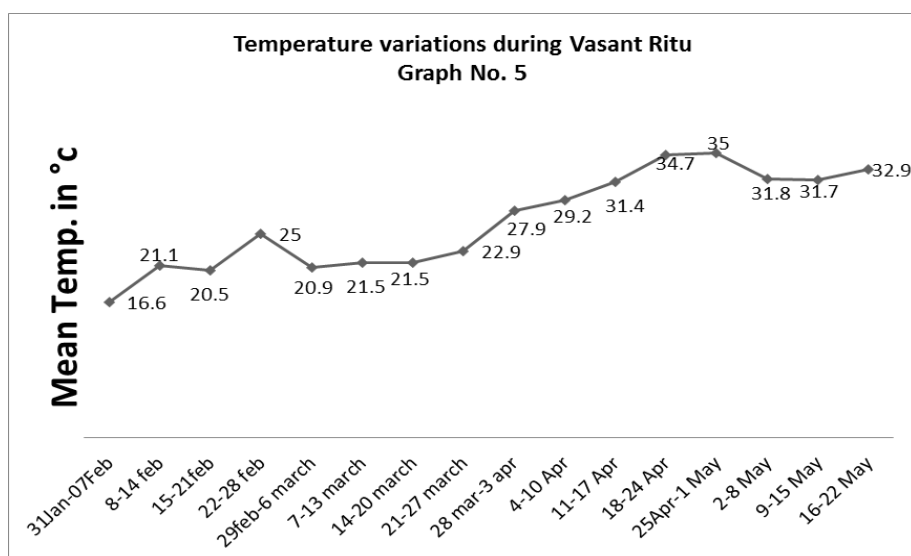
to 17<sup>th</sup> April ten characteristics and from 18<sup>th</sup> to 24<sup>th</sup> April seven characteristics were found prevalent (i.e. duration of one week). (Graph No.-4).

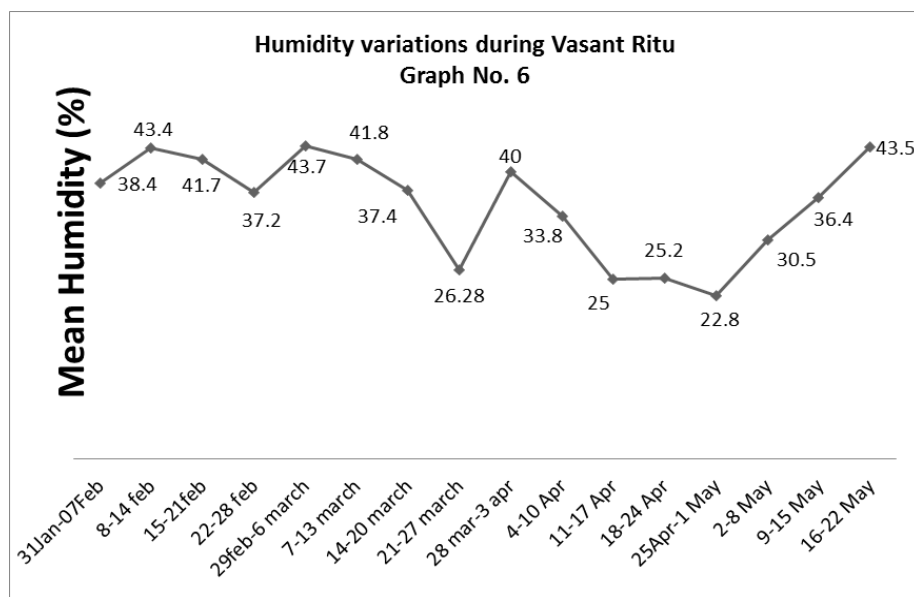
All eleven selected characteristics of *Vasant Ritu* were found present during six weeks i.e. from 29<sup>th</sup> February to 10<sup>th</sup> April 2016.



### Meteorological components and their variations

Mean Average Temperature recorded weekly for that period (29<sup>th</sup> February to 10<sup>th</sup> April 2016) varies from Maximum 29.2°C and Minimum 20.9°C. (Graph-). Mean Average Humidity (in percentage) recorded weekly was Maximum 43.7 and Minimum 26.28. (Graph No.-5,6).

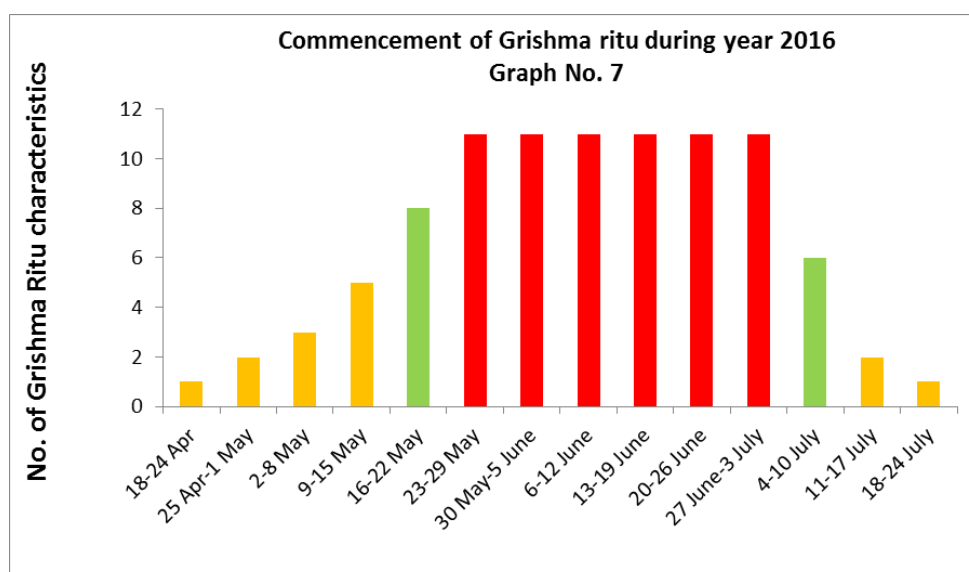




### Grishma Ritu

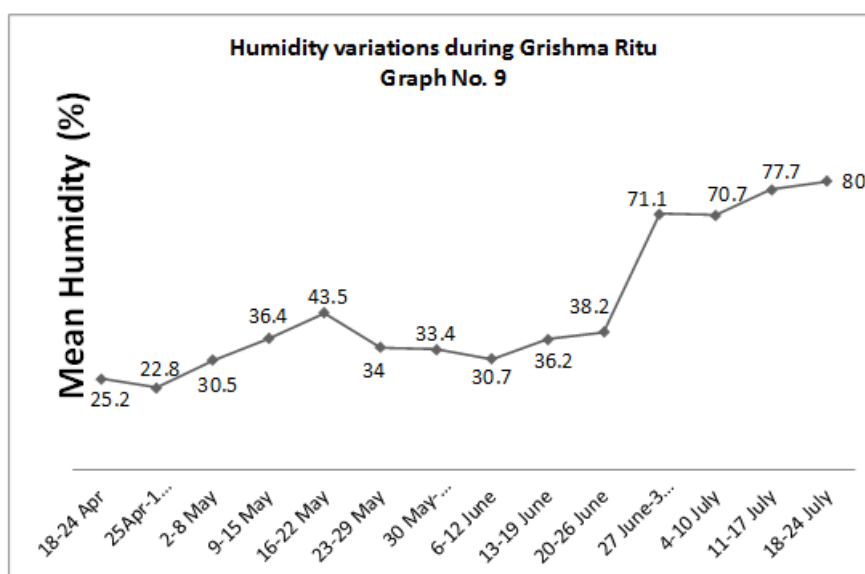
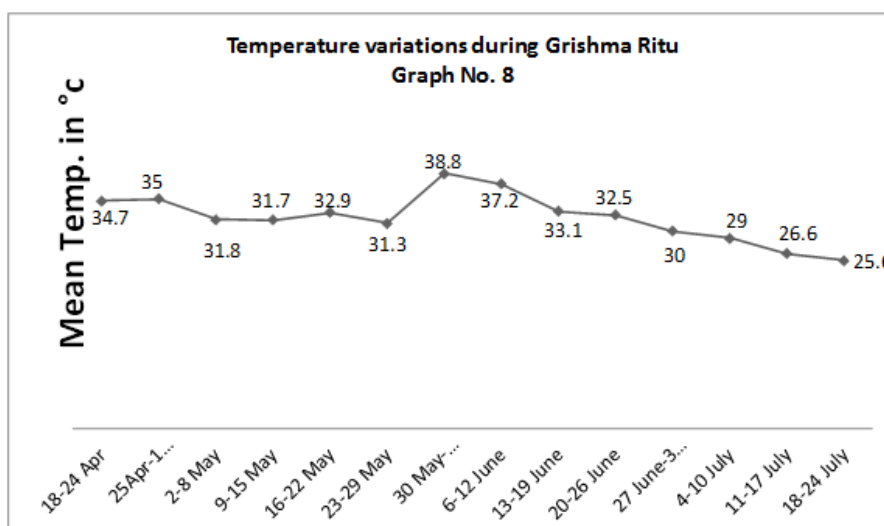
For *Grishma Ritu*, total of eleven characteristics were selected to be observed. Observations were done in particular months corresponding to *Grishma Ritu* during the months of May, June and July 2016 (i.e. *Vaishakha*, *Jyeshtha*, *Ashadha* and *Shravana*). All eleven characteristics were found prevalent during the period 23<sup>rd</sup> May to 3<sup>rd</sup> July 2016. (i.e. duration of six weeks). However, five and eight characteristics were found present during the weeks of 9<sup>th</sup> to 15<sup>th</sup> May and 23<sup>rd</sup> to 29<sup>th</sup> May 2016 (i.e. two weeks). Six characteristics were found prevalent during the week 4<sup>th</sup> to 10<sup>th</sup> July (i.e. one week). (Graph No.-7).

All eleven selected characteristics of *Grishma Ritu* were found present during six weeks i.e. from 23<sup>rd</sup> May to 3<sup>rd</sup> July 2016.



### Meteorological components and their variations

Mean Average Temperature recorded weekly for that period (23<sup>rd</sup> May to 3<sup>rd</sup> July 2016) varies from Maximum 38.8°C and Minimum 30.0°C. (Graph-). Mean Average Humidity (in percentage) recorded weekly was Maximum 71.1 and Minimum 30.7. (Graph No.-8,9).

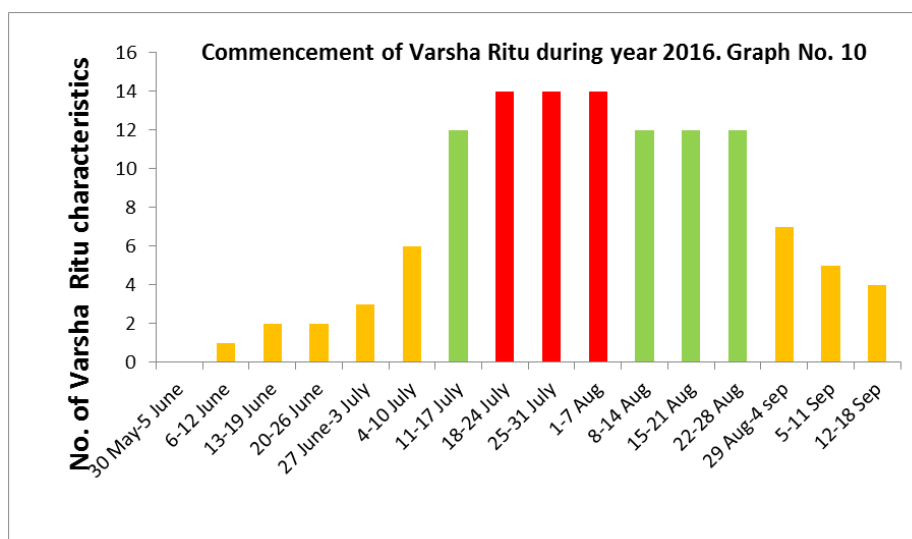


### Varsha Ritu

Total fourteen characteristics were selected for observation to be made during *Varsha Ritu*. These observations were done during particular months corresponding to *Varsha Ritu* i.e. months of June, July, August and September 2016 (i.e. *Ashadha*, *Shravanaa*, *Bhadrapada* and *Ashvina*). All fourteen characteristics were found prevalent in surrounding during 18<sup>th</sup> July to 7<sup>th</sup> August 2016. (i.e. during a period of three weeks). However, twelve characteristics were present during 8<sup>th</sup> August to 14<sup>th</sup> August 2016 (i.e. for period of three weeks). Six

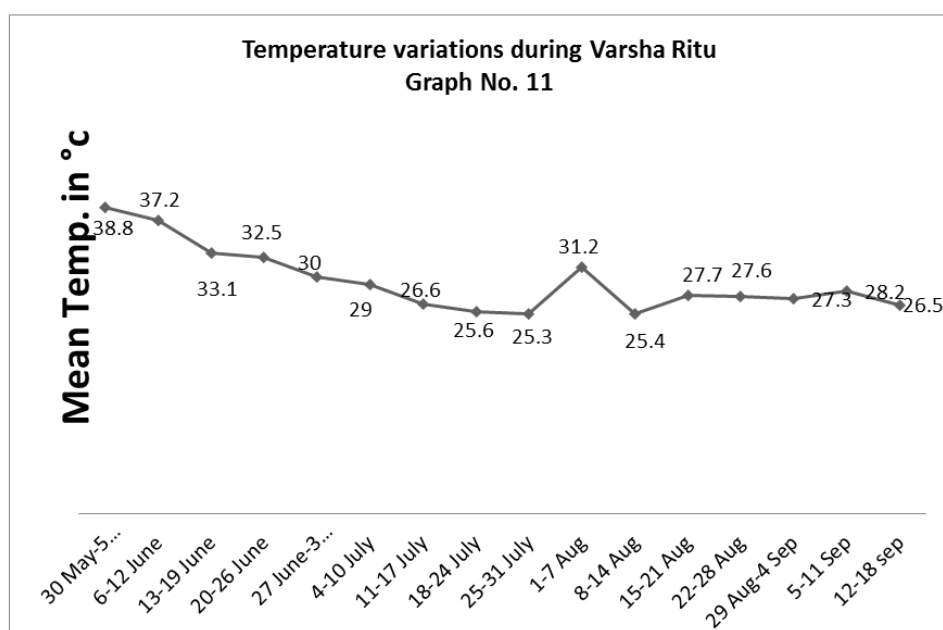
characteristics were present during one week i.e. from 11<sup>th</sup> to 17<sup>th</sup> July and seven characteristics during another one week i.e. from 29<sup>th</sup> August to 4<sup>th</sup> September 2016. (Graph No.-10).

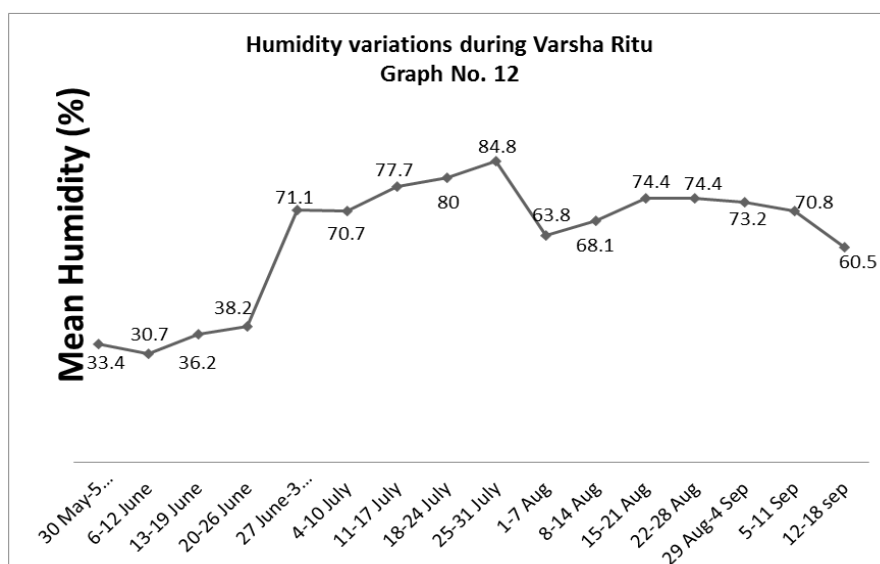
All fourteen selected characteristics of *Varsha Ritu* were found present during only three weeks i.e. from 18<sup>th</sup> July to 7<sup>th</sup> August 2016.



### Meteorological components and their variations

Mean Average Temperature recorded weekly for that period (18<sup>th</sup> July to 07<sup>th</sup> August 2016) varies from Maximum 31.2°C and Minimum 25.3°C. (Graph-). Mean Average Humidity (in percentage) recorded weekly was Maximum 84.8 and Minimum 63.8. (Graph No.-11,12).

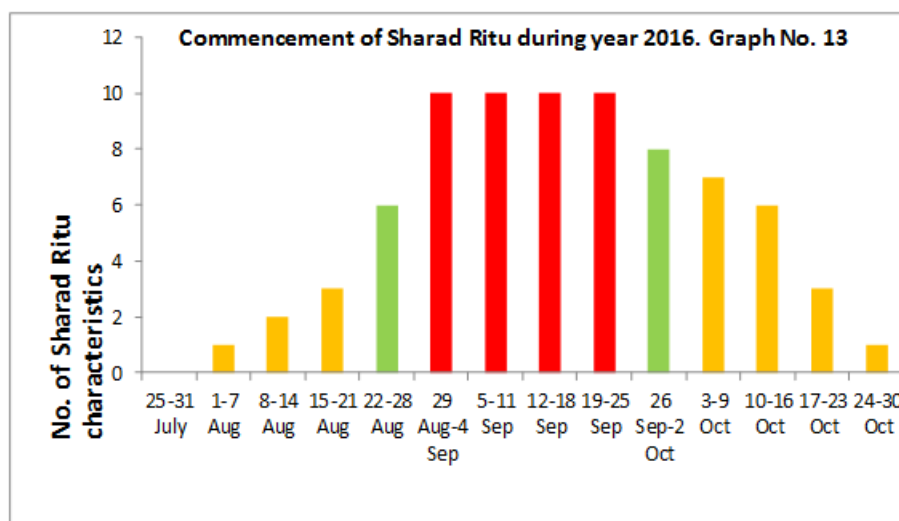




### *Sharad Ritu*

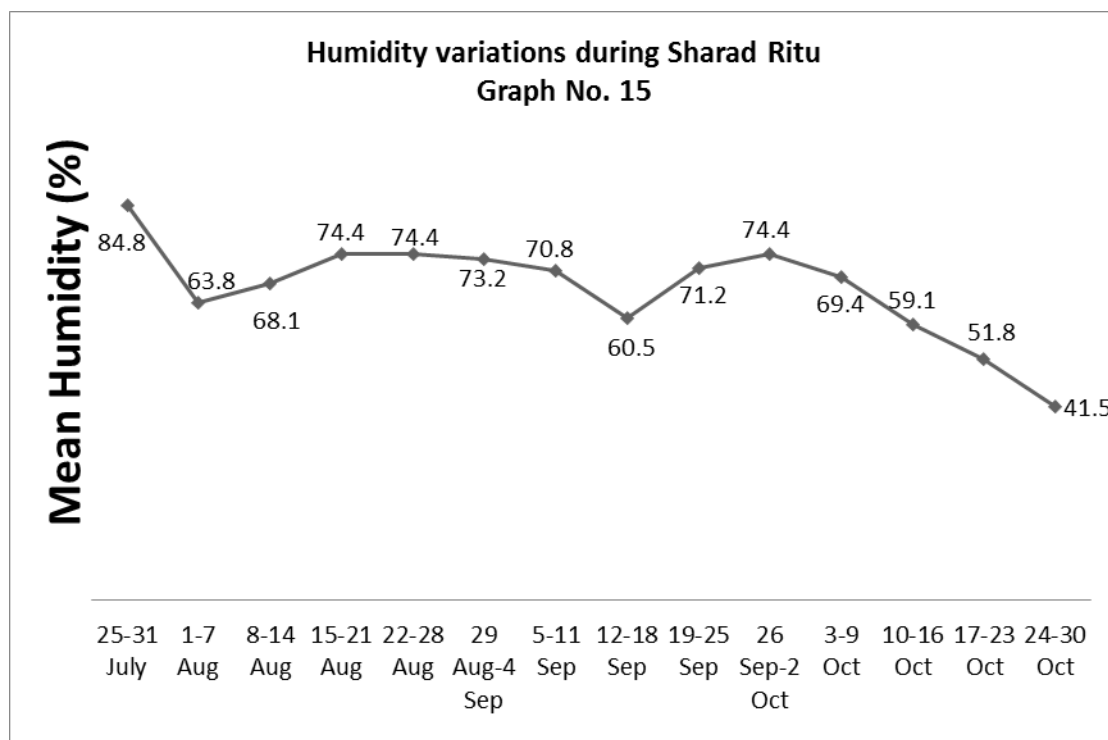
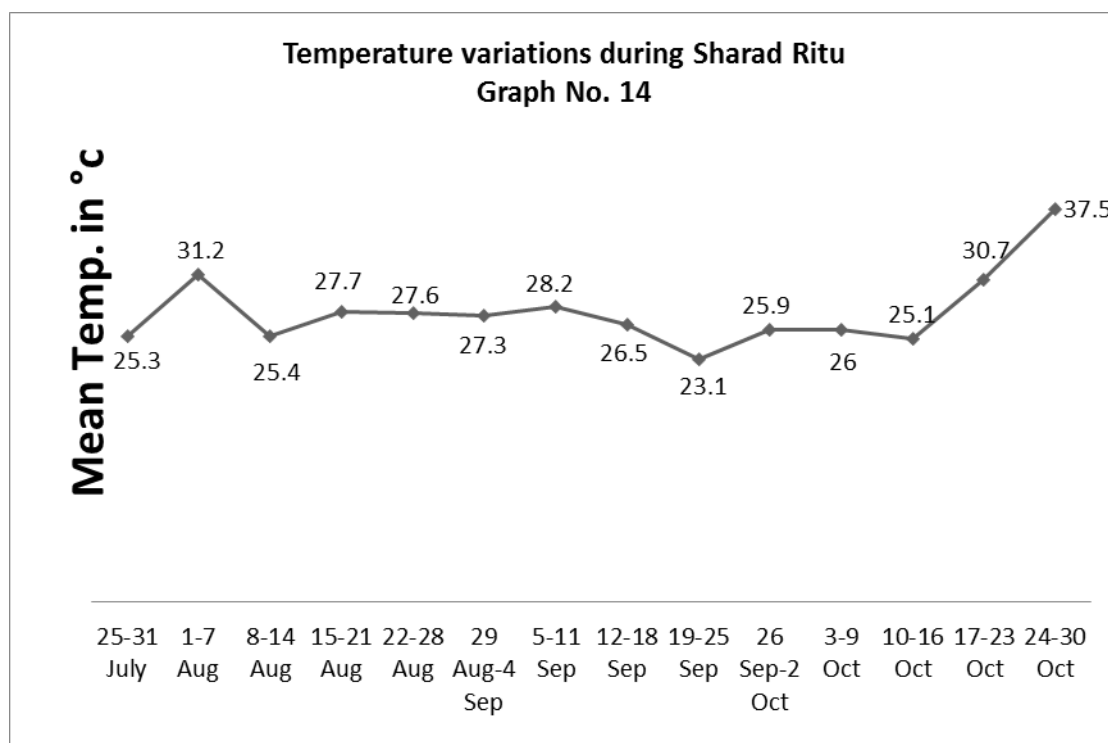
For assessment of months corresponding to *Sharad Ritu*, observations were made during months of August, September, October and November 2016 (i.e. during *Bhadrapada*, *Ashvina*, *Kartika* and *Magshirsha*). Total ten characteristics were selected. These ten characteristics were observed and all ten characteristics were found prevalent during 29<sup>th</sup> August to 25<sup>th</sup> September 2016 (i.e. duration of four weeks). However, six characteristics were found present during one week from 22<sup>nd</sup> to 28<sup>th</sup> August and 10<sup>th</sup> to 16<sup>th</sup> October 2016. Eight and seven characteristics were found present during the week 26<sup>th</sup> September to 2<sup>nd</sup> October and 10<sup>th</sup> October to 16<sup>th</sup> October 2016. (Graph No.-13).

All ten selected characteristics of *Sharad Ritu* were found present during only four weeks i.e. from 29<sup>th</sup> August to 25<sup>th</sup> September 2016.



### Meteorological components and their variations

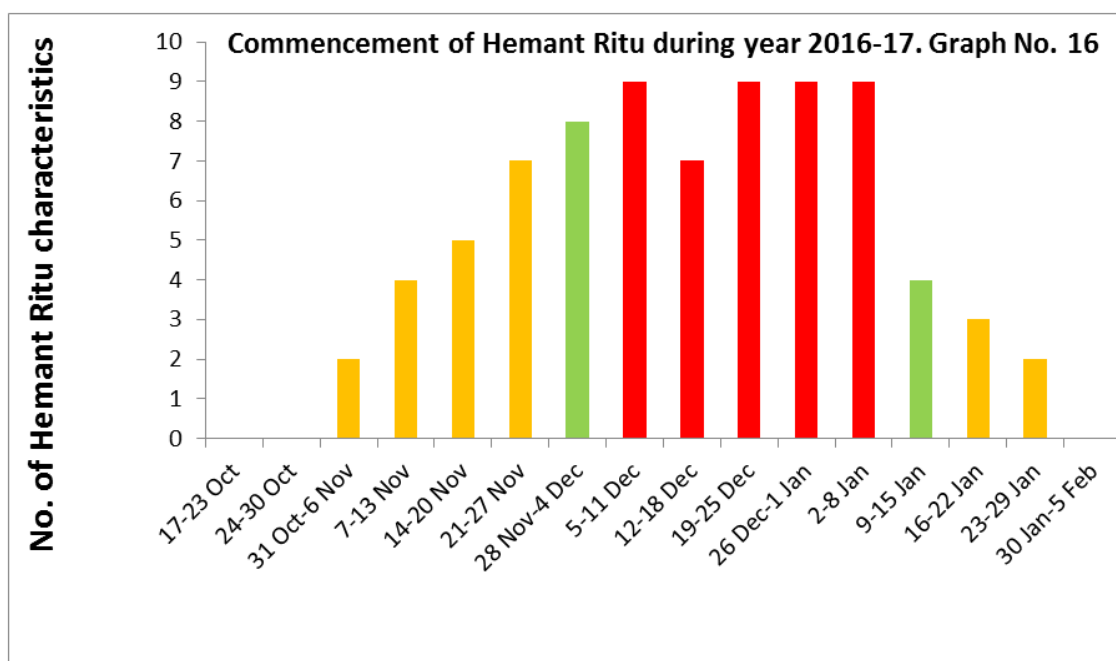
Mean Average Temperature recorded weekly for that period (29<sup>th</sup> August to 25<sup>th</sup> September) varies from Maximum 28.2°C and Minimum 23.1°C. (Graph-). Mean Average Humidity (in percentage) recorded weekly was Maximum 73.2 and Minimum 60.5. (Graph No.-14,15).



***Hemant Ritu***

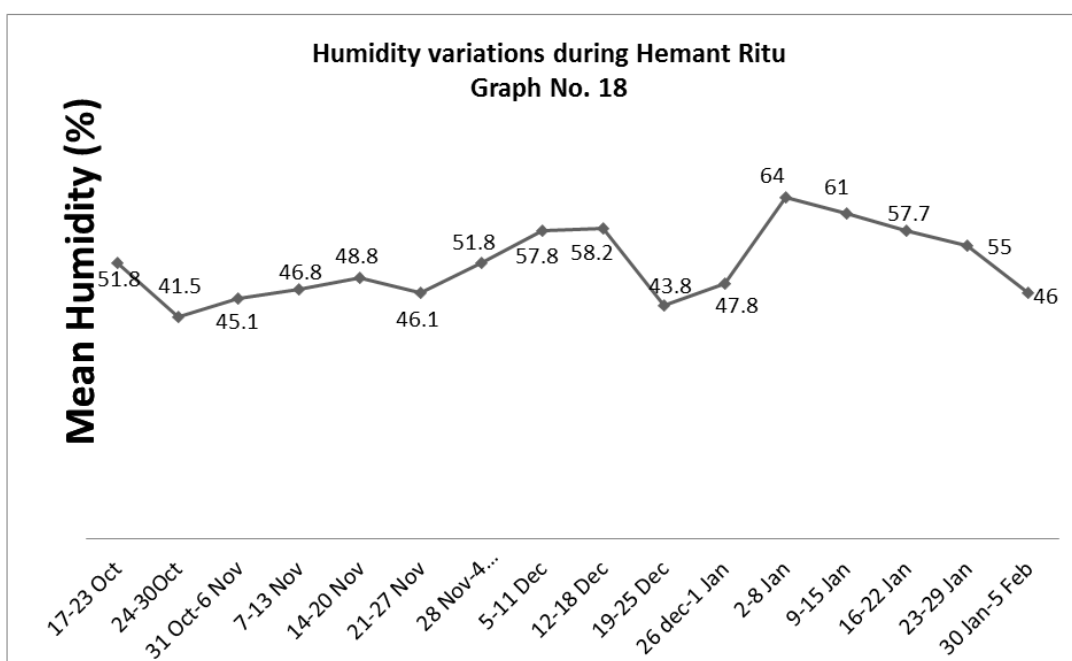
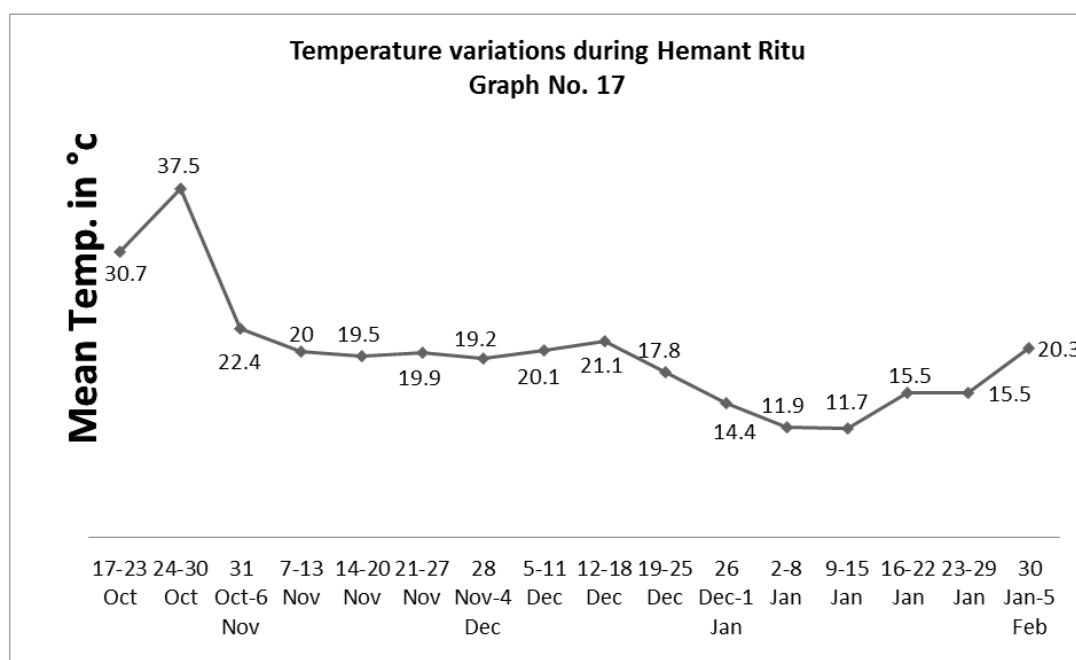
There were nine characteristics chosen for the assessment of months corresponding to *Hemant Ritu*. These observations were made during the months of October, November, December 2016 and January 2017 (i.e. *Kartika, Margshirsha, Pausha* and *Magha*). All nine characteristics were found prevalent during the week 5<sup>th</sup> to 11<sup>th</sup> December 2016 and during three weeks 19<sup>th</sup> December to 8<sup>th</sup> January 2017 (i.e. four weeks). However, seven characteristics were present during one week in-between i.e. from 12<sup>th</sup> to 18<sup>th</sup> December 2016. (Graph No.-16).

All nine selected characteristics of *Hemant Ritu* were found present during five weeks i.e. from 5<sup>th</sup> December 2016 to 08<sup>th</sup> January 2017.

**Meteorological components and their variations**

Mean Average Temperature recorded weekly for above period (5<sup>th</sup> December 2016 to 08<sup>th</sup> January 2017) varies from Maximum 21.1°C and Minimum 11.9°C. (Graph-). Mean Average Humidity (in percentage) recorded weekly was Maximum 64 and Minimum 47.8. (Graph No.-17,18).





## DISCUSSION

Survey was conducted to confirm the appearance of characteristics during all six *Ritus* in whole one year and to assess the particular months corresponding to that *Ritu* during the year 2016 and 2017 in Dehradun and surrounding areas.

### Discussion on Survey on *Shishira Ritu*

Presence of all five characteristics selected was found prevailing during 12<sup>th</sup> December 2015 to 22<sup>nd</sup> January 2016. These six weeks corresponds to *Shishira Ritu*. However, a period of

one week i.e. from 5<sup>th</sup> December 2015 to 11<sup>th</sup> January 2016 (having three characteristics present) and another one week from 23<sup>rd</sup> to 29<sup>th</sup> January 2016 (having four characteristics present) both weeks can be considered as weeks of *Ritusandhi* between *Shishira* and *Vasant Ritu*. Temperature recorded was low and humidity was high during *Shishira Ritu*. This satisfies the “*Sheetam Adhikam*” characteristic of *Shishira Ritu*. However, this increase in cold and dryness during this period (*Sheetamadhikam Rokshayam*) is caused due to high humidity because of presence of Clouds, breeze and rain (*Megha Marutavarshajam* and *Vatavristyakula Disha*).

Later half of December and full month of January are the corresponding months for *Shishira Ritu*.

### Survey on *Vasant Ritu*

Presence of all eleven characteristics selected was found prevailing during 29<sup>th</sup> February to 10<sup>th</sup> April 2016. These six weeks corresponds to *Vasant Ritu*. However, a period of two weeks presiding *Vasant Ritu* i.e. from 15<sup>th</sup> to 21<sup>st</sup> February and 22<sup>nd</sup> to 28<sup>th</sup> February 2016 possesses six and nine characteristics (representing *Ritusandhi* between *Shishira* and *Vasant Ritu*) and another two weeks after *Vasant Ritu* i.e. period from 11<sup>th</sup> April to 24<sup>th</sup> April 2016 possesses ten and seven characteristics. Both these weeks can be considered as weeks of *Ritusandhi* between *Vasant* and *Grishma*. Temperature recorded was increasing but humidity remains almost same with slight variations during *Vasant Ritu*. Increased hotness and redness in sun rays (*Tamrakirnoravi*) increases temperature during *Vasant Ritu*. However, much rise is not that high due to cold wind blowing from south (*Dakshinanilshiteshu*) and patches of clouds in sky (*Adrishtanashtasureshu*). This pleasant climate is enjoyed by flora and fauna. Evolution of new leaves, flowers, bark and self-plantation (*Navpravalwakpatrapadpa*), presence of black bees on flowers (*Kvanitamtmadhuruvlalasum*), sounds of excited birds specially *Kokila* (*Kokilalikulalapakkollahakula*) and people found usually cheering/ enjoying outdoor environment (which were forced to stay inside houses due to low temperature) i.e. (*Goshthikathabhichitrabhirmadhyahgamyetsukhi*) shows the arrival of new life, energy and *Kala* (time). Also the earth is found gracefully covered with colored flowers and green forest look like gems on earth (*Manikutimkantishu*) an all direction are clear (*Dishovasantevimla*). This is a symbol of evolution of new life. However, *Kapha* starts liquefying during this month and *Agni* tends to decrease. *Vihara* mentioned during *Vasant Ritu* has *Panchkola Yavagu*, *Arishta*, *Sidhu* etc. which is *Pachaka* and *Agnivardhaka*. Hence, variations in

characteristics of flora and fauna during *Vasant Ritu* affect the humors of body and it tends to develop diseases. This satisfies the relation between changes in *Ritu* and diseases occurring.

It was observed that *Vasant Ritu* starts after 15<sup>th</sup> February and finishes near about 24<sup>th</sup> April. Hence, these months corresponds to *Vasant Ritu*.

### Survey on *Grishma Ritu*

Presence of all eleven characteristics selected was found prevailing during 23<sup>rd</sup> May to 3<sup>rd</sup> July 2016. These six weeks corresponds to *Grishma Ritu*. However, a period of one week presiding *Grishma Ritu* i.e. from 16<sup>th</sup> to 22<sup>nd</sup> May 2016 possesses eight characteristics (representing *Ritusandhi* between *Vasant* and *Grishma Ritu*) and another one week after *Grishma Ritu* i.e. period from 04<sup>th</sup> to 10<sup>th</sup> July 2017 possesses six characteristics (representing *Ritusandhi* between *Grishma* and *Varsha Ritu*). Temperature recorded was increasing sharply and humidity was decreasing during arrival of *Grishma Ritu*. However, during last weeks of *Grishma Ritu*, one episode of rainfall preceding *Varsha Ritu*, recorded a high rise in humidity. During *Grishma Ritu*, sun's rays appear like that of flowers of *Atasi* and are very hot (*Atasipushpanibham Tikshana Anshudarvadeepti*) and ground is found heated up (*Bhustaptah*). This heat dries up leaves, bark and creepers (*Shushkavalkala Lataankita*) and trees have no shade under them because of falling ripened leaves (*Chayaheena Mahiruha Vishirna Jirna Parnascha*). Fire breaks out in forests (*Jvalanti Bhumishcha*) and the quarters appear as though burning (*Disha Prajvalanti*). Rivers appear thin (*Saritastanvyo*) and their embankments became prominent (*Pravridhauhdso Nadya*). These all changes are due to excessive raise of temperature during *Grishma Ritu*. *Uttarayana* progresses and weakens nature and humans, takes out their energies by dehydrating them.

Months corresponding to *Grishma Ritu* observed were last quarter of May and whole June. However, some characteristics of *Grishma Ritu* starts showing up from early May and remains up to mid-July.

### Survey on *Varsha Ritu*

Presence of all fourteen characteristics selected was found prevailing during 18<sup>th</sup> July to 7<sup>th</sup> August 2016. These three weeks corresponds to *Varsha Ritu*. Twelve characteristics were found prevailing during one week preceding the above three weeks (i.e. 11<sup>th</sup> to 17<sup>th</sup> July) and three weeks after (i.e. 8<sup>th</sup> to 28<sup>th</sup> August 2016). Involving these four weeks, a total of seven weeks corresponds to *Varsha Ritu* (i.e. from 11<sup>th</sup> July to 28<sup>th</sup> August 2016). However, a

period of one week presiding *Varsha Ritu* i.e. from 04<sup>th</sup> to 10<sup>th</sup> July 2016 possesses six characteristics (representing *Ritusandhi* between *Grishma* and *Varsha Ritu*) and another one week after *Grishma Ritu* i.e. period from 29<sup>th</sup> August to 04<sup>th</sup> September 2016 possessing seven characteristics represents *Ritusandhi* between *Varsha* and *Sharad Ritu*). Temperature recorded was again decreasing sharply and humidity was found sharply increasing during arrival of *Varsha Ritu*. Rainy season brings life to weakened flora and fauna. Sky is found covered with rainy clouds obstructing sun's view (*Naatigarjanstavan Meganirudharkagraha Nabha*), all vegetation springs up (*Sarvasya Udgama*), green grass, mushrooms and *Kutaja* trees with flowers are found all around (*Parita Shyamlatatrina Silindhrakutajaujwala*), soil as well as pits in earth are often hidden due to grass grown (*Bhu Avayakta Sthalachabhra*) and landscape looks beautiful on account of abundant crops (*Bahusasya Upshobhita*). All these characteristics occur on account of rains due to this season. Continuous rains flood up the rivers full of water so much so that they uproot the trees on bank (*Nadyoambhachanookhatatadruma*), and these rains fills up ponds and flights of steps are covered with fresh water (*Didhirka Navyadhmagna Sopanapanktya*) and rivers appear like oceans (*Sarita Sagarkaraka*). Tanks are studded with full blooming *Kumudha* (water lilies) and *Neelotpala* (blue lotuses) (*Vapya profulla Kumudhaneelotalavirajitah*) due to continuous rainfall. The demarcation of land area and water area is also not clear (*Bhuravyakta Jalthala*) due to uninterrupted rainfall. However, concerning fauna, wondering around forests one can hear pleasant sounds from peacock and frogs constantly (*Mandrastanita Jimuta Shikhid Darduranadita*) and insect *Indragopa* (chochineal or –insects with bright red colored fur) found crawling on ground (*Indragopa Dhanukhandvidyutachitadeepta*)

It was observed that characteristics of *Varsha Ritu* starts appearing after 27<sup>th</sup> June and finishes near about 11<sup>th</sup> September. However, if compared to presence of all fourteen characteristics of *Varsha Ritu*, duration between 18<sup>th</sup> July and 7<sup>th</sup> August 2016 represents *Varsha Ritu*. Hence last quarter of June, whole July and almost whole month of August corresponds to *Varsha Ritu*.

### Survey on *Sharad Ritu*

Presence of all ten characteristics selected was found prevailing during 29<sup>th</sup> August to 25<sup>th</sup> September 2016. These four weeks purely corresponds to *Sharad Ritu*. Six characteristics were found prevailing during one week preceding the above four weeks (i.e. 22<sup>th</sup> to 28<sup>th</sup>

August). Eight and seven characteristics were present during two weeks after (i.e. 26<sup>th</sup> September to 9<sup>th</sup> October 2016). Involving these three weeks, a total of seven weeks corresponds to *Sharad Ritu* (i.e. from 22<sup>nd</sup> August to 9<sup>th</sup> October 2016). However, a period of one week presiding *Sharad Ritu* i.e. from 15<sup>th</sup> to 21<sup>th</sup> August 2016 possesses three characteristics (representing *Ritusandhi* between *Varsha* and *Sharad Ritu*) and another one week after *Sharad Ritu* i.e. period from 10<sup>th</sup> to 16<sup>th</sup> October 2016 possessing six characteristics represents *Ritusandhi* between *Sharad* and *Hemant Ritu*). Temperature and humidity recorded remains same with slight variations during arrival of *Sharad Ritu*. This *Ritu* marks the absence of rains. Sky is now clear of clouds (*Vayoma Shubhabhama*) and with absence of clouds, the sunrays are spreading wide and hot (*Vikshipta Tikshana Kirnoo Meghatvigamat Ravi*) also the sun rays are brownish and hot (*Babhrushma Sharada Arka*). Excessive rains stops, sky has white clouds and is clear (*Shvetabhravimalam Nabha*) and now the water of ponds etc. is clear (*Saaransi Vimalani*). Ground has dried slush, dry trees and elevation and depressions are exposed (*Pankashushkadrurnakirna Nimna-Unnatasameeshubhu*) on account of stoppage of rains. Flora during *Sharad Ritu* includes *Baana*, *Saptahavaha*, *Bandhuka*, *Kasa* and *Asana*. Also ponds are full of lotus flower and herds of swan (*Saarasyamburuarbhanti Hansansaghatita*), plants like *Kasa*, *Saptahva*, water lily (*Kumuda*), paddy, *Shali* are found during *Sharad Ritu* (*Kichittapanksaankita Mahi*). Rains are stopped and sun rays became hot. Changes in characteristics of nature around and body changes are all on account of sun rays and stopped rains.

It was observed that characteristics of *Sharad Ritu* starts appearing after 15<sup>th</sup> August and finishes near about 9<sup>th</sup> October. However if compared to presence of all ten characteristics of *Sharad Ritu*, duration between 29<sup>th</sup> August and 25<sup>th</sup> September 2016 represents *Sharad Ritu*. Hence, last half of August, whole September and first half month of October corresponds to *Sharad Ritu*.

### Survey on *Hemant Ritu*

Presence of all nine characteristics selected was found prevailing during 05<sup>th</sup> December 2016 to 08<sup>th</sup> January 2017. These five weeks purely corresponds to *Hemant Ritu* (however one week in-between is observed with seven characteristics). Seven characteristics were found prevailing during one week preceding the above five weeks (i.e. 21<sup>st</sup> to 27<sup>th</sup> November 2016) and eight characteristics during another one week (i.e. from 28<sup>th</sup> November to 04<sup>th</sup> December 2016). Whereas four characteristics were present during one week after those five weeks (i.e.

09<sup>th</sup> to 15<sup>th</sup> January 2017). Involving these three weeks, a total of eight weeks corresponds to *Hemant Ritu* (i.e. from 21<sup>nd</sup> November 2016 to 15<sup>th</sup> January 2017). However, a period of one week presiding *Hemant Ritu* i.e. from 14<sup>th</sup> to 20<sup>th</sup> November 2016 possesses five characteristics (representing *Ritusandhi* between *Sharad* and *Hemant Ritu*) and another one week after *Hemant Ritu* i.e. period from 09<sup>th</sup> to 15<sup>th</sup> January 2017 possessing four characteristics represents *Ritusandhi* between *Hemant* and *Shishira Ritu*). Temperature recorded falls sharply and humidity also falls during *Hemant Ritu*. Coldness is observed to start during this *Ritu* as sun rays do not reach earth due to hindrance by fog (*Chinastushara Svitah*) and all the quarters appears smoky with covering of thick mist, sun is also covered likewise (*Dhumadhumra Rajomana Tusharavilamandla*). However, also cold wind blows from north (*Vayurvata Uttara*) and this cold breeze from north cause horripilations (*Marutshaityat Uttaroromaharshanam*) decreases the temperature. To save themselves from such cold people spent their time residing in houses kept warm/ underground chambers. (*Angaartapa Santapagarbha Bhuveshamcharinna*). Such cold in environment cause water of wells and ponds feel warm (*Sushmanaa Kupashcha Himagame*). Sun is observed for less time in sky and thus nights grown longer and thus person feels hungry after such long night breaking the night long fast (*Dedhryan Nishanametahee- Pratareva Bubhukshitah*). Flora rich in *Lodhra*, *Priyangu*, *Punnaga*, *Lavali* are found full with blossom in *Hemant Ritu*. Absence or less seeing of sun creates such environment changes and humans should have *Vihara* accordingly to avoid those effects from change in characteristics of *Hemant Ritu*.

Months corresponding to *Hemant Ritu* observed were last half of November, whole December and first half of January. However, some characteristics of *Hemant Ritu* starts showing up from early November and remains up to last week of January.

### Discussion on Meteorological components

Temperature and humidity were observed and recorded during the month of December 2015 and during whole year-2106 up to 30<sup>th</sup> January 2017. An average daily temperature and humidity was calculated. Mean average temperature and humidity was calculated weekly in correspondence to the weeks selected for assessment of characteristics of *Ritus*.

### Temperature and Humidity

- *Shishira Ritu*: Range for Average temperature recorded lies between 15.1°C-21.1°C. Mean humidity lies between 46% to 64%.



- *Vasant Ritu*: Range for Average temperature recorded lies between 20.5°C-35.0°C. Mean humidity lies between 26.2% to 43.7%.
- *Grishma Ritu*: Range for Average temperature recorded lies between 26.6°C-37.2°C. Mean humidity lies between 30.7% to 71.1%.
- *Varsha Ritu*: Range for Average temperature recorded lies between 25.3°C-31.2°C. Mean humidity lies between 63.8% to 84.8%.
- *Sharad Ritu*: Range for Average temperature recorded lies between 23.1°C-30.7°C. Mean humidity lies between 51.8% to 73.2%.
- *Hemant Ritu*: Range for Average temperature recorded lies between 15.5°C-21.1°C. Mean humidity lies between 43.8% to 64%.

## REFERENCES

1. Kashinatha Shastri and Gorakhnatha Chaturvedi, (Vol. 1), Hindi commentary: elaborated by Charak and Drudhabala, Charak Samhita of Charak, Vimana Sthana, Chapter no. 3. Chukhambha Bharti Academy Varanasi, 2015; 10: 694.
2. Sushruta Samhita of Sushruta with Ayurveda Tatva Sandipika, hindi commentary by Dr. Ambika Dutta Shastri Purvardha (part-1), Sutra Sthana 6, Chaukhamba Sanskrit Sansthana, Varanasi, 2006; 22-36: 23.
3. Vagbhata's Ashtanga Samgraha with hindi commentary Vol. 1 by Kaviraj Atrideva Gupta, Sutra Sthana 4<sup>th</sup> chapter, Chowkhamba Krishnadas Academy, Varanasi, 2011; 41.
4. Ashtanga Hridayam of Vagbhata with Vidyotini hindi commentary by Kaviraj Atrideva Gupta, Sutra sthana 3<sup>rd</sup> chapter, Chaukhamba Prakashan, Varanasi, 2010; 32.
5. Harita Samhita text with 'Nirmala' hindi commentary, edited by Vaidya Jaymini Pandey, Pratham Sthana 4<sup>th</sup> chapter, Chaukhamba Visvabharati, Varanasi, 2010; 19.