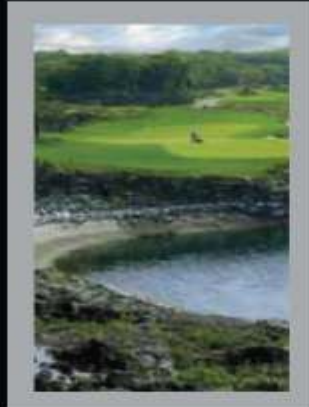
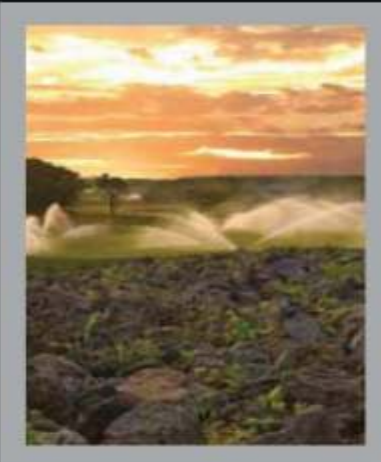


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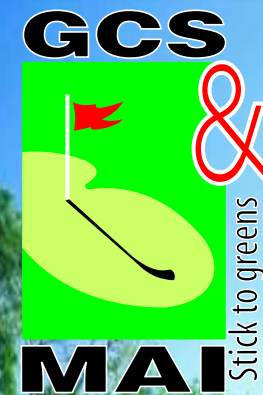
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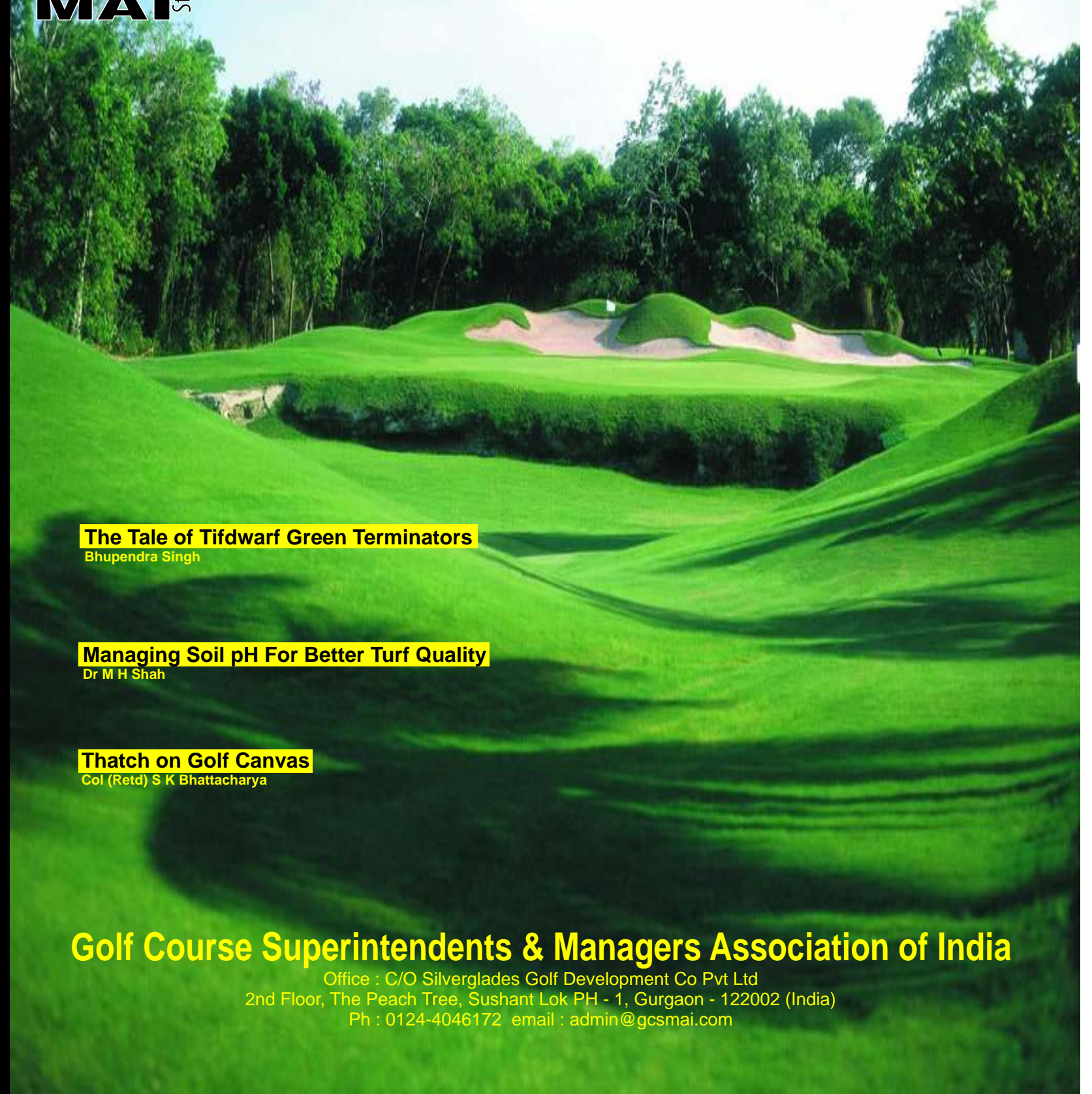
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# Stick to Greens

Apr, 2012  
Vol 18

supported by



**The Tale of Tifdwarf Green Terminators**  
Bhupendra Singh

**Managing Soil pH For Better Turf Quality**  
Dr M H Shah

**Thatch on Golf Canvas**  
Col (Retd) S K Bhattacharya

**Golf Course Superintendents & Managers Association of India**

Office : C/O Silverglades Golf Development Co Pvt Ltd  
2nd Floor, The Peach Tree, Sushant Lok PH - 1, Gurgaon - 122002 (India)  
Ph : 0124-4046172 email : [admin@gcsmai.com](mailto:admin@gcsmai.com)

## Stick to Greens

Editorial

### President

Col (Retd) S K Bhattacharya  
M:+919871222890  
admin@gcsmai.com

### Vice President

Col (Retd) Ravi Rana  
M:+919871445577  
admin@gcsmai.com

### Vice President (South)

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admin@gcsmai.com

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## FROM THE PRESIDENT'S DESK

Dear readers,

Since we had great success in the Green Keeping Seminar during AGIS 2011, certain amount of complacency appears to have set in. We must start preparing for next seminar in September, 2012.

One can't continue to live on past laurel hence I take this opportunity to share my thought process with the readers in general and GCS & MAI members in particular.

We find dearth of information from Golf courses that are useful for all involved in maintaining Golf courses. I urge all members to write to us so that we are able to collate and pass it to all.

Let us be proactive to organize a turf Seminar in the South as we find not very many people are able to attend the AGIS that is held every year in Delhi.

To this mission GCS & MAI has been able to add an important Office Bearer from the South Zone. Mr. G.S.Mani is now our Additional Vice-President, South. He is going to Organize a Green Keeping Seminar at the South may be at the Kodaikanal Golf Course.

Please wait for the final programme so that you may plan to attend the event and simultaneously enjoy the beautiful weather in that zone.

I can't avoid sharing a disturbing news about the health of Col. K.D.Bagga, our founder President. Let us all pray for his early recovery and Good health. At the moment he is being looked after well at his daughter's place at 257, Sector-37, Noida, U.P.

I personally called on him and assured him of our whole hearted support at this crucial moment.



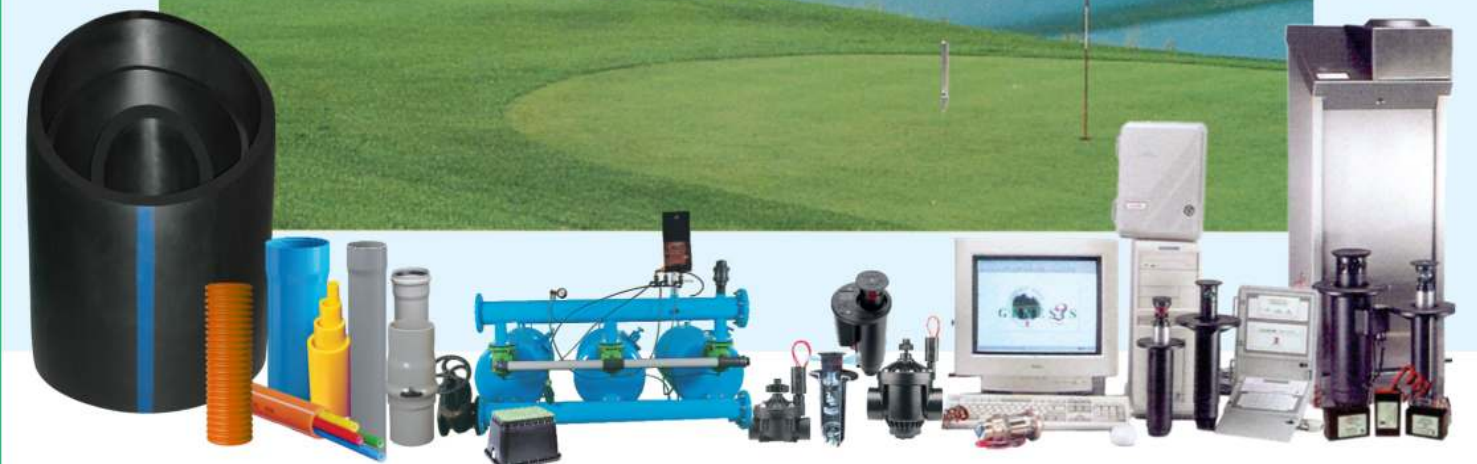
It was a delightful news of Digvijay Singh playing a flawless game to lift the Panasonic Asian tour event at Delhi Golf Club. Well done Diggi. Keep it up.

More on next issue. Happy Golfing!!!

Col (Retd) S K Bhattacharya  
President



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## THATCH ON GOLF CANVAS

**T**urf Grass its growth and appropriate maintenance is one of the most important activity that leads to the overall impression a Golf course gets its rating in terms of look, aesthetics and of course playing condition.

The Golf course may be of an outstanding design, precision construction, challenging, best quality Turf grass, best of landscape etc etc, but the quality of cultural practice shall grade a Golf course in terms of its standing among similar facilities.

The cultural practice is distinctly variable and need to be followed to make the Golf canvas stand out with laudable appreciation. Cultural practices though variable but there are few common denominators that play a crucial role for the Superintendents/Green Keepers to keep them alert all through the season.

One of this common denominator is THATCH which is a natural by-product of any vegetative life, of course in different form, shape and size.

I have honed on to THATCH as this is very much instrument in dictating the growth and health of Turf Grass.

Let's address sequentially, right from formation of thatch in turf grass, its growth pattern and effect on the health of grass. How this natural growth can be tackled to benefit a Golf canvas.

Although all areas covered with grass shall have similar situation, but we are confining ourself in Fairways and Greens.

What is Thatch and how does it grow are fundamental. Briefly Thatch is a dry natural product of Turf grass that occurs during its growth. It is the dry aerial shoot and the protective insulation of the stem that keep falling off from its body as old skin is shed to create conducive condition for better growth and health of Turf grass. Thatch also grows in volume due to inducement of nutrient and seasonal changes in micro-climatic condition.

Some variety shed faster and more frequently than its compatriots. We hear a general opinion that clipping cause thatch accumulation. Clippings are mostly made of water and carbohydrates that are easily broken down. This misconception stems from the fact that if you induce fertilizer you get more clipping therefore more Thatch. Actually along with aerial shoot growth other parts of the grass are also shedding.

Naturally Thatch falls off at the roots of grass and remains there till it is degraded or physically removed from the root zone.

Result of Thatch accumulation:-

Accumulation of Thatch creates layer which prevents movement of water, air, Sun and Nutrient into the root zone. Grass gradually become not only prone to growth of pathogen, creates home for pests but also causes root rot. Finally grass became sick, gets wilted and degeneration at the root zone takes place.

Thatch control:-

Vertical mowing or dethatching is a direct invasive approach to remove and control Thatch build up. Vertical mowing brings up copious quality of Thatch. It is though a brutal force but Thatch problem is rectified.

To remain effective throughout, vertical mowing has to be ruthless. Following de-thatching turf area looks thinner. Light vertical mowing can be done throughout the year.

Heavy de-thatching however to be done just prior to vigorous growth period. This is to avoid damage and weed invasion as the turf will remain open.

Post vertical mowing and or De-thatching we need to fertilize and irrigate after light top dressing shall heal the damaged turf faster.

In case this activity is not done, after effect may be that the damaged turf shall wilt and may start withering. In worst case turf may even die.

Suggested activity post de-thatching will eliminate this growth, pest and weed invasion.

Aerification through coring is an indirect method of de-thatching. Only coring may not act much on thatch as only small plug of thatch come up.

Top dressing with sand/soil and small quantity of lime may start process of degeneration/de-gradation of residual thatch, leading to decomposition.

We shall continue to bring it for the reader more information to share in the following issues of the GCS & MAI newsletter. We shall share vital information like low thatch can help its mother plant and soil including microbial activity. ●



### Underdevelopment of sport in developing countries

**R**esearch shows that investment into sport in developing countries is much less than in developed countries, as sport development is usually not a top priority in the national budget or in the education system of most developing countries.

Studies show that a 'vicious cycle' is emerging as a result of the underdevelopment of sport in developing countries, in which lower investment in sport decreases the potential for athletes to build their talent.

It also means that there are fewer prospects for athletes to continue their sport training or pursue professional sport careers in a developing country. In turn, the lack of talent-building opportunities in a developing country leads to less return on the little investment put into local talent, further debilitating local sport development structures and sport career pathway.

Less developed countries are unable to utilise the talent of their strong performers and/or tend to lose them to more powerful nations in global sport. Sport regulated by global processes can thus contribute to the underdevelopment of a developing country's talent. A case in point where Eastern European Countries athletes being swayed by the United States and also African Nations athletes attracted towards US and European Clubs.

'Muscle drain' has been deemed comparable to 'brain drain' – athletes from developing countries supply the industrialised countries' markets with talent.

In developing countries, players are either enrolled in official clubs linked to the national associations or they play for non-affiliated sports associations.

The ongoing Indian Premier League because of its strong economic fundamentals have been able to attract massive contributions from the corporates and the associates alike. If the standards of the games and sports in our Country has to go up we need to have a strong HR policies ably supported by the economic reforms that will create and take care of sporting infrastructure, an edifice on which games and sports could be played. The Chinese have done it, as the 2008 Olympic medal tally would suggest. Remember the old saying that the Battle of Waterloo was won in the play fields of Eton. Sports and games will remain integral path of our growth and

## CHIEF EDITOR'S NOTE

development and the game of golf and necessary related golf infrastructure shall assume special significance in years to come. Golf courses and sporting infrastructure will become integral part of the town planning.

The interest in integrating one's golf skills in business and one's business skills in golf has grown significantly in recent years. There is a reciprocal relationship.

If you can improve your productivity on the golf course, it's going to help business and likewise, if you can improve your productivity in business, it's going to help your golf game. Any career minded individual who has taken advantage of the game's business benefits can easily explain why. GCS&MAI will have a greater role to play in future.

In this issue, our President, Col Bhattacharya shares his worldly wisdom, in "Thatch on Golf Canvas". Dr Shah shares his opinion on "Managing Soil pH for Better Turf Quality" while Mr Bhupendra Singh narrates the story of "Intriguing off colours patches that appear and disappear on you putting greens" that makes I hope an interesting and an educative reading for all our readers and all those who are charged with responsibilities of maintaining and administering golf courses. We welcome as always your valuable suggestions to improve the style and substance of our issue.

Here is wishing you as always long and straight drives accurate pitching and firm putts. ●

Col (Retd) S K Sharma  
Chief Editor



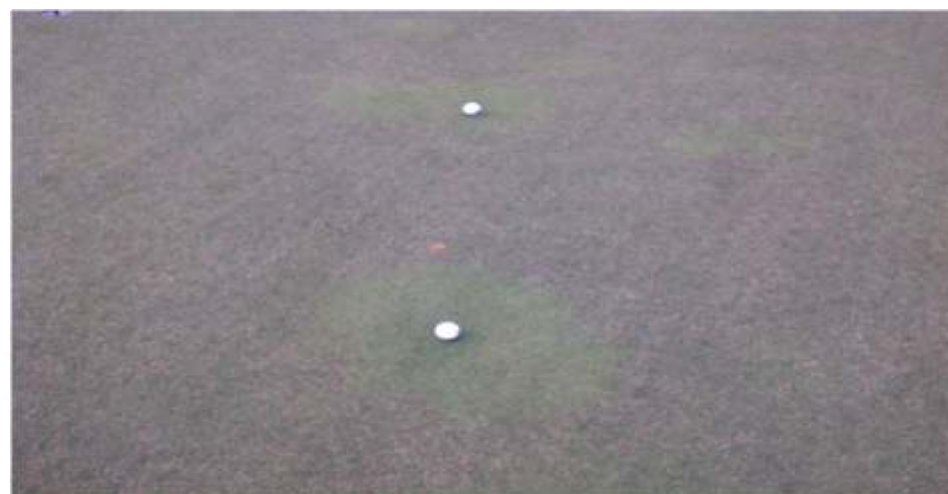
## The Tale of Tifdwarf Green Terminators: OFF-TYPES

*The story of the intriguing off coloured patches that appear and disappear on your Tifdwarf putting greens. Simplified...*

**Bhupendra Singh\***  
15 April, 2012

The golf ball had been rolling on the Tifdwarf greens since April, 1965 when it was officially released by the U.S. Department of Agriculture and the Georgia Coastal Plain Experiment Station. Tifdwarf grass was born as an 'off-type' from Tifgreen (T-328) which itself is a 27 chromosome hybrid turf grass released in 1956. Tifdwarf was first discovered by an Agronomist James B. (Monty) Moncrief as a small circular patch from a golf green of Tifgreen which was under evaluation before its release.

The very process of origin of 'Tifdwarf' that is mutation is now threatening its own dominance as a golf green grass. The identity crisis of Tifdwarf is an outcome of the tendency of Tifdwarf to mutate and produce 'off-types'. The natural propensity of Tifdwarf to produce off-types had been doubted and discussed since very beginning and now when it is accepted in general that sooner or later Tifdwarf putting surfaces get crippled with off-types the one big question that is looming large is whether Tifdwarf will succeed in sustaining its dominance and remain the choicest



putting green grass of warm climate courses? Or its off-types will turn into the terminators of its own identity in the times to come that too when the new 3G grasses has come to challenge its dominance!



Within green off-types may also spread as a result of routine hole cutting practice and infestation spreads on the whole green with the passage of time. Even cultural operations like scarifying and core aeration aggravates the infestation of off-types.

### What are off-types and from where do they come?

Let me put it in most simple terms, if you have planted an 'X' species of a turf grass hoping to get a homogenous turf cover of desired characteristics like texture, colour, appearance and growth habit etc. but in the base turf you figure out a grass plant or a patch of turf growing, which is different, then this 'different' plant is called 'off-type'. It is generally agreed that primarily off-types intrude your greens as:

- (1) Contaminant in initial planting stock of sprigs or seeds that is used for laying turf.
- (2) A drifting vegetative propagule or a stray seed of different grass settling eventually on your established putting greens
- (3) Genetic mutations.

Source: Turf grass soil fertility and chemical problems. Carron, Waddington, Rieke. The Author acknowledges the work of Kan Claney.

### CONCLUSION:

"Healthy turf can only come from healthy soil" when pH is optimized, soil chemistry is simply no longer a limiting factor in turf grass growth. Nutrients are utilized at their peak efficiently and the microbial wealth as critical to plant growth is essence. In Essence, a pH in the range of 6.5 to 7.0 creates the foundation for vigorous turf growth.

*The author is Former Director Research and Dean Faculty of Agriculture, besides a keen golfer and can be emailed on admin@gcsmai.com*

### "Do you Know that"

- The American Golf Market is worth 25 billion \$. 4 billion \$ account for golf equipment alone, 1 billion \$ account for apparel sale and green fee alone account 20 billion \$.
- Presently 26.1 million golfers enjoying golf at American Golf Courses.
- From 1980 to 2000 United States was constructing a 200 to 400 golf courses

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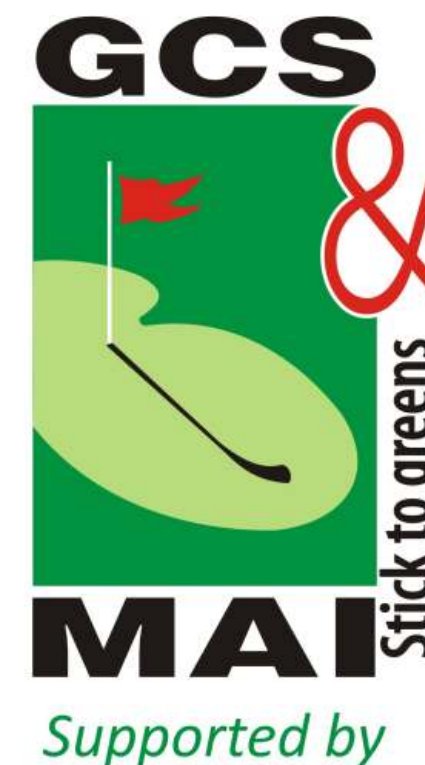
The economic history of our Country shows that it is very much capable of reforms. The liberalisation policies of 1991, brought on by the balance-of-payments crisis, are a case in point. Similarly the reforms initiated during the second phase of the NDA regime allowed for high growth during the first tenure of UPA dispensation. Besides there are, several factors in India's favour; the Country's low per capita income allows greater headroom for growth add to this India's growing middle class and large youth population and there is no doubt that Country's demographic fundamentals are favourable all that is required to catalyse the available resources are market oriented reforms that incentivise competition, bring in FDI, observe fiscal prudence and invest in critical infrastructure.....Golf courses are part of urban infrastructure.

Chief Editor

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**GCS&MAI is now supported by Jain Irrigation**



## MANAGING SOIL pH FOR BETTER TURF QUALITY

It is measure on a logarithmic scale, with each pH unit representing a ten fold change in relative acidity or alkalinity. Soil pH is driven primarily by climate, parent soil material, irrigation water quality and a lesser degree by kind and amount of fertilizer. Acid soil are amended with lime while alkaline soil with elemental sulfur.

The term Acid, Neutral and alkaline refers to the relative concentration of hydrogen ions (H<sup>+</sup>) and hydroxyl ions(OH<sup>-</sup>) in the soil solution. An Acid soil has a higher concentration of hydrogen ion than hydroxyl ions, while an alkaline soil has the reverse. A neutral soil simply means the two ions are present in off settings amount.

In order to distinguish between relative degrees of acidity or alkalinity, a pH scale from 0-14 is used. The middle of the pH scale 7.0 is neutral. Below 7.0, the soil is acidic and above 7.0, the soil is alkaline. The corresponding decrease and / or increase depict extremities. For example, a soil with a pH of 4.5 is ten times more acidic then a soil of 5.5 and 100 times more acidic then a soil with a pH of 6.5.

Analyzing soil pH is essentially a 02 step procedure. The primary test determines the pH of the soil solutions and is known as the active pH. One can look at active pH as the concentration of Hydrogen or Hydroxyl ions that are “free” in the soil system. When the active pH is below 6.8, the buffer pH is measured. The buffer pH determines the soils potential acidity by measuring the acidifying ions held on soil exchange sites and their medium term effect on pH. The buffer pH is the analytical tool used to quantify the amount of lime required to neutralize the soil.

### OPTIMUM pH

A pH of 6.5-7.0 offer the best environment for turfgrass growth because nutrients are at their greatest level of collective availability. As pH moves away from the ideal range, a number of chemicals and biological reactions occur that have a marked effect on nutrient availability and turf grass health.

As soil pH decreases, Aluminum (Al) and Manganese (Mn) become increasingly soluble. Al toxicity is the most significant growth limiting factor in soils with a pH less then 5.5. Hydrogen (H) also becomes a toxic when pH is less then 4.5. In Acids soil, phosphors (P) availability is impaired due to fixation with high levels of soluble (Al). Acids soils are usually deficient in Calcium, Potassium and Magnesium due to the dominance H and Al on soil exchange sites. Finally, acid soils tend to have very low microbe population, which inhibit nutrient conversion as well as organic matter and thatch decomposition. In short, agronomic problems in acids soils can severely inhibit turf

grass growth and health. As pH rises, Calcium becomes increasingly soluble, reacting with P and micro nutrients to form insoluble compounds. As a results, P, Iron (Fe), Mn and Zinc (Zn) Deficiencies are common in Alkaline soils. Though serious, these problems are easier to manage and not quite as deleterious to plant growth as are the problems associated with acids soils. In case of high pH induced deficiency, applications of phosphatic fertilizer often produce excellent response in turf grass growth and density.

### CORRECTIVE MEASURES

In Order to produce the healthiest turf possible, one that is able to thrive stressful maintenance regimes, acidic soil should be amended with lime. Soils primarily low in only Calcium should be limed with Calcium carbonate, while, soils low in both Calcium and Magnesium should be limed with dolomite limestone. Due to its inherent insolubility, lime must be ground into a finer powder to be effective. Prilled lime stone, which consists of finely ground lime powder in the form of a water dispersible prill, is not only effective but is also essay to apply. Though not practical on established turf, incorporating lime in the soil enhances its effectiveness. Small particles of insoluble limestone rock are essentially inert and should not be used for liming acid soils.

The amount of lime required to neutralize a soil depends on a combinations of the soils Cation Exchange Capacity (CEC) and its Hydrogen base saturation. Lime applications should always be used on soil test results and should not exceed 20 pounds per 1000 sqft, in single application. The following formula provides a rough guid line for the amount of calcium carbonate required to neutralize the top six inches of soils.

Limestone (Tons/Acre) =0.5 X (CEC X Hydrogen base saturation)

Elemental sulfur is a powerful acidifying fertilizer amendment, converting to sulfuric acid through the action of soil microbes. It's a widely available low cost method to lower soil pH. Alkaline soils that are not deprived from Calcium Carbonate parent material are the best for pH lowering elemental sulfur applications, particularly if the available irrigation water is not high in dissolved Calcium Salts.

In order to avoid leaf or crown damage, individual elemental sulfur applications should not exceed 5 ponds/ 1000sqft on fairways and 0.5 ponds/ 1000 sqft on greens.

AMOUNT OF ELEMENTAL SULFUR REQUIRED (IbsX1000sqft) to lower soil pH to approximately 6.5, based on soil type or texture.

Existing Soil pH	Sand to Sandy loam	Loam	Clay
8.5	30-50	50-60	60-70
8.0	15-25	25-35	35-50
7.5	10-15	15-20	20-25
7.0	02-05	03-06	05-10

### **The inside story: Within the cells**

The integrity of a species of plant or an animal is maintained by a set of 'chromosomes' found in the body cells which carries a specific genetic code also called 'genotype' of the species. This genotype is unique for each species and is passed from parents to the off springs of a species. The expression of the genotype in physical form is called 'phenotype' which translates into the physical attributes of the individual like in case of a grass plant the texture of leaves, inter-nodal distance, colour, responses to environment etc. So the phenotypes of all the plants of a species of a grass remain same as they carry similar genotype.

### **The twist in the tale: Mutations**

The evolution of new species occur from the existing species and of the several mechanisms that nature has at its disposal to create new species, one important tool is 'mutation'. Mutation is the phenomenon of change in the genotype of an offspring of a species. Such offsprings which have different genotypes and consequently different phenotypes than the parent plants are called mutants.

As turfgrass cells divide, spreading of genetic information to new cells increases the likelihood of species survival (Buchanan et al, 2000). For the continuity of life every species has a natural tendency to multiply and is programmed to perpetuate. Cell division is the fundamental process that makes multiplication happen in all plants including turfgrasses.

The dividing cells in the growing turf grass plants have the susceptibility to mutate maximum because during cell division the chromosome strands unwind to replicate. In such a state external agents capable of causing change in the chromosome (genes) like high energy radiations, chemicals and even heat or physical factors also called mutagens easily affect genes resulting in mutations. Putting green turf grasses are always under intensive maintenance regime. So they remain exposed to such stresses or mutagens always and consequently tend to mutate more.

### **Mutant Vs Off-type: Difference lies in reference**

All mutants in a base turf are off-types but all off-types in a base turf may not be mutants. Mutant is a plant which necessarily differs in the genotype with respect to its parents while off-types are simply different plants with respect to the base turf. In effect an off-type may be considered as a weed which by definition is an undesired plant growing out of place.

*The mutants or offtypes in a turf grass have new characters and attributes than the parent grass type which may be desirable or undesirable from the perspective of putting in golf. If the new characteristics are desirable and superior then the off-type may be selected, tested for stability and then may be used as a new turf grass variety as had happened in the case of Tifdwarf in 60s when it originated as an off-type of Tifgreen. If the off type has undesirable characters it is discarded.*

*Evolutionary importance of mutations lies in the fact that mutations result in genetic variability in the population of a species and more is the variation in the population the better are the chances of its survivability in the changing environment. Those who do not change may perish in the changing environment so every species tends to mutate naturally. This is the reason why we cannot have an ideal, absolutely stable grass type for putting greens for indefinite time.*

*I have observed over the years in northern parts of India that the off-type patches here in the Tifdwarf putting greens becomes prominent in the months of July-August after few first showers and are very susceptible to water logging probably due to which they decline after consistent heavy rains.*

*After-rain green management becomes extremely critical in such greens to retain and reclaim the declining off-type grass patches. In case of even a slightest error these declining weak patches quickly wither away leaving behind barren patches on the Tifdwarf putting greens.*

*Maintaining offtype infested Tifdwarf greens becomes extremely tricky & demanding especially in the months of incessant downpours, cloudy weather, reduced photoperiods and intermittent days of open sunshine with higher temperatures reaching up to 35° C or more characteristic to parts of northern India.*

*A keen eye on green is inevitable in such situations to avoid wet-wilt and salt injuries in case you have problem soils.*

#### **Off-types Vs Tifdwarf: How different are they?**

These mutants or off-types in a Tifdwarf green have different characters and attributes than the parent grass type owing to the different genotype. Due to this the off type patches that appear in putting greens behave differently than the base turf of Tifdwarf.

The off-types in Tifdwarf greens may differ from Tifdwarf in several attributes like:

- 1) The difference may be just in colour or appearance and it may not affect putting quality.
- 2) The off type may have more aggressive growth rate or less aggressive growth rates during the period of stress as compared to base turf.
- 3) The texture of leaves may be coarser or finer resulting in inconsistent greens.
- 4) The off-types may turn hydrophobic and become a maintenance issue.

These off-types definitely behave aggressively at least in some season or part of year that is why they are observed distinctly in certain months and remain masked in other months of the year.

#### **Green and green keepers tussle: Managing greens with off-types**

Managing greens with off types is more a tedious task requiring extra vigil, attention and efforts as compared to pure greens. Because then the superintendent is like a Jockey trying to drive a cart with a stallion and a pony hitched together with a same stick and that too without toppling.

If off-types in the putting green have not grown extensively and are identified in initial stages as few small patches then they could be removed and replaced by a hole cutter or by resodding. However if the off-types have encroached a substantial surface and manual removal is not a practical proposition then to keep the putting surface consistent an extra attention in green keeping and superior understanding of the behaviour of off-types in different seasons of the year becomes a necessity. A proper record keeping of the behaviour of different green sections in different seasons of the year may help in planning the management of such greens in more effective manner.

#### **When Tifdwarf green terminates: Time for a change**

When putting greens are severely infested with off types and it becomes impractical for a green keeper to maintain the green to a satisfactory consistency. When majority of golfers putt with a doubt in the mind and when they complain greens are not true and what they say is not a lie! And when golfers and green keeper together start believing that the patches are a problem! Then it's time to replant the greens with a pure putting green grass.

In the Board Rooms of the high end international Golf Clubs where the membership demands highest standards of putting green surfaces the arguments for changing or not changing the off-type infested green grass often keep tossing on the table. However when such a club with good financial health decides to improve the health of its greens by replanting pure grass then the next step is to choose the right method to do so.

There may be several 'quick-fix' methods available to replant your greens but all such methods have their associated drawbacks as well. The 'no-till or no-till planting' is one such easy method that could save you a lot of money but the purity may be lost soon because in this method the probability of a left out viable contaminant of previous grass does exist to some extent which may again express itself as an off-type in the long run.

#### **Should Tifdwarf be replanted again? Conclusion of Confusion**

Tifdwarf undoubtedly gave us perfect putting surfaces for long but its tendency to mutate is now well known and should be considered before making any decision. Utmost care should be taken in sourcing the true and pure Tifdwarf for planting if it is chosen again. In any case by planting Tifdwarf on greens in present time we definitely replant the risk of off-types in the long run if not in the immediate years.

There is a whole new brigade of 3rd Generation Ultradwarf grasses like Champion, Miniverde, Novotek, Tifeagle, MS Supreme, Flora dwarf etc. which have outperformed their predecessors in delivering the speeds for the delight of golfers. These grasses are promising options that may be tested for their performance in different areas. If found successful these grasses has the potential to take the putting pleasure to a different high. However stable performance of these ultradwarfs in the present time should not be interpreted as an absolute insulation of these grasses from mutation in future because one species of grass may be more stable and preferred today but the probability for a change always exists!

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*\*The author is a graduate in Agriculture Sciences from G.B.Pant University of Agriculture & Technology, Pantnagar and is presently serving as an Asstt. Golf Course Superintendent at Delhi Golf Club, India.*

For further feedback the author may be contacted at [bhupendra.golf@gmail.com](mailto:bhupendra.golf@gmail.com)

