

Grass and soil for sports turf in Thailand

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In this seminar, I explained some of the fundamental considerations for grass selection and management, and soil selection and management, to produce high quality football pitches in Thailand. One must use warm-season grasses in this climate, and of those, the three best options are bermudagrass (*Cynodon dactylon*), seashore paspalum (*Paspalum vaginatum*), and manilagrass (*Zoysia matrella*)—specifically the ‘nuwan noi’ variety of that species. Other grasses are less suitable for sports turf because they lack rhizomes, or do not withstand regular traffic. High quality pitches require a sand rootzone and subsurface drainage in this climate. At a minimum, to get a pitch that offers basic functionality, one could install subsurface drainage, apply sand topdressing until a 5 cm layer of sand is atop the soil, and put slit drainage at a 90 degree angle to the subsurface drains. Such a pitch would not be suitable for professional competition, because one can’t guarantee it will be playable immediately after heavy rains, but it would be suitable for standard fields.

The overall objectives are these, and I take them directly from FIFA’s “Manager’s Guide to Natural Grass Football Pitches.”¹

The main characteristics of the playing surface that need to be achieved are:

- Suitable gradient and free from dips and hollows
- Well drained
- Good grass cover of desirable grass species
- Firm and stable to give good playing characteristics
- Appropriate pitch markings with a good visual appearance

In the seminar, I explained my general recommendations that will achieve all those characteristics of the playing surface, with the exception of pitch markings, which I did not discuss.

Grass varieties

MANY GRASSES can be used in Thailand for football pitches, but only three species should be considered for the highest quality pitches.

Bermudagrass This is *Cynodon dactylon* or its hybrids. Although this is the standard grass for sports turf in warm-season climates around the world, I’ve never seen a bermudagrass pitch in Thailand that I would classify as high quality. Why is that? I think it is to do with

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¹ You can find this guide for download in PDF format by searching for it on Google.

the climate. Bermudagrass thrives in sunshine, it does not produce a good turf in cloudy weather or in shade, and it doesn't do well in wet soils. Bermudagrass could produce a high quality pitch in Thailand. To do that, first I'd look to use a variety such as 'Celebration,' or would select a locally developed variety that produces a dense turf in this climate. Some of the varieties developed and selected in sunnier parts of the world produce a thin and weak turf in Thailand's climate. Second, I'd make sure to use this grass on pitches or in stadiums with limited or no shade. Third, I'd be especially vigilant about managing the soil organic matter, so that the soil can be kept with plenty of air space and limited water, even during the rainy season.

Seashore paspalum This is *Paspalum vaginatum*. This grass can grow well in Thailand and does better than bermudagrass in wet soils and in shade. Of course, wet soils are not ideal for football pitches, so seashore paspalum requires careful maintenance that can provide the amount of water that the grass requires, while at the same time managing the surface to be firm and stable enough for football. Seashore paspalum is especially susceptible to fungal diseases and insects; these problems can be treated by adjusting the grass management, and with pesticides if necessary.

Manilagrass This is *Zoysia matrella*. The 'nuwan noi' variety that is found all over Thailand grows faster than other varieties of this species.² Manilagrass is resistant to traffic, although it is generally considered to have a slow recuperative ability once it is damaged from traffic. Of course, where one sees this grass showing the slow recuperative ability in Thailand, it is generally not managed—the soil is compacted, irrigation and fertilizer have not been supplied in suitable amounts. My expectation is that with management of soil compaction, and supply of fertilizer and irrigation, 'nuwan noi' manilagrass will perform as well or better than any bermudagrass or seashore paspalum in Thailand.

Tropical carpetgrass (*Axonopus compressus*) and javagrass (*Polytrias indica*) are common on lawns and in mown turf in Thailand. These grasses are less suitable for high quality football pitches because they lack rhizomes, and thus cannot recover from traffic damage as well as the three species described above. Many school or community pitches with limited maintenance have extensive amounts of *Chrysopogon aciculatus* and *Eleusine indica*; these grasses are even less desirable. *Chrysopogon aciculatus* produces a seedhead that cannot be cut by reel mowers, and the seeds stick to socks and clothing. As a bunch grass, *Eleusine indica* is difficult to manage to produce a smooth surface.

² In fact, it grows more than bermudagrass or seashore paspalum too, according to research conducted at the Thailand Institute of Scientific and Technological Research. For more about this research, see our abstract from the 2017 American Society for Horticultural Sciences conference, <https://ashs.confex.com/ashs/2017/meetingapp.cgi/Paper/27386>, or watch my presentation video about this at <https://ashs.confex.com/ashs/2017/videogateway.cgi/id/4855?recordingid=4855>.

Grass management

There are six primary things I consider when thinking of grass management.

Light If there is any shade³ on the pitch between 09:00 a.m. and 03:00 p.m. at any time of the year, then I expect there may be some problems with turf quality. To deal with shade, one can remove the source of the shade, or one can supply supplemental lighting.⁴ One can also choose a grass that performs better with low light. In this case, the best grass in Thailand will be *Zoysia*. The problem with shade is that the grass grows less. It therefore cannot withstand as much traffic, or use. Realistically, if a pitch is shaded, the amount of play on the pitch must be restricted.

Air in the soil Ideally 25% or more of the soil volume will be air space. This produces a soil in which grasses can grow well, and a surface that is firm and dry and suitable for play. This is achieved by sand topdressing, or by core or solid-tine aeration, or by verticutting, or by a combination of these and related practices. This is easier to do when the pitch is constructed with a sand rootzone. An easy test to see if there is enough air space in the soil is by checking how much water it holds; one can do this with a soil moisture meter, or one can try to squeeze water from the soil immediately after a 25 mm rainfall or irrigation. If one can squeeze water from the soil, it has too much water-holding capacity, and not enough air space.

Water For high quality pitches, one must have the ability to supply water to maintain growth.

Fertilizer The grass must be supplied with enough nutrients from fertilizer to maintain enough growth. Fields receiving regular traffic may require about 1 g N/m²/week. The requirement of other elements should be assessed by soil nutrient analysis. If soil nutrient analyses are not done, other elements can be supplied in proportion to nitrogen, although such an approach is not optimal.

Diseases, insects, and weeds Pitches grown on a sand rootzone and maintained well will have few problems with diseases, insects, and weeds. These pests can be prevented or managed on a site specific basis.

Mowing Turf will typically be mown to a height of 20 to 35 mm; it is essential that the turf is cut with sharp mower blades. The health of the grass, the visual appearance of the pitch, and the playability of the pitch, are all enhanced by sharp mowers, and damaged by

³ This could be shade caused by buildings, the stadium structure, trees, or mountains.

⁴ A particular problem with supplemental lighting is the quantity of light supplied by the lighting systems available today. My understanding is that the typical lighting systems supply, when run continuously for 24 hours, about as much light as the turf would receive from 2 hours of midday sun. For warm-season turf, the light requirements are such that typical supplemental lighting doesn't supply what I consider to be meaningful amounts of light. LED lighting systems promise to be much better, although I have not seen LED systems that cover large areas.

dull or maladjusted mowers. Turf for high performance pitches will be growing rapidly, and it must be mown frequently. High quality pitches in Thailand probably need to be mown a minimum of three times per week. The general guideline of cutting no more than 33% of the leaf blade off at any mowing event should be followed.

Soil

High quality pitches in Thailand need to be constructed with subdrainage and a sand rootzone. This will be similar to a typical golf course putting green construction.⁵

If a sand rootzone cannot be constructed, then an alternative is to apply sand topdressing until a 5 cm layer has been established above the existing soil. Subsurface drainage must be installed. It will be helpful to put slit drainage at 90 degree angles to the subsurface drainage.⁶ I don't recommend this for pitches with professional football, but for school or community pitches, such an approach could be a big improvement over the current conditions.

Basic requirements

For high quality football pitches in Thailand, these are some minimum requirements:

- Drainage
- 5 cm sand layer
- Mow 3x per week
- Ability to supply irrigation
- Sprayer for use as necessary in weed, insect, and disease management
- 6 week break at end of season for field renovation and regrowth
- Resod areas as necessary

I've mentioned a 6 week break at the end of the season for renovation and regrowth. I take this directly from the FIFA guide to natural grass pitches, and I reproduce the paragraph on **Renovation** here:

At the end of the playing season, it is essential that a period is set aside to renovate the pitch. This will typically include aeration to relieve compaction, scarification, sand dressing to improve levels and dilute organic matter and accumulated finer materials in the surface layer,

⁵ You may have read some articles, or heard some seminars, by me, in which I suggest that sand rootzones are not required, and in fact are not desirable, for golf course fairways and rough. Golf courses are not flat; there is surface drainage. On sports fields, the surface is flat. And the area is small compared to golf course fairways or rough. Sand rootzones then become almost a necessity for sports fields; they are terribly overused and mismanaged on golf courses.

⁶ See the Spartan Cap sand-cap build up systems description at <http://msue.anr.msu.edu/uploads/236/68678/Sand-Cap-Athletic-Fields.pdf> for more details of this approach.

fertiliser application, and localised seeding, sprigging or returfing to produce a strong, healthy grass cover. Normally a six-to-ten week break is required to produce a good-quality surface for the start of the next playing season and it is important that all usage is suspended over this period.

There must be sufficient time given to allow the grass to grow, and to allow maintenance work to be done, or pitch quality will deteriorate. In Thailand conditions, this can be at the end of the season, or it can be divided into multiple short breaks (1 week rest, 5 weeks use, or variations of such a plan). The key is to recognize that the pitch must be managed to deal with the use, and time must be allocated for that work and for the grass recovery from such work.

Ideal requirements

For the best pitches in Thailand, here are some requirements:

- All things listed as basic requirements, and ...
- 30 cm sand rootzone
- Irrigation system
- Use growth regulators⁷
- 10 week break for renovation and repair
- Mowing more than 3x per week
- More frequent aeration and verticutting

⁷ This might sound counterintuitive, but use of plant growth regulators such as trinexapac-ethyl on sports turf can enhance the traffic tolerance (and the pitch quality).