

A close-up photograph of a gravel lawn in autumn. The grass is a mix of green and yellow, with some blades appearing dry and brittle. The gravel is visible through the sparse grass.

Gravel lawn in fall 2012

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Question and Answers The Gravel Lawn

by Anna Thurmayr

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What is a gravel lawn?
The expression 'gravel lawn' is not actually a contradiction in terms— although it might at first glance seem so. It describes a specific type of lawn constructed on gravel, which provides water permeability and supports vehicular traffic. These properties make gravel lawn most suitable for temporary parking areas, fire lanes or infrequently used roads. As an alternative to asphalt or concrete the technology of gravel lawn is not only economically interesting, but also ecologically sound. However, one must know that this specific type of lawn cannot handle heavy

loads daily. Grasses and herbs do not survive when they are permanently shaded or without rainwater, especially if they are parked on by vehicles. However, if one wants to drive over a lawn from time to time without damaging it or if one wants to prevent gravel being washed away, a gravel lawn is a viable option.

How is it constructed?

The construction of a gravel lawn is simple, and common practice in Europe. It is made out of 80% natural gravel or crushed recycling material, as is used for any road construction, and 20 % compost and soil. Aggregates and soil have to be mixed,

applied in a layer one foot thick, then compacted and levelled with a maximum inclination of 5% by a roller before sowing. In the case of fire lanes or heavy loads, an additional base layer of gravel is recommended, which serves as frost protection, as well as a supporting layer.

What is the ecological value?

In contrast to asphalt or concrete, the gravel lawn allows up to 80% of rainwater to seep away. Its advantage lies not only in its higher load-bearing capacity compared to regular turf, but also in its increased infiltration abilities with regard to precipitation in comparison with hard surfaces. The water is stored in the layered structure, absorbed by plants, and released after a time lag. Applying water-permeable ground-covers counteracts the effect of land sealing and reduces pressure on the sewage and water systems. Also, a primary concern in urban settings is its positive effect on the microclimate. Furthermore, any unsealed surface is a potential habitat for soil organisms, plants, insects and animals.

What are the costs?

Gravel lawn is half the price of asphalt. It is easily available and common construction materials are used.

Does it exist in the Prairies?

In rural Manitoba, driveways made out of gravel will frequently turn 'green' by accident. Chances are high

that people will look at a gravel lawn picture and spontaneously shout out, "Oh! I know that from my cottage!" Beside this natural and incidental formation the construction of gravel lawn has been tested at The University of Manitoba's Alternative Village in Winnipeg since 2010. Plant coverage of 80 % was achieved in the first year after construction. Since then cars have been parking twice a week on the test plots. Otherwise, observation within Manitoba indicates that alternative surface consolidations are not currently being incorporated into landscape design.

Does it work with the cold Prairie climate?

The existence of the natural green gravel roads in Manitoba serves as the first piece of evidence that a gravel lawn can exist in the province. It also provides the proof that it can withstand the cold prairie climate. However, special attention needs to

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be paid to the low permeability of the clay-rich soil that is the common sub-grade in Manitoba and its environs. Infiltrating runoff may freeze below the pavement, causing frost heave. To reduce this risk and to support drainage an additional 20 cm (8 in.) sub-layer made out of gravel has been incorporated into the Gravel Lawn Project at The University of Manitoba's Alternative Village. Also, the inclination of top layer, base and subgrade has been synchronized in order to direct runoff to adjacent swales. Snow clearing in the winter months is another thing that needs to be taken into account. The test field at The University of Manitoba has not required a winter service so far. But throughout European alpine regions it is known that the shield of the snow-plough has to be kept 5–10 cm (2–4 in.) above ground in order to avoid

damage to the plant cover. Road salt and de-icing products must be avoided because of the deleterious effect to plants, but sand or grit can be applied in appropriate amounts.

Which aggregates can be applied?

At The University of Manitoba limestone 3/4" down was tested versus crushed concrete 3/4" down. Both materials were mixed with 20% compost and soil. In the limestone area the vegetation has survived without irrigation since 2011. Soil tests confirmed a pH of around 10 for the applied concrete mixture. This high pH makes growing almost impossible. Based on these data crushed concrete mixtures make sense where natural plant growth should be precluded. Other locally available base material has not yet been tested.

How to compact?

It is very important to know that the compaction is conducted without vibration, for example by a roller compactor. The successful order is: compacting first and then sowing. Tests at The University of Manitoba confirmed that sowing carried out before compaction did not lead to the desired result.

What to seed?

Selection criteria for The University of Manitoba's seed mixture were: drought resistance, wear tolerance, low growth, and registration for sale in Canada/Winnipeg. The mixture

Testing limestone versus crushed concrete



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was composed of perennial ryegrass (*Lolium perenne*), tall fescue (*Festuca arundinaceae*), creeping red fescue (*Festuca rubra*), sheep's fescue (*Festuca ovina* var. *ovina*), Brooklawn Kentucky bluegrass (*Poa pratensis* "Brooklawn"), and Kentucky bluegrass 98/95 (*Poa pratensis*). The seeding was done by hand at a rate of 1g seeds per square foot. Dominant grass species one year after construction were tall fescue (*Festuca arundinaceae*) with a covering of 80 %.

Just to give it a try, native salt grass (*Distichlis spicata*) was transplanted into the area of the crushed concrete mixture in 2011. Seeds are not available on the open market for this species. Native salt grass has a high salinity and alkaline tolerance. Minimal growth relative to potential has been observed. The wonder is that this grass species is surviving on crushed concrete.

In Europe herbs and legume seeds are part of standard gravel lawn seed mixtures that are widely available. Flowers attract attention through their particular aesthetic appearance. Therefore, an important next step would be to investigate existing native vegetation communities that could potentially be suited to a life on a gravel lot with limited moisture, high summer and low winter temperatures, high winds, seasonal and long-term drought cycles, and limited depth for root systems. It makes sense to look into the short grass or fescue prairie



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Sowing before and after roller compaction

and more specifically, the sand hill districts of Western Manitoba. The plants surviving there have adaptive strategies for dealing with intensive radiation due to the openness of the meadows and also for succeeding in extreme soil conditions.

How to maintain?

During the first three months after construction, the lawn should not be used in order to ensure good root formation and powerful growth right from the start. Within this time period regular irrigation is crucial for the success of the 'green-scape'. Thereafter, maintenance depends on the intensity of usage. In general it is recommended that the gravel be mowed twice or three times a year. Low-growing seed mixtures that suit local conditions make an essential contribution to the maintenance effort and costs. For example, at The University of Manitoba irrigation was only done in 2010, while mowing was only done only once in 2011.

Who has been involved in this research?

The gravel lawn project in Manitoba was undertaken by landscape architect Prof. Anna Thurmayr, in collaboration with engineer Dr. Kris Dick, both from the University of Manitoba. The Landscape Architecture Canada Foundation (LACF) approved 'seed' funding of \$2,500 CAD in 2010 and 2011. Additional material contributions were provided by several companies (Reimer Soils, Rocky Road and Brett Young) and professional advice or technical /voluntary assistance by Chris Penner, Prof. Dietmar Straub, Dr. Douglas Cattani, Farhoud Dalijani, Kathy Fedirchuk, Jeremy Pinkos, Shawn Wiebe, Devin Segal and Vincent Hosein.

What is the future of gravel lawn technology in the Prairies?

The gravel lawn trial at The University of Manitoba's Alternative Village can be seen as a prototype of

a Prairie-wide construction method. The private sector could pick up on the technique and to an even greater extent, so could communities or public institutions. For example, churches, sport facilities or community centres as well as recreational areas of Provincial or National Parks could benefit from 'grassy' overflow parking lots. It would even be worthwhile considering its incorporation into the bus parking area at the new football stadium in Winnipeg. A standard gravel lawn seed mixture based on indigenous species would boost the adoption of gravel lawns.

Further research and funding are needed so that many of the low-use parking lots in cities and towns on the prairies can become little meadows instead of concrete. 🍀

Gravel lawn in summer 2011

