

## DANDELIONS – SCRIPT

### Picture 01 – Opening Screen.



Is there a plant in this world more maligned than the dandelion? This most common "weed" is native to Eurasia, but it is now naturalized to many other continents including North America.

Each spring, people declare war on dandelions, but the so-called weeds have an advantage, because they easily tolerate a wide range of soil and climate conditions and offer an important food source for essential insects.

### Picture 02 – “Dent de Lion”



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It wasn't until recently that the dandelion was declared an enemy. Until the 20th century, when manicured lawns became the norm, dandelions were just another plant in the landscape, not something to eradicate.

Despite the war on dandelions will probably never truly be won because weeds by their very nature tend to be difficult to tame. As a newspaper columnist once wrote, **"A weed is a plant that has mastered every survival skill except for learning how to grow in rows."**

### Picture 03 - How the Dandelion saved Norway.



German submarines devastated the Norwegian merchant marine, and, thus cut off from the maritime trade that had sustained it for centuries, the country descended into a period known as ‘dyrtiden’ — literally, “the expensive time.”

On 13<sup>th</sup> January 1918, a new rationing system came into effect. It limited the purchase and consumption of sugar, coffee, grain, and flour. For Norwegians, who even today subsist in great part on bread and coffee, the situation was dire.

Enter the dandelion. **Taraxacum officinale** grows abundantly and enthusiastically here, and with enough time and tenacity you could use it to supplement your official rations.

One roadblock to dandelion consumption was mental. Newspapers of the time described dandelions as excellent food for pigs and “one of the best things that one can offer to rabbits,” which were easy to raise and recommended as an additional source of protein if only one could feed them for free.

To admit that the situation had grown so desperate that one was reduced to eating livestock feed must have smarted. The dandelion’s reputation as a hard-to-kill weed also contributed to the prevailing negative attitude towards the plant.

#### **Picture 04 – Dandelion Coffee.**



The introduction of ration cards seems to have spurred people to reevaluate their prejudices.

While ads for dandelion coffee had appeared as early as 1917, the substance only really took off when rationing forced people to seek alternatives to real coffee.

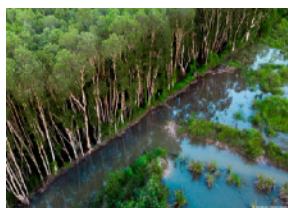
Aftenposten, one of Oslo’s most respected newspapers, published an article about the “helping hand” extended by “this fiendish weed” just a week after rationing began. It included a taste test: “It has a slightly different taste, a sweet aftertaste, but it’s not unpleasant”

Dandelion coffee cost half the price of real coffee and was not subject to rationing, so you could drink as much of it as you desired (though cream became so scarce that it became necessary to either drink it black or use ersatz cream made from milk, eggs, sugar, and potato flour).

While dandelions served their purpose during the war, they were abandoned as soon as real coffee, flour, and sugar became readily available again.

Dandelion coffee made a brief comeback during World War II; as a flour substitute, however, it was superseded by fish flour made from dried cod.

#### **Picture 05 – After the First World War.**



In 1931, Soviet scientists were on the hunt for a natural source of rubber that would help the USSR become self-sufficient in key materials.

They scoured the vast and various territories of the Soviet Union and tested over 1,000 different species looking for an alternative to the South

American rubber tree, *Hevea brasiliensi*. Eventually, on the ‘steppes’ of Kazakhstan, they found one.

Once the war was over and supplies returned to normal, these countries — including, ultimately, the Soviets — switched back to *Hevea* tree rubber because it was cheaper.

By 1941, the Russian dandelion, *Taraxacum koksaghyz*, supplied 30% of the USSR's rubber.

### **Picture 06 – Synthetic Rubber production.**



When the Japanese cut off most of the world’s supply of natural rubber, and by 1942 controlled some 90% of the world's natural rubber production with the United States using about 50% of this production.

The United States Forest Service and the Bureau of Plant Industry initiated an emergency rubber project to explore the potential of growing rubber within the continental United States.

There’s an old saying that necessity is the mother of invention. At every turn Americans seemed to need more of everything—more supplies, bigger bombs, faster airplanes, better medical treatments, and more precise communications.

In response, scientists, technicians, and inventors supplied a steady stream of new products that helped make victory possible.

Many of these innovations transformed the very nature of warfare for future generations and also had a significant impact on the lives of civilians as well.

Some of the new inventions helped the United States find the strategic goods necessary for fighting the war. Rubber, for example, was a vital material that was needed in enormous quantities.

### **Picture 07 – Dandelion**



A single military airplane could use a half ton of rubber. Tanks used a ton and battleships used 75 tons. Even forces personnel used 32 pounds of rubber all associated with some form of their equipment and you could rightly assume that an army without access to natural or synthetic rubber was unlikely to be victorious.

### **Picture 08 – Henry T. Chamberlain.**



## **An American prisoner of war's story.**

“We were picking dandelions on the lawn there and we would boil them up,” Henry T. Chamberlain remembered from the Great Depression.

With little money, he learned from his neighbours about survival. After watching others rooting around in the lawn, the young man learned that dandelion flowers were free food.

In addition to boiling them, “sometimes we went over to a park where the dandelions were prolific and we would pick the dandelions and wash them off and eat them green,” Chamberlain said.

On his 18th birthday, in 1940, he enlisted in the army, Chamberlain said he wanted to help people and trained first as a medic, then later as a surgical technician.

By December 1941, Japanese planes bombed points in Manila and Chamberlain found himself on the front lines of Bataan serving as a combat medic.

Chamberlain stayed at the hospital after American and Filipino forces surrendered on Bataan on April 9, bearing witness to horrors that took a grisly toll on the Filipino and American troops.

Under Japanese control, Chamberlain found himself at Cabanatuan Prison Number 1 assigned as a medic in a hut adjacent to the camp hospital known as the Z, or “Zero” Ward.

Here prisoners too weak to stand were sent to die. Without any medicines to treat the ill, often sheer kindness and willpower became the deciding factor between life and death.

In the prisons there was no medicine to treat the sick, and the ill prisoners were missing key nutrients.

Recalling the situation over 75 years later, Chamberlain observed how “there was a whole profusion of dandelions, so I told the guys ‘let the things blossom and we’ll pick the seeds, and don’t pull them up, just pull the leaves off them and eat them that way.’”

## Picture 09 – Henry T. Chamberlain in 2017.



In October 1944, the Imperial Japanese Army shipped Chamberlain and approximately 1,100 prisoners out of the Philippines to work as forced labourers.

Before leaving Cabanatuan, Chamberlain made sure his dandelions came with him.

After labouring in Formosa (present-day Taiwan), Chamberlain arrived in Moji, Japan, in January 1945 and was moved to Hosokura to a lead and zinc mine owned by the Mitsubishi Mining Corporation.

At Hosokura, Chamberlain served as a medic for his fellow prisoners in Sendai #3-B Prisoner of War Camp.

Chamberlain worked with one doctor to take care of all the 284 American and British prisoners. “Taking care of them didn’t mean much because we were not given any medicine, we were given very little food.

Relief for the Hosokura prisoners arrived on September 12, 1945, when American forces reached the camp and accepted the surrender of the Japanese guards.

## Picture 10 – UVM Experiments with Rubber Plants.



This is one of three photos of a local World War II Victory Garden taken by Burlington photographer L. L. McAllister that show a group of women in a field.

The photos immediately led to questions. Where were the photos taken? Who were the women in uniform? Why were they working in what looked like a field of planted dandelions?

The Experiment Station worked on projects to help the war effort. One of those projects was a study of the potential yield of seed and rubber from a Russian dandelion, *Taraxacum-kok-saghyz*.

## Picture 11 – A full grown plant.



In this photo, a UVM agronomist displays a full-grown dandelion plant—including roots—with a label that reads, “*Taraxacum-kok-saghyz*/Russian Rubber-Bearing Plants, 65 Days From Planting.”

Under the direction of agronomists Paul Miller and H. L. Smith,

one acre of the Russian dandelion seed was planted at the UVM Farm, then located off East Avenue in Burlington.

### **Picture 12 – Burlington Unit of the Volunteer Drivers.**



Mrs. Gerald E. Prescott, the leader of the Burlington unit of the Volunteer Drivers Corp, and platoon leaders Mrs. Esther I. Adler, Miss Barbara Mitchell, and Mrs. Thomas Loudon directed the weeding.

In August 1943, the Burlington Free Press reported that almost a ton of roots were harvested and sent to a research laboratory in Philadelphia for analysis.

Unfortunately, the analysis revealed that the Burlington harvest contained mostly rogue dandelions that yielded little or no rubber.

### **Picture 13 – Fields of Dandelions.**



Apollo was part of the EU-funded DRIVE4EU consortium, a project that ran from 2014 to 2018 and worked on developing the entire production chain for dandelion rubber, starting with cultivation.

"We cultivated the dandelion in Belgium, the Netherlands and Kazakhstan," said Ingrid van der Meer, coordinator of DRIVE4EU, adding that other researchers had previously cultivated the crop in Sweden, Germany and the United States.

### **Picture 14 – The Rubber produced ...**



Once the dandelions are harvested "hot-water extraction" is used to separate out the rubber.

"The roots are chopped up mechanically and water is added," van der Meer explained. "It has to be heated up, but no large volumes of chemicals are needed.

This is in contrast to Hevea rubber extraction, which requires the use of organic solvents, resulting in chemical waste that poses an environmental hazard if not disposed of properly.

When a passenger jet touches down, the rubber that cushions the landing comes from trees grown in Asia.



This is the same rubber found at the business end of your car tyres and in thousands of other products because natural rubber from trees is still far superior to synthetic rubber in how it absorbs energy and bounces back.

However, the EU currently imports all of its natural rubber and there are concerns that the trees in Southeast Asia, which accounts for more than 90 % of our supply, can be vulnerable to diseases.

One of the answers is for Europe to grow its own rubber, not as trees, but as flowers that are a familiar sight along roadsides – **dandelions.**

**Picture 15 ... Thank you for listening.**