

⊕ **A student's sample analytical report**

**Analysis to determine the best stove
for long-distance ultralight backpacking**

By

Jason Varney

For

**Devin Wood
ENG215-01**

Eastern Maine Community College

10 May 2005

117 Essex Street
Bangor, ME 04401

10 May 2005

Ms. Devin Wood
Eastern Maine Community College
354 Hogan Road
Bangor, ME 04401

Dear Ms. Wood:

Here is the purchase report you asked for that analyzes the best camping stove for ultralight backpacking. My recommendation is to purchase a Trangia Mini, Model 28, from Campmor Online for \$28.00.

I based this recommendation on the fact that the Trangia is extremely reliable, uses a readily available fuel source, and weighs considerably less than its competitors. The other two stoves evaluated were either too heavy or too inefficient to be seriously considered.

In the course of my research I was unable to locate much information on the MSR Superfly, simply because it's new on the market and little is known about it. I also couldn't find customer satisfaction information about the Trangia Model 28, so I used the information related to the Model 27, which is a similar type of stove.

I would especially like to thank Arthur Webber for his help in compiling my data. His knowledge of long-distance backpacking and his exhaustive supply of catalogs and magazines helped simplify my research.

If you have any questions or concerns regarding this research, please feel free to contact me in class.

Sincerely,

Jason Varney

Jason Varney

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Abstract

Long-distance backpacking has been my favorite hobby for the past ten years. During that time I have begun to try to reduce my pack weight as much as possible. The purpose of this report is to reduce my ultralight backpack weight while retaining the highest possible level of cooking efficiency. Two stoves that I'm particularly interested in are the Trangia Mini and the MSR Superfly. The Superfly, however, is so new that I had trouble finding information about boil times, fuel consumption, reliability or customer satisfaction. To address this deficiency, I've included a third stove, the Optimus Svea Climber, in my comparison. The information in this report is comprised of Internet data, interviews with experts, and various outdoor magazines and catalogs.

The Trangia Mini is an alcohol stove noted for its light weight and durability. The Svea Climber is a white gas burner with a reputation for reliability, but it's apparently difficult to light without an additional priming pump. The Superfly is a flexible canister stove with super fast boil times.

The Optimus Svea Climber at 19 ounces dry weight is too heavy to compete with the other two stoves. Once you throw in a priming pump (4 oz.) and a set of cookware (another pound), you have a full-blown cooking system too heavy for ultralight use.

The Trangia uses alcohol, including rubbing alcohol, which makes it especially easy to find fuel in a pinch. It might be good to know how easy it is to locate the recommended denatured alcohol. The Climber burns white gas, which is readily available. The Superfly fits on almost any brand of isopropane/isobutane or blended fuel canister, making it more likely that I would be able to find replacements.

Boiling times varied greatly. Backpacker magazine says that the Superfly boils twice as fast as the Climber. In my own test I found that the Climber came to a boil (5 min.) almost two minutes faster than the Mini (7 min.). The boil times in my test were 25% faster than Backpacker's times, which should suggest that the Superfly would boil in two minutes! However, because the Superfly is so new I couldn't find anyone who owned one that I could test.

The Trangia Mini burns roughly 23 quarts of boiled water per 16-ounce bottle of alcohol. The Climber burns on high at a rate of approximately one ounce per 21 minutes. That translates to roughly 70 quarts of boiled water per 16-ounce bottle of fuel. The Superfly burns on high at a rate of approximately one ounce per seven minutes. That translates to roughly 37 quarts, or nearly twice as many quarts per 16 ounces of fuel as the Mini but only half that of the Climber.

The Mini is a single-piece brass unit with no moving parts and nothing to break. There is nothing to go wrong in the field and no need to carry extra parts. The Climber has rubber 'O' rings and machined valves that can wear out. A replacement kit is recommended, and field maintenance appears to be a real but rare possibility. Because the Superfly is so new, no reliability information was forthcoming on it.

Both the Mini and the Climber had their supporters. I could find no one who would say anything bad about the Mini. Those who used it tended to appreciate its silent operation, its simplicity of operation, and the ready availability of fuel. The Climber gathered numerous complaints about being balky when cold, with a tendency to flare up, and difficulty lighting without an aftermarket pump. The Superfly had problems with cold weather efficiency and wind flutter, but its single biggest drawback is that the fuel canisters it uses are non-reusable.

Considering the stove's limited efficiency this seems doubly wasteful.

The Mini costs half what the Superfly costs, and less than half what the Climber costs.

Based on this analysis, I would recommend purchasing the Trangia Mini, Model 28, from Campmor Online for \$28.00.

SAMPLE

Introduction

Background

Long-distance backpacking has been my favorite hobby for the past ten years. In that time I've become obsessed with reducing the amount of weight I carry on my back. When I first began hiking, I carried an average pack weight around forty pounds, not including food, which averages an extra two pounds per day. Over time I've gotten my pack weight down to less than twenty pounds, not including food, and with a few more modifications to my gear I can get even lighter. One thing I need to do is to find a replacement for the stove I carry, which is an old Coleman Peak 1 that weighs over two pounds all by itself. There are several stoves out there that weigh only a few ounces. Three that I'm particularly interested in are the Trangia Mini, the Optimus Svea Climber, and the MSR Superfly. All have been recommended to me by other hikers.

Purpose

The purpose of this report is to find a stove that will allow me to reduce my ultralight backpack weight while retaining the highest possible level of cooking efficiency.

Scope

I have limited my research to the following three stoves: the Trangia Mini, the Optimus Svea Climber, and the MSR Superfly.

I will consider the following questions in my quest for the perfect stove:

1. What are each stove's basic features?
2. What is the dry weight of each stove?
3. What are the fuel requirements of each stove?
4. What are the boiling times for each stove?
5. What is the rate of fuel consumption for each stove?
6. How reliable is each stove?
7. How satisfied are others with each stove?
8. What is the price for each stove?

Limitations

The MSR Superfly is so new that I couldn't locate anyone who owns one, so I was unable to do a hands-on test for boil times or fuel consumption. Also, because the stove is new I could find no data concerning reliability and customer satisfaction.

Procedures

- April 9** I called a friend of mine in Massachusetts, Arthur Webber, who is an Appalachian Trail thru hiker, and asked him his opinion about which stoves would be best to research. We discussed features, weight and fuel consumption.
- April 12** Called a friend in Massachusetts who hiked the Appalachian Trail. He gave me ideas about the best stoves to consider, regarding weight and reliability.
- April 15** Spoke to a sales representative at Cadillac Mountain Sports in Bangor, who gave me a lot of good information about the three stoves I chose to research, including features, boil times, fuel requirements, and prices.
- April 17** Went to the Bangor Public Library and looked through current issues of Backpacker magazine for tests on the three stoves I chose to research. Found some information about customer satisfaction and reliability.
- Browsed the Internet for sites related to the three stoves, looking for information about each stove's features and customer satisfaction.
- April 20** Found information about pricing and features for all three stoves in a Campmor outdoor equipment catalog.
- April 22** Found several sites online with information about every aspect of the stoves, including features, weights, fuel needs, and customer satisfaction.
- April 24** Found more information online about others' opinions about the stoves.
- Located another article in Backpacker about field testing the MSR Superfly.

Collected Data

Basic features

Trangia Mini

At only four ounces this all-brass alcohol-burning stove's primary features are its light weight and durability. The stove comes equipped with a simmer lid, a wind screen, and a removable pot handle, all of which pack easily into its accompanying 0.8 liter aluminum pot with tight fitting lid (Coombs).

Optimus Svea Climber

This self cleaning, all-brass white gas stove is a venerable old-timer that hasn't changed in over thirty years. It comes equipped with a built-in six-ounce fuel canister, wind screen, stainless steel valve key, and twelve ounce aluminum cup with detachable handle. A primer pump may be purchased for an additional \$15.00, which dramatically simplifies an otherwise temperamental lighting procedure (Marks).

MSR Superfly

The MSR Superfly system features Multi-Mount technology. It's the only butane stove that fits almost all self-sealing butane canisters, including MSR IsoPro. The Superfly is an ultra-light 4.5 ounces, offers a fast sub-3 minute boil time, and offers exceptional flame stability, staying lit even in extreme wind ("MSR Superfly" ...stoves).

Dry weight

Trangia Mini

This weight includes: Burner **11.5 oz.**
Pot and lid and removable handle 4.0 oz. 7.5 oz. ("Model 28")

Optimus Svea Climber

This weight includes: Stove **23 oz.** 19 oz.
Priming pump 4 oz.
("Stoves" Campmor 111)

Although the priming pump is not considered a necessity, it pays for its weight by making it much easier to light the stove. "With the pump, lighting is a simple process; without it, it's a mess" (Morrel).

MSR Superfly

4 oz. ("Stoves" Backpacker 184)
A piezoelectric starter attachment is available at an additional 3 oz. ("MSR Superfly" ...new). According to April Backpacker the auto-starter worked intermittently (Lanza).

Fuel requirements

Trangia Mini

Alcohol (70 - 90%)

Denatured alcohol, found at most hardware stores, works best. Common rubbing alcohol is a weak but workable alternative. Hi-power rums are good but expensive (Kuenstler).

Optimus Svea Climber

White gas (brand name Coleman fuel) (Marks)

MSR Superfly

Blended fuel

Butane

Isobutane

Isopropane ("Stoves" Backpacker 184)

Boiling time

For one quart of room temperature water at sea level at full burn.

Note: The first time represents boiling times according to Backpacker Magazine; the second time is based upon personal observation.

Trangia Mini

12:00 minutes (189)

7:00 minutes

Optimus Svea Climber

6:00 minutes (184)

5:00 minutes

MSR Superfly

3:00 minutes (183)

See Limitations

Fuel consumption

For one quart of room temperature water at sea level at full burn.

Note The first time represents fuel consumption according to Backpacker Magazine; the second figure is based upon personal observation.

Trangia Mini

30 minutes for 3 ounces of fuel (Coombs)

26 minutes for 3 ounces of fuel

Optimus Svea Climber

75 minutes for 4 ounces of fuel (Leavitt)

84 minutes for 4 ounces of fuel

MSR Superfly

53 minutes for 8 ounces of fuel (Kuenstler)

See Limitations

Reliability

Trangia Mini

The stove is a one-piece brass unit with no moving parts. There's nothing to break, so it should last forever (Webber).

Optimus Svea Climber

Known for its long-lasting service, the Svea Climber has been around virtually unchanged for thirty years. Robert Morrel has used his every season for fifteen years without a problem.

Rubber 'O' rings and machined valves might need periodic replacement. A kit is sold separately for this (Graeber).

MSR Superfly

See Limitations.

Customer satisfaction

Trangia Mini

Sixteen reviewers at Outdoor Reviews.com rated the Model 25 (not the Mini) 4.59 out of a possible 5 (“Outdoor”).

Optimus Svea Climber

According to four reviewers listed in epinions.com, the Climber got an overall rating of 3.5 stars out of five, and a quality rating of 4.5 stars (“Members opinions on Optimus”).

MSR Superfly

“[T]he Superfly performs much like similar stoves that mount atop canisters. Convenience is its calling card.... [T]he stove boils water about as fast as I can tear open my oatmeal packets.... But like most stoves of this type, the Superfly’s flame flutters in a breeze... The Superfly also has the usual canister-stove shortcoming: diminished output in temperatures near or below freezing” (Lanza 113).

The thing to remember when using any canister stove is that none of the canisters on the market today are either reusable or recyclable (Kuentler).

See Limitations.

Price

Trangia Mini

Backpacker Gear Guide 2000

Campmor

Cadillac Mountain Sports

\$30.00 (189)

\$28.00 (“Stoves” 111) Not available

Optimus Svea Climber

Backpacker Gear Guide 2000

Campmor

Cadillac Mountain Sports

\$70.00(184)

\$65.99(“Stoves” 109) Not available

MSR Superfly

Backpacker Gear Guide 2000

Campmor

Cadillac Mountain Sports

\$50.00(184)

Not available

\$54.95 (Kuentler)

Conclusion

Interpretation

The Trangia Mini is an alcohol stove that is noted for its light weight and durability. The Svea Climber is a white gas burner with a reputation for reliability, but it's apparently difficult to light without an additional priming pump. The Superfly is a canister stove with super fast boil times. I like the Superfly here simply because it seems modern and easy to use.

The Optimus Svea Climber at 19 ounces dry weight is too heavy to compete with the other two stoves. Once you throw in a priming pump (4 oz.) and a set of cookware (another pound), you have a full-blown cooking system too heavy for ultralight use. In the end, the Climber's reputation for reliability just can't overcome its weight. The Mini and Superfly stoves weigh within a few grams of each other.

The Trangia uses alcohol, including rubbing alcohol, which makes it especially easy to find fuel in a pinch. It might be good to know how easy it is to locate the recommended denatured alcohol. The Climber burns white gas, which is readily available. The Superfly fits on almost any brand of isopropane/isobutane or blended fuel canister, making it more likely that you could find replacements.

Boiling times varied greatly. Backpacker magazine says that the Superfly boils twice as fast as the Climber. In my own test I found that the Climber came to a boil (5 min.) almost two minutes faster than the Mini (7 min.). The boil times in my test were 25% faster than Backpacker's times, which should suggest that the Superfly would boil in two minutes! However, because the Superfly is so new I couldn't find anyone who owned one that I could test. At any rate, by any measurement, if you're in a hurry, pick the Superfly.

The Trangia Mini burns on high at a rate of approximately one ounce per ten minutes. That translates to roughly 23 quarts of boiled water per 16-ounce bottle of alcohol.

$$16 \text{ oz. fuel} \times 10 \text{ minutes} = 160 \text{ minutes}$$
$$160 \text{ minutes} / 7 \text{ minutes boil time} = 22.8 \text{ quarts}$$

The Climber burns on high at a rate of approximately one ounce per 21 minutes. That translates to roughly 70 quarts of boiled water per 16-ounce bottle of fuel.

$$16 \text{ oz. fuel} \times 21 \text{ minutes} = 336 \text{ minutes}$$
$$336 \text{ minutes} / 5 \text{ minutes} = 67.2 \text{ quarts}$$

The Superfly burns on high at a rate of approximately one ounce per seven minutes. That translates to roughly 37 quarts, or nearly twice as many quarts per 16 ounces of fuel as the Mini.

$$16 \text{ oz. fuel} \times 7 \text{ minutes} = 112 \text{ minutes}$$
$$112 \text{ minutes} / 3 \text{ minutes boil time} = 37.1 \text{ quarts}$$

Based on this formula, the Climber is by far the most efficient stove. On an extended trip where gas would have to be carried in, the efficiency of the Climber might overcome its dry weight.

The Mini is a single-piece brass unit with no moving parts and nothing to break. There is nothing to go wrong in the field and no need to carry extra parts. The Climber has rubber 'O' rings and machined valves that can wear out. A replacement kit is recommended, and field maintenance appears to be a real but rare possibility. Because the Superfly is so new, no reliability information was forthcoming on it. Under the circumstances, the Trangia wins the reliability game.

Both the Mini and the Climber had their supporters. I could find no one who would say anything bad about the Mini. Those who used it tended to appreciate its silent operation, its simplicity of operation, and the ready availability of fuel. The Climber gathered numerous complaints about being balky when cold, with a tendency to flare up, and difficulty lighting without an aftermarket pump. The Superfly had problems with cold weather efficiency and wind flutter, but its single biggest drawback is that the fuel canisters it uses are non-reusable. Considering the stove's limited efficiency this seems doubly wasteful. Based on this analysis, I would have to say the Mini garnered the highest praise of the three stoves.

The Mini costs half what the Superfly costs, and less than half what the Climber costs.

Recommendation

Based on this analysis, I would recommend purchasing the Trangia Mini, Model 28, from Campmor Online for \$28.00.

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