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QRP Antenna Showdown

What's the best antenna to use with your QRP rig?

More often than not, when you hear someone ask this question, they are looking for answers more in line with those for a query like, "Which antenna is going to give me the biggest signal, or the most contacts?" That is, they are talking strictly performance.

How any antenna performs is a very important characteristic, without which there would be no wireless communications. However, if we can set aside an antenna's performance ability for a moment and give consideration to a couple of other important characteristics, the question stands a better chance of being answered correctly.

All too often the individual asking the question has not given thought about two other very important considerations for portable use; the intended "use" for the antenna and a familiarity with what's "available." Once the user understands and becomes familiar with these two issues, then performance can be given its deserving consideration as a determinate in deciding which antenna is best.

I have been told that religion, sex, and antenna "stuff" can be taboo discussion items. However, after having heard so many QRP hams ask this very question regarding best antenna selection, I feel the need to run the risk of being involved in such a taboo discussion. Note that I don't plan to include cost and ultimately "real value" into this discussion. The variables involved with real value are so numerous that this would be an article all its own!

It is not my intention to dwell into the performance aspects of these antennas either. The myriad of details is mind-boggling. There have been antenna shootouts conducted under controlled testing conditions that better provide results comparing one antenna to another.

Even more important than performance, the first step to finding the best antenna for your needs is to identify where and how you want to use your QRP rig the majority of your on-air time. For example, you might decide that ultimate mobile performance can be obtained by mounting a three-element beam on a 10-foot pole attached to the rear bumper of a minivan. Performance should be very good, but aside from looking silly and being expensive, it's unsafe and might not even be road-legal! Yet, there are several low profile antennas that are better suited for mobile, providing practicality over ultimate gain.

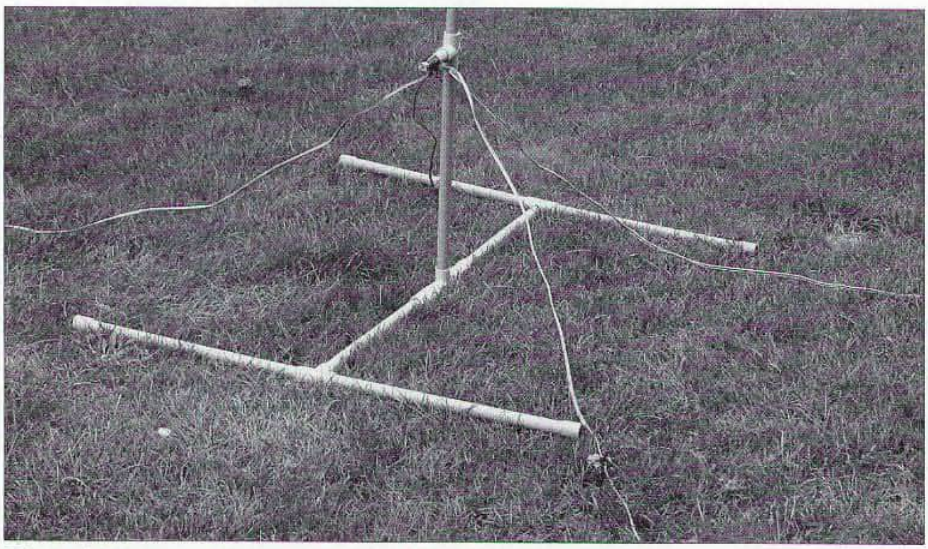

Photo A. *Mounting base standard with the Minute Man 20.*

Or, if you're a hiker, a long wire antenna gets a little clumsy, if not impossible, on those mountain trails. Again, not a good choice for the specific application, in this example a pedestrian portable use. Thus the need to determine where and how (usage) the flea-powered rig will spend most of its "ON" time is the first consideration that needs addressing.

Another example of the importance of identifying usage lies with the simple rubber duck antenna. Consider this fact: There is no better antenna than the rubber duck type attached to a handheld rig while walking around a hamfest. Here you don't want directivity, don't need gain, and don't want anything protruding up into your sides when you're bent over picking up a prized goody. The right antenna for the right job!

Moving right along, let's first examine the basic groupings of the ways your rig can be pressed into service, and then examine what supports each.

Group 1: Pedestrian/fixed portable operation such as hiking, public service volunteering, and fixed such as sitting up on top of a mountain peak.

Group 2: Mobile operation such as in an auto, motorcycle, bike, boat, airplane, etc.

Group 3: Fixed station (home) use of the base station antenna.

Hams, the versatile lot we are, will likely try all three groups. However, after the experimenting is done, most will usually settle on one or the other. Within that one category, most operators will drill down even further, settling on one or two sublevels of the group.

For me, my FT-817 spends most of its time in Group 1 (fixed portable) and sometimes Group 3 (home). Thus, I have appropriate antennas that offer me the best performance within the limits imposed by the constraints within these two groups. Within the boundaries of my Group 3 hamming, I am restricted by my XYL, not restrictive covenants or CCRs!

I've listed some characteristics that I have found KEY for each of the 3 groupings. See if you agree and/or can add or change those characteristics that are more meaningful for your specific application.

PEDESTRIAN/FIXED PORTABLE. For hiking: reduced size, light weight, attaches directly to the radio, minimize the use of interconnecting coax, no radials (regardless of the improved performance); consider monobanders. For fixed portable operation at the family's beach cabana or on a mountaintop: some gain and directivity could be useful and easy to handle; any required rotation of an antenna should be the "Armstrong" rotation method; antenna, pole, and accessories should be easily assembled/disassembled and packed; may consider a reduced size and/or lightweight antenna if climbing is part of the trek to the operating site.

MOBILE OPERATION. The key nonperformance criteria here are physical characteristics such as wind loading and mounting methodology. Wind loading is a mechanical metric that you'll usually see offered by the manufacturers on larger, permanent installations, and hardly ever provided for the typical QRP/portable genre of antennas. However, you don't really need to be a mechanical or structural engineer to figure out if your antenna choices could stand up to whatever the fastest speed you'll be traveling is. Size as well as geometry of the elements must also be considered for mobile applications. A horizontally rigid dipole cut for 20 meters, regardless of how durable it is and how well it is welded to a motorcycle's frame, is probably not the best choice of this application!

FIXED STATION (HOME). A fixed base station QRP antenna installation usage does not have many of the same physical property limitations as the portable and mobile application does. However, depending upon city, state, and federal regulatory laws, the antenna choices may not be any easier than the above two. In my experience living in homes that had restrictive covenants (CCRs), I almost always had to go about practicing my hobby in somewhat of a clandestine fashion. At one such house I decided to run my coax line to the mobile antenna on my parked car in the driveway, and use

Photo B. *Center insulator and position adjustment knobs for the Buddipole.*

small magnetic loops on portable tripods. Longwire antennas made from very-small-gage wire, tapping into the metal gutter system, or the concealed vertical within a fiberglass flagpole can all be made to work very well. Regardless, you'll need to keep size, weight, and the ability to be stealthy in mind before you settle on your antenna choice. Further information on dealing with CCRs can be found in the FCC's PRB-1 bill at [www.arrl.org].

Should you be one of those who lives where there are no restrictive covenants, then you're limited only by "best practices" techniques. Lucky you!!

What's available

QRP operation is not new. However, today it is credited for getting many hams back on the air. It is *so* popular that numerous manufacturers have begun marketing QRP-specific rigs coupled with a full array of accessories. My last (unofficial) count revealed that over 25 different antennas were being marketed as specialized QRP/portable antennas.

Almost weekly, new antenna products are appearing in magazine ads. Keeping up with all that's available is difficult and expensive. Over the past couple of years, I have acquired six commercially made portable/QRP antennas. As a way to assist in categorizing usage to decide what works best for your application, I've developed a table comparing my antennas. Within reason, you'll find that these six antennas fall somewhere within one of the three groupings above and represent a good cross-section of today's QRP/portable antenna offerings. A lot of time has been spent assembling, disassembling, transporting, testing, evaluating, and developing my personal opinion as to where these six antennas fit.

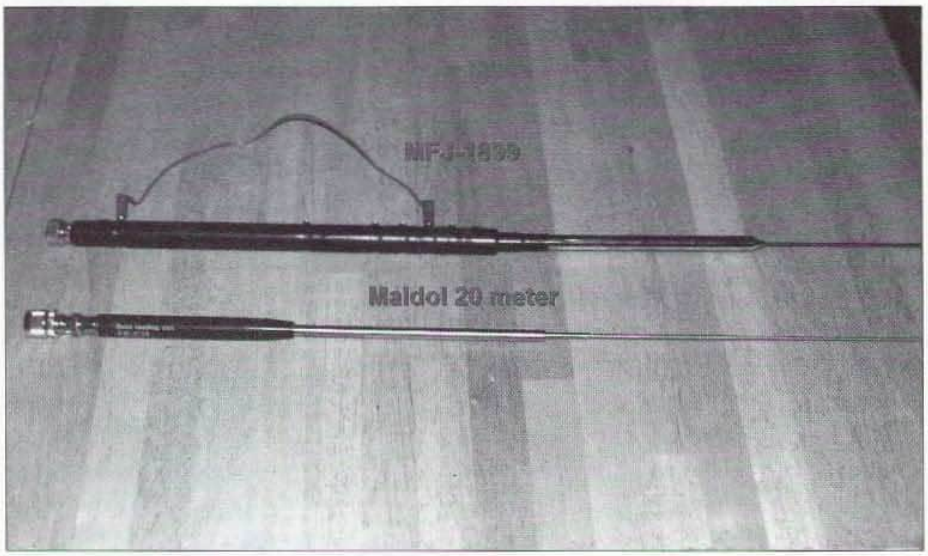

Photo C. *The MFJ-1899 (ATX) and Maldol monobander antennas.*

In your judgment I may be off base, and that's OK. It's like taboo subjects: There definitely are no two opinions exactly alike. There are many good antennas on the market in addition to the six I listed here. The object here is the same when making the comparisons.

The chart I use lists 10 categories, each exhibiting a numeric score from 1 to 3 with 3 being EXCELLENT, and 2 and 1 being OK and WEAK, respectively. The scoring is very subjective and opinionated. The values you see are those I placed on the antennas, my call. You can accept my values or alter them as you see appropriate. The end results should fit your needs and usage, other than performance as discussed earlier in the article. Addressing the usage within the categories is what's important. The rationale I used for scoring is as follows:

Frequency coverage: More points are given to those antennas that are multi-banded. If my specific applications were for a single band only, I would reverse this scoring.

Size, assembled, and disassembled: Smaller is important.

Ease of setup and teardown, including initial tuning and band changing: I don't want to spend a lot of time putting together the antenna, having to read a lengthy instruction manual, and having to pretune or trim parts of the antenna. (I don't do well at Christmastime assembling the kids' toys either!)

Portability when assembled: Specifically, can I easily walk around with the antenna attached to the rig if I want to use the radio while hiking?

Self-supporting/standing: If I decide to operate when stationary, will I need to provide some sort of pole and stand or wire guys to hold the antenna?

Quality of construction: Material selection, workmanship, appearance, all lead to product longevity. The repetitive process of assembling and disassembling the antenna is going to be the litmus test for durability.

Wrapping up

Nothing is cast in concrete, that's for sure. If you add up all the data points on my chart for each antenna, you will notice that the Miracle Whip scored a perfect 30 points! You may or may not agree that the Miracle is excellent in all 10 nonperformance categories, but don't forget, a 5 watt, 50 ohm resistive dummy load would exhibit all the favorable nonperformance characteristics I've identified and scored excellent in the same categories.

Now it is up to you to insert a value, or better yet a multiplier, for performance. Performance data can be obtained from your very own experience or from organized efforts such as the HFpack [www.hfpack.com] group antenna shootout results. If all else fails, you could use the manufacturers' published performance specifications. If you do, make sure that all results are in the same unit of measure, dBs or dBi, etc.

I did not include the way I chose to factor performance but when I was done, the results can be seen by the order the antennas are listed in the chart. That is, for my particular QRP usage, the Buddipole and the Miracle Whip are the best antennas in this lot for my applications, all things being considered.

The idea of looking at and evaluating other antenna characteristics in addition to performance will prepare you for the process of selecting the best antenna for your usage. A QRP/portable antenna's purpose is to get you operating on the air in places where a larger antenna is not practical or feasible. Couple that with the challenge of QRP — that being to operate with low power, not with poorly chosen equipment — and you'll surely understand why all the characteristics of equipment selection must be given proper consideration. Performance and application, together, will yield the best antenna for any QRP/portable activity.

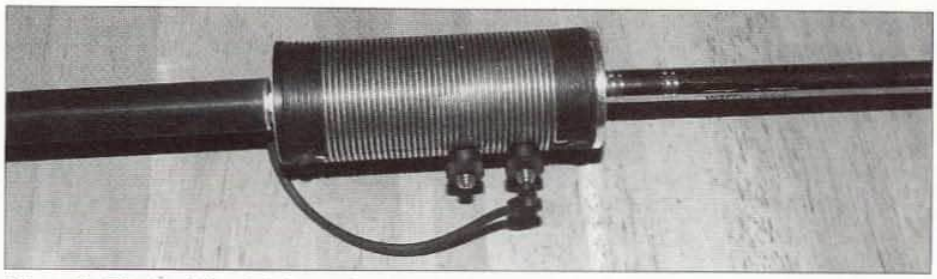

Photo D. *The Buddipole's large loading coil.*

Best of the tests

Individual highlights for each antenna used in this article are:

The Buddipole demonstrated super construction and excellent material selection, all pointing to expected durability in the field. This antenna uses stainless whips instead of the lower-cost, less durable aluminum, a nice complement of brass-threaded fittings and epoxy composite arms add to a beautifully designed antenna. Configuration versatility is an understatement with the Buddipole. The user can adjust the arms to make a horizontal dipole, centerfed vertical dipole, J-pole, "V" and inverted "V", etc., etc. A light-duty travel case comes with the antenna for transporting around. A standard of quality for all to strive for.

The Miracle Whip offered the widest frequency coverage. The small size of the MW made it a natural for throwing in my briefcase before leaving on a business trip. The designers chose top-notch materials, and used excellent workmanship skills when assembling this antenna. I found that the MW offered excellent performance when used as a short-wave receiving antenna, covering all the HF and VHF ham bands. The fact that you can also transmit on all the same bands was a plus. Note that for transmitting you really need a counterpoise.

The MFJ Super Loop was absolutely

Continued on page 58

Antenna Model	Contact	Freq Coverage	Size		Construction Quality	Ease of			Portability Assembled	Self-Supporting	Performance Merit (0–10, 10 highest)
			Assembled	Disassembled		Set-up	Tear-down	Band Change			
Buddipole	530-226-8446	3	2	3	3	2	3	2	2	0	10
Miracle Whip	866-311-6511	3	3	3	3	3	3	3	3	3	4
MM-20	www.qsradio.com	2	2	3	1	3	3	2	1	3	10
ATX/MFJ	662-323-6551	3	3	3	2	3	3	3	3	3	6
MFJ Loop	662-323-6551	2	1	1	3	2	2	1	2	1	8
Maldol	www.cometantenna.com	3	3	3	3	3	3	Monobander	3	3	2
52Ω resistor	—	3	3	3	3	3	3	3	3	1	0
Key: 3 = Excellent; 2 = OK; 1 = Weak											

Table 1. *Characteristics of six QRP/portable antennas.*

continued from page 13

the quietest antenna of the bunch. Eliminating the noise floor allows weak signals to almost jump right out at you, giving the illusion of some sort of gain factor. The super loop is somewhat fragile; a sharp jolt can break the capacitor's rotor away from its stator assembly. I know, it happened to me. Although not very portable, this antenna works well on travel trailers and cabin installations.

As with the Miracle Whip, the ATX/MFJ 1899 also provides wide frequency coverage. The multiple loading coil taps allow for very fast frequency changes in the field anywhere from 80 meters up through the UHF bands.

The MM-20 was the only antenna that included a built-in mount making it self-supporting. The MM-20 is not much of a shortened antenna, as it is a full 1/4 wavelength vertical on several bands and on others it requires very little use of the loading coil. If needed, the large, 2-inch high-Q coil needs only to be tapped a couple of turns to

obtain resonance. Three sets of full-size tuned radials for each band are provided with the antenna.

The Maldol monobander antenna is the simplest, smallest, and least frilled of all the antennas I used. Several have experimented using two of these as a rotatable dipole, with some real success. 73