Evaluation of long distance casting performance – a comparison between three fly line prototypes and a commercially available long belly floating line #5

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Abstract

Long distance fly casting has improved remarkably over the last decades. A major contributor to this progress is the development of fly lines. One direction of fly line development involves the so called long tapers, which are useful for both discreet presentations of the fly as well as for long distance casting. Due to the development of new casting techniques and the light fast modern fly rods it seems reasonable to believe that there are prospects for further development of long taper fly lines.

The objective of this study was to compare long distance casting performance of three novel prototype lines produced by RIO, USA, and a commercially available long taper line Mastery Extreme Distance from Scientific Anglers ™, USA, which is considered "the best on the market" by many long distance casters.

Six experienced fly casters, of which two were master certified caster instructors, competed in a long distance casting competition using the four lines. During the competition, each caster had two minutes of casting with each line and the longest cast for each caster and line was recorded.

The result revealed no significant difference in casting distance between the lines. However, the four longest casts were performed with the new prototypes by the master certified caster instructors.

The conclusion of the study is that there are small (or no) differences between the casting performance of the various lines. (At least no significant differences that could be detected in the small group of casters included in the present study.) There is, however, a tendency towards an advantage for the new prototypes when casted by the most experienced long distance casters. That is, casters who use the most extreme casting techniques, involving longer line carry and faster and later line haul and rod rotation, compared to less skilled casters.

Background

The improvements in long distances casting with fly fishing equipment have been rapid over the last 10-20 years. This improvement is due to increased knowledge about the physics of fly casting, development of more efficient casting techniques and technical development of the equipment. Models of the dynamics of fly casting can be found in previous papers by Spolek [1], Lingard [2], Robson [3], and Gatti-Bono and Perkins [4-6], and ongoing discussions on the development of fly fishing and casting techniques are continuously updated on the internet, e.g., [7].

The development of the fly rod manufacturing has led to light and fast (stiff) rods. These modern rods allow the caster to insert a high line speed, and thereby a large amount of movement energy into the fly line, and to control the line to travel in straight directions. Along with the fly rod development, the development of fly lines has been a key factor for the improvements in casting distance. Roughly, the development of fly lines for distance casting has taken two different directions. One direction involves short tapers, so called shooting heads, which commonly are combined with very thin shooting lines characterised by a minimal friction. This design allows for long casts without carrying long line during false casting before the delivery cast. Shooting heads are commonly used in large waters like the sea and in big rivers or lakes, when fishing with large flies, e.g. streamers. They have, however, been found less useful when the need for delicate presentation is a major factor, e.g. when fishing with small dry flies. The other direction of fly line development involves long tapers, e.g. long belly lines and double tapers. These line designs allow for a larger variation regarding the use of type and size of the fly as well as fishing short and long distances with discreet presentations of the fly.

Opposite to the shooting head design, the long tapers require long line carrying during false casting before the delivery cast in order to get proficient weight, and thereby movement energy, into the line when performing long distance casts. The new techniques used for long distance casting with long taper lines includes, apart from carrying long line, the use of late (and fast) line hauling combined with a late rotation of the rod during the back- and forward cast phases in order to maximise line speed.

The modern fast rod designs and the long line carrying casting technique make the design of the fly line highly important to maximise casting distance. For example should the taper be adequately long to allow for carrying as long line as possible with as high speed as possible before delivery and the running line section should contribute with as small amount of resistance (friction) as possible. Also, the air resistance should be small to minimise loss of movement energy during the backward, forward and delivery phases of the cast.

One of the most commonly used long taper fly lines designed for the fast modern fly rods and new casting techniques is the Mastery Extreme Distance (MED) fly line made by Scientific Anglers ^{TM}, USA. It seems reasonable to believe that new material, new production techniques and improved knowledge about fly casting physics would allow for further development of long taper fly lines. Lines that are specifically designed for the modern fly rods and casting techniques. The purpose of this study is to evaluate the long distance casting performance of a set of new fly line prototypes. This was done by comparing the new prototypes with each other and a golden standard fly line, the MED fly line from SA.

Aim

The aim of the study was to compare maximum casting distance between four different long belly floating lines with AFTM class 5.

Method

Subjects

Six experienced male fly casters where included in the subject group, with age ranging from 23 to 40 years old and years of fly fishing experience ranging from 10 to 30 years. Two of the casters where Master Certified Casting Instructors (MCCI) for the Federation of Fly Fishers (FFF).

Equipment and procedure

Four different floating lines, all class 5 weight according to the AFTM system, where used in a so called "shootout", i.e., a distance casting competition. Three fly line prototypes, here referred to as V6, V7 and V8, from the company RIO, USA and a golden standard reference line, the Mastery Extreme Distance (MED) (Scientific Anglers ^{TM}, USA), were included. Two fly rods (TCX 590 and TCR 590, Sage, USA) where used to allow for simultaneous fly casting by two casters using different lines. Two lines (V6 and V7) where casted with TCX 590, while the other two lines (V8 and MED) where casted with the TCR 590. Each subject was allowed 2 minutes of casting with each line. The task was to cast as far as possible using the long line carry double haul technique. The longest cast with each line was recorded for each caster. A few casts with each line was allowed prior to the two minutes of testing in order to familiarise with the line.

Environment

The shootout was performed on an outdoor football field (grass) between 17.00 and 18.00 in the afternoon in early autumn (6 September), in Piteå, Northern Sweden. Air pressure was 1005 hPa. Air moisture was 95%. There was a slight wind from the back and short periods of slight rain during the shootout. The shootout was a finishing event after a two day casting course held by the two MCCI casters included in the study.

Statistics

Descriptive statistics including mean values and standard deviations (SD) were calculated for each line and for each subgroup of caster, i.e. MCCIs and non-certified casters. SPSS 15.0 for windows was used for significance analysis. Analysis of Variance (ANOVA) (or its non-parametric equivalents Kruskal-Wallis and Mann-Whitney U test) was used for analysis of casting length differences between the lines and between MCCIs and non-certified casters. Differences were considered significant if $p<0.05$.

Results

Each caster performed a minimum of 4 and a maximum of 6 maximum distance cast trials with each line.

The four longest casts where performed with the new prototype lines (V6, V7 and V8) by the MCCIs, se figure 1. For the whole group (n=6), the mean values (and SD) of the maximum distance casts for each line were 31.9 (2.8), 31.9 (2.1), 31.3 (2.5) and 31.7 (1.7) meters (m) for the V6, V7, V8 and MED, respectively. The mean (and SD) values for the MCCI casters only (n=2) were 34.5 (0.9), 34.1 (2.1), 33.3 (1.1) and 31.8 (0.04) m for the V6, V7, V8 and MED, respectively. No significant difference was seen between the lines for the whole group, nor

were there any significant differences detected when the results from the certified and non-certified casters were analysed separately ($p>0.05$).

Mean distance (and SD) for the four fly lines where 30.8 (0.456) m for the non-certified and 33.4 (0.645) m for the MCCIs. Statistical analysis using Mann-Whitney U test revealed that MCCIs made significantly longer casts compared with non-certified casters ($p=0.002$).

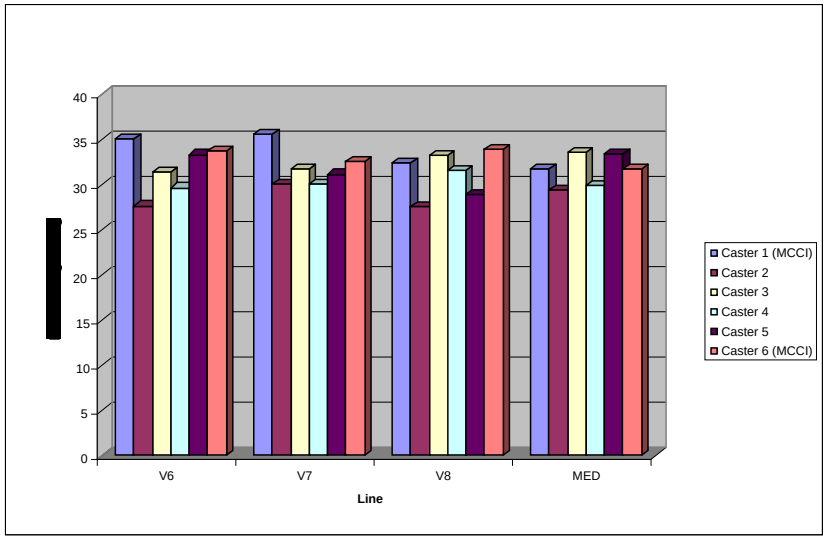

Figure 1. Maximum casting distance for each of the four fly lines and for each of the six casters. V6-V8 are prototype lines, MED (Mastery Extreme Distance) is commercially available and included as a golden standard reference line. MCCI: Master Certified Casting Instructor.

Discussion

Main findings

The aim of this study was to compare maximum casting distance for three new prototype lines and a commercially available golden standard line, the MED, using a group of six experienced fly casters. The results revealed no significant difference between the lines, conversely, the mean values for the different lines were conspicuously similar for the whole group, ranging from 31.3 m (V8) to 31.9 m (V6 and V7). For the MCCI only, however, the difference was larger (but not significant) with mean values ranging between 34.5 m (V6) and 31.8 m (MED). The four longest casts (of which two where > 35 m, (V6 and V7)) where performed with the prototype lines by one of the MCCI casters.

MCCI vs non-certified casters

The MCCI casters made significantly longer casts compared to non-certified casters, which was expected. Although no significant difference was found between the lines, an interesting finding is that the prototype lines tended to perform better than the MED line for the MCCI casters, but not for the non-certified casters. A possible explanation is that the prototype lines are better designed for the more extreme casting techniques used by the MCCIs. Such as extremely long line carry and late and fast hauling combined with late and fast rotation of the rod. Also, interesting, but puzzling, is that the two longest casts with the MED line was done by non-certified casters. Both MCCIs have used the MED line and its predecessors as a standard line for the last 10-15 years of fishing and therefore this result can not be attributed

to unfamiliarity with the line among the MCCIs. Possibly, this was a random effect, but it also indicates that two of the non-certified casters are highly skilled with a MED line.

Limitations
Some important limitations of the study need to be high lighted. The small group size (six casters and only two in the subgroup of certified casting instructors) reduces the power of the study, i.e., reduces the chance to detect actual differences. Two rods where used which means that two of the lines were tested with the same rod while the other two lines were tested with another, but similar, rod. Variation in rod performance may therefore have influenced the results. The subjects where not blinded to (unaware of) which line that was used in each trial. The circumstances for the shootout were not optimal. Casters where tired after two days of previous fly casting. Also, the weather conditions included high humidity (95 %) and occasionally there was a slight rain.

Future investigation
Only the maximum distance was measured for each caster on the separate fly lines. Other variables that would increase the knowledge about the performance of the various lines include mean or median values and variability in distance (i.e. standard deviations) for each caster and fly line. Also maximum line carrying would be informative since this is an important variable in long distance casting with long tapers.

Conclusions
The results indicate that there are small (or no) differences in maximum casting length performance between the lines. However, this result may be biased by the small group of casters. When taking casting experience into account there seems to be a possible advantage for the new prototypes which were accounted for the four longest casts, all by the MCCI casters. This implies that although there was no significant difference in casting lengths between the lines, the new prototypes may contribute to longer casting distances for the most skilled casters. More answers could be revealed from an extended study including a larger group of casters. Also, calculation of complementary variables, e.g., maximum line carrying length during false casting, would contribute with valuable information.

References

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